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## नव अन्वेषित महापाषाणिक पुरास्थल सिपकोना : खारुन नदी घाटी के विशेष संदर्भ में

## नितेश कुमार मिश्र / ढालसिंह देवांगन / प्रवीन कुमार मिश्र / भाग्यश्री दीवान

भारत के हृदय स्थल में स्थित छत्तीसगढ़ राज्य का प्राचीन इतिहास कई ऐतिहासिक परिवर्तनों का साक्षी रहा है। यह क्षेत्र नदियों, पहाड़ियों, पठारों एवं संघन वनों से आच्छादित है अत: प्राकृतिक रुप से यह मानव के निवास के लिए उपयुक्त रहा है किन्तु सर्वोत्तम आश्रय स्थल के रुप में सदैव नदियों को ही सर्वोपरी माना गया है। भारतीय संस्कृति में नदियों का विशेष स्थान रहा है एवं भारतीय नदियाँ न केवल जल के स्रोत के रूप में बल्कि एक जीवन देने वाली जननी के रूप में पूजी जाती रही है। मानव जीवन से संबंधित विभिन्न पहलुओं जिनमें–जन्म, शिक्षा, विवाह, रीति-रिवाज, धार्मिक अनुष्ठान जैसे कर्म सम्मिलित है इनका आयोजन नदियों के तट पर ही हुआ करता था इन्हीं कार्यों में दाह संस्कार की प्रथा का प्रचलन भी महत्वपूर्ण है। इसी संदंभ में छत्तीसगढ़ प्रांत के मध्य भू–भाग में प्रवाहित होने वाली प्रमुख नदी खारुन के बायें तट पर स्थित ग्रांम सिपकोना का महापाषाणिक संस्कृति के महत्व की दृष्टि से विशेष स्थान है।

सिपकोना ग्राम खारुन नदी के बायें तट पर सिकोला नाले के पास स्थित है। यह दुर्ग जिले के पाटन तहसील के अंर्तगत एक ग्रांम पंचायत है। यह पुरास्थल सिपकोना जाने वाले मार्ग में सड़क के किनारे खेतों में स्थित है। इस स्थल को ''चितावर'' के नाम से जाना जाता है। इस स्थल के चितावर नाम से ही यह स्पष्ट होता है कि यहाँ कभी न कभी दाह संस्कार की प्रक्रिया होती रही होगी। यह पुरास्थल सर्वप्रथम हमारे द्वारा खारुन नदी घाटी के सर्वेक्षण के दौरान प्रकाश में आया है। प्रस्तुत लेख में खारुन नदी घाटी के सर्वेक्षण के परिणाम स्वरुप प्रकाश में आये महापाषाणिक पुरास्थल की जानकारी देना है।

मृतकों के अंतिम संस्कार की शुरुआत सम्भवत: "निअण्डर्थल मानव" ने किया<sup>1</sup> किन्तु नवपाषाण काल में मिट्टी के बर्तनों में खाद्य-पदार्थ भर कर मृतकों के साथ दफनाने की प्रथा का प्रारंभ 1200 ईसा पूर्व के लगभग हुआ। नव पाषाण युग की समाप्ति के बाद दक्षिण में जिस संस्कृति का प्रसार हुआ उसे वृहत अथवा महापाषाणिक संस्कृति कहा गया है। इस संस्कृति के लोग अपने मृतकों के अवशेषों को सुरक्षित रखने के लिए बड़े-बड़े पत्थरों का प्रयोग करते थे।

वृहतपाषाणिक अथवा महापाषाणिक समाधि शब्द अंग्रेजी भाषा के "मेगालिथ" (MEGALITH) शब्द का हिन्दी रुपान्तरण है। मेगालिथ शब्द की व्युत्पत्ति यूनानी भाषा के "मेगॉस" (MEGAS) और (LITHES) "लिथॉस" शब्द से हुई है। मेगॉस का अर्थ विशाल और लिथॉस का तात्पर्य पाषाण से है।

यह संस्कृति प्राचीन मानव के शवाधान परंपरा से हमें अवगत कराती है। इनकी रचना करते समय चतुर्दिक दीवालों के स्थान पर विशालकाय प्रस्तर खण्ड खडे किये जाते थे तथा कभी-कभी उन पर छत के रुप में एक बड़ा पत्थर रख दिया जाता था।3 इनके निकट कपितय मृद्भाण्ड, लौअस्त्र एवं दैनिक जीवन की उपयोगी वस्तुएँ रख दी जाती थी। महाश्म संस्कृति से संबंधित जिन स्मारकों की सर्वप्रथम प्राप्ति हुई वे सम्भवत: बहुत ही बड़े-बड़े पत्थरों से बनाए गये थे अत: इनकों महापाषाण कहा गया किन्तु महापाषाणिक सभी स्थलों से ऐसी आकृति नही मिलती है। इस संस्कृति के लोगों ने मृतकों को दफनाने की विभिन्न प्रक्रिया को जन्म दिया। इस परंपरा का सर्वाधिक प्रसार भारत के दक्षिण प्रान्तों में अधिक हुआ है। भारत में महापाषाणिक संस्कृति के कई प्रकार मिले हैं जिनमें डोलमेन (DOLMENOID CIST), छत्रशिला (UMBRELLA STONE), फर्ण शिला (HOOD STONE), संगोरा (CAIRN CIRCLE), गुफा समाधि (ROCKCUT CAVES), अन्त्येश्टि कलश (POT BURIAL) एवं सर्वाधिक मेनहीर (MENHIR) मिलते हैं।4

इसी क्रम में छत्तीसगढ़ राज्य के विभिन्न क्षेत्रों से भी

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### Abstract

The Archaeological investigation took place on the Village – Bewarti, Kanker. From the previous work, some archaeological remains already have been noticed in Kanker district by the researchers. Through the further investigation a Megalithic remains and Pictograph were noticed within the village. This research paper will mainly consist of the unreported pictograph and megalithic site of Bewarti. There will be the detailed information about the findings. The detailed study will be done of the figures of the painting in "Layamatta hill" and the megalithic remains within the village. The research paper also consists of the developing phase of the rock art which can be seen in the tribal communities. The research will content about the importance of the rock art and megalithic culture in the tribal society. Various rituals are performed on the both sites by the tribal people till today. This research paper will describe the new investigation site and related rituals which are performed by the tribal people. The paper will consists of the study of correlation between the rock art and the various arts forms and cultures present in the tribal community.

### Keywords

Layamatta, Pictograph, ocher color, Tribal belief, Megalithic, Stone, Muria Gonds Introduction

Bastar is known for rich tribal communities with that this area is very potential of archaeological remains. Till today the King policy still living with own places and they are attached with the tribal's. Going back to the primitive age, prehistoric evidences were notified by scholars from many places. After that prehistoric, early historic, historic, medieval and British remains are present. Some culture sequences are not in vague these days that is why Archaeological investigation is necessary to know about the facts related to these cultures. Kanker is an upper part of Bastar division and located southern part of Chhattisgarh state. In 1819 to 1904 Kanker comes under the Nagpur division and after that in 1905 it merge to central province in British Government. Kanker occupied 20'6' to 20'24' latitude and 80'48' to 81'48' east longitude of Uttar Bastar. At present 7 Block comes under the Kanker district – Kanker, Charama, Narharpur, Bhanupratappur, Durgukondal, Koyalibeda, and Antagarh.

When we look on to the historical and cultural aspects of kanker district we see to through different angle of history. From the prehistoric to the historical evidence scattered within the city and connected area. Bewarti village one of the important archaeological area were Pictograph and megalithic remains noticed by the exploration. Regarding to the megalithic culture is still in a practice. Ancient megalithic reported from the Dhamtari and Balod district which are very close to the District. Some site like Karhibhadar, Karkabhat, Mujgahan, Dhanora etc. Rock art

## छत्तीसगढ़ की खैरवार जनजाति का ऐतिहासिक एवं सांस्कृतिक अध्ययन

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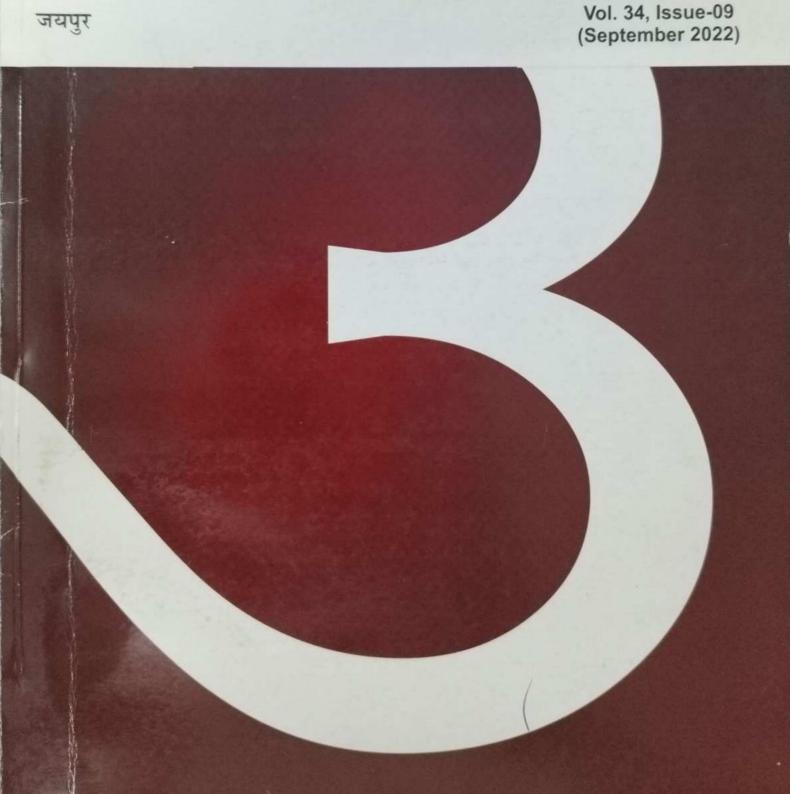
### डॉ० नितेश कुमार मिश्र

सहायक प्राध्यापक, प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्त्व, अध्ययनशाला, पंडित रविशंकर शुक्ल विश्वविद्यालय, रायपुर

देश के हृदय में स्थित मध्यप्रदेश का दक्षिण पूर्व क्षेत्र "छत्तीसगढ़" कहलाता है। प्राचीनकाल में दक्षिणकोसल, महाकोसल, दण्डकारण्य, महाकांतार, गोंडवाना आदि के कुछ मू—माग इसमें सम्भिलित है। वर्तमान में बिलासपुर, सरगुजा, रायगढ़, रायपुर, बस्तर, दुर्ग, राजनांदगांव जिले के मू—भाग इस नाम की परिधि में आते हैं जबकि पूर्व में सम्मिलित सम्बलपुर का क्षेत्र अलग होकर उड़िसा प्रांत में शामिल है। पं. लोचन प्रसाद पाण्डेय के अनुसार "दक्षिणकोसल" की सीमा उत्तर में गंगा दक्षिण में गोदावरी, पश्चिम में उज्जैन और पूर्व में पूर्वी समुद्र तटवर्ती पाली थी। वास्तव में मध्ययुग में इस क्षेत्र का गढ़ी के कारण छत्तीसगढ़ नाम पड़ा। प्राचीनकाल से ही इस क्षेत्र में अनेक वन्य जातियॉ, निवास करती थी। जिनमें गौड़, खैरवार, कंवर, उराव, हल्बा, कोरबा आदि मुख्य है। अतीत से ही यह क्षेत्र मारतीय संस्कृति का एक मुख्य केन्द्र रहा है।

छत्तीसगढ़ अंचल की खैरवार जनजाति खुरवार, खरिया, खैरवा आदि कई नामों से जानी जाती है। खैरवार शब्द की उत्पत्ति खैर से मानी जाती है । विच्ध के क्षेत्र से वृक्ष से कत्था के कारण इस जनजाति का नाम खैरवार पड़ा।(1) इनके मूलस्थान के संदर्भ में विद्वानों की यह धारणा है कैमूर की पहाड़ी या खैरागढ़ है। जहाँ से यह झारखण्ड, उत्तारप्रदेश, छोटानागपुर, छत्तीसगढ़ के क्षेत्रों में बस गये। उत्तरप्रदेश एवं झारखण्ड के क्षेत्रों यह जनजाति स्वयं को अभिजात्य मानते हैं एवं ब्राहमणों जैसा जीवन व्यतीत करते हैं।(2) खैर जनजाति की उत्पत्ति के संदर्भ में एक किवदन्ती भी है कि प्राचीनकाल से बिहार राज्य के पलामऊ जिले में जनसाय नाम एक पराक्रमी राजा था जिसके पास तीन बाण थे इन बाणों के माध्यम से उसकी यह इच्छा थी कि तीनों लोकों पर विजय प्राप्त करे। यह कहा जाता है कि एक दिन भगवान वेश बदलकर राजा के समक्ष अवतरित हुये एवं उनसे प्रश्न किये कि तीनों बाणों का किस कार्य के लिये उपयोग करोगे? प्रतिउत्तर में राजा ने कहा कि इन बाणों से त्रिलोक विजय करूंगा। यह कह कर उसने धनुश से एक–एक कर के बाणों को छोड़ा। बाण छोड़ने के पश्चात् दो बाण राजा के हाथ में वापिस आ गये, परंतु एक बाण भगवान के पैर के तलवे के नीचे चुम गयी, जिसके कारण कोधित होकर भगवान ने राजा के सिर को काट कर पतामु जिले के बारेसांड नामक स्थान में एक खैर वृक्ष में लटका दिया। यही कारण है कि राजा के समस्त जाति वर्ग के जितने लोग थे, वे सभी खैरवार कहलाये।(3)

समस्त जाति वग के जितन लोग थे, व समा उरपार फर्शनाय (ए) इस जाति में दो प्रमुख गोत्र पाये जाते हैं। प्रथम सूर्यवंशी और दूसरा दोलवंशी। इन दोनों गोत्रों में आपसी मेल-जोल, खान-पान तो विद्यमान है, परंतु परंपरानुसार शादी-विवाह वर्जित है। गोत्रों में आपसी मेल-जोल, खान-पान तो विद्यमान है, परंतु परंपरानुसार शादी-विवाह वर्जित है। दोनों गोत्र अपने को क्षत्रिय मानते हैं यही कारण है कि नाम के साथ सिंह क्षत्रिय सूचक के रूप में रखते हैं। छत्तीसगढ़ क्षेत्र में यह रायगढ़, बिलासपुर, कोरबा, चांपा के क्षेत्र में निवास करते हैं। रखते हैं। छत्तीसगढ़ क्षेत्र में यह रायगढ़, बिलासपुर, कोरबा, चांपा के क्षेत्र में निवास करते हैं। रखते हैं। छत्तीसगढ़ क्षेत्र में यह रायगढ़, बिलासपुर, कोरबा, चांपा के क्षेत्र में निवास करते हैं। र्याश्मकाल में यह जंगलों में अस्थायी निवास बनाकर इस जनजाति के लोग वृक्षों से कत्था निकालते प्रीश्मकाल में यह जंगलों में अस्थायी निवास वनाकर इस जनजाति के लोग वृक्षों से कत्था निकालते हैं एवं वापस अपने स्थायी निवास में चले आते हैं(4) इसके अतिरिक्त यह कृशि कार्य भी करते हैं। हैं एवं वापस अपने स्थायी निवास में चले आते हैं(4) इसके अतिरिक्त यह कृशि कार्य भी करते हैं। हैं एवं वापस अपने स्थायी निवास में चले आते हैं(4) इसके अतिरिक्त यह कृशि कार्य भी करते हैं। हैं हुई है। रायबहादुर हीरालाल एवं रसेल खैरवारों की उत्पत्ति चैरो एवं सन्याल से हुई है। खैरवारों से हुई है। रायबहादुर हीरालाल एवं रसेल खैरवारों की उत्पत्ति चैरो एवं सन्याल से हुई है। खैरवारों के सामाजिक जीवन सहज एवं सरल है। इस जनजाति का मुख्य भोजन चांवल तथा कोदो का पेज के सामाजिक जीवन सहज एवं खरत है। इस जनजाति का सुख्य भोजन चांवल तथा कोदो का पेज के सामाजिक जीवन सहज एवं दासरल है। इस जनजाति के लोग रहना पसंद करते हैं। इनके घर ईट, मिटटी, बहुलता होती है उसी स्थल पर इस जाति के लोग रहना पसंद करते हैं। इनके घर ईट, मिटटी, बहुलता होती है उसी स्थल पर इस जाति के खास, फूस, खपरैल की बनी रहती है। दीवालों में पीली मिटटी की कलात्मक पुताई करते हैं घर में जीवनोपयोगी सभी वस्तुतये रहती है। खैरवारों में पीली मिटटी की कलात्मक पुताई करते हैं घर में जीवनोपयोगी सभी वस्तुतये रहती है। इनका घर के प्रति विशेश मोह पाया जाता है इस जनजाति का सामाजिक संगठन सुद्द को जे केसला पंचायत मुखिया महतो–माझी कहा जाता



दर्शन प्रतिष्ठान

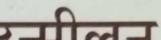
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### Chitra Gupha: unexplored rock art site of Koriya district

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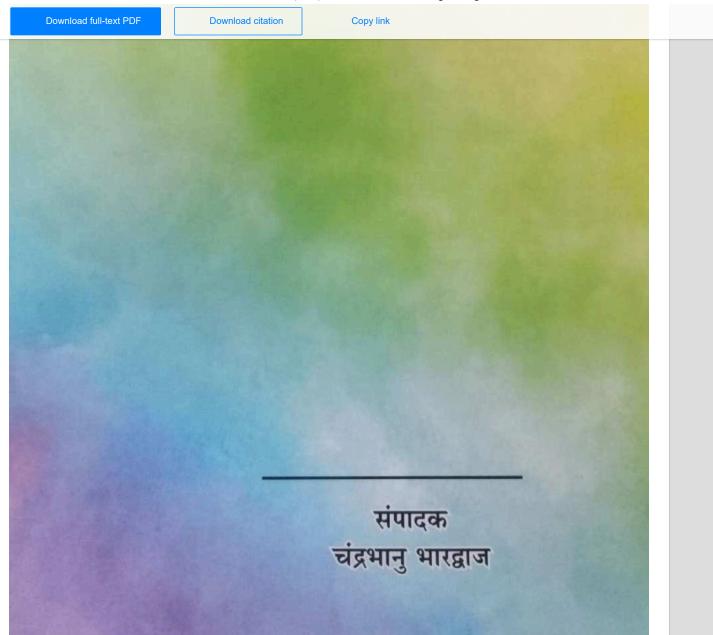
### Abstract

This research paper will mainly consist of the unreported rock art site of Koriya district (Chitra Gupha). In this paper there will be the detailed information about the rock paintings. The detailed study will be done of the various figures of the paintings. The research paper also describes the rituals and art skill of the Gond tribe, which are similar to the figures of rock paintings. There will be the detailed information about the Shobha kala made by the tribe and (Chauk making) in the ceremonies of the Gond tribe. The paper will consists of the geographical background of the districts and village of the rock art site. This paper will also describe about the basic information about the colors used in the paintings.

Key words - exquisite deer, mythological form, Chauk, illustration, Sobha Kala, Gond tribe,

### Introduction

After the origin of man, different types of natural events took place on this earth. In which mainly heavy rain, cold winds and there was also a fear of animals. To save life, man had to resort to cave in the mountains located amidst the thick forest. In these cave, humans first invented paintings. Since this painting was made by humans on the stone wall of their caves, it became famous s rock painting. The rock paintings present a living depiction of the activities of human beings and their sentiments. The human first depicted the things, which they have seen at that time. Mankind used natural colors to make these pictures. Apart from these, humans also made figures by carving for illustration. The main feature of these paintings made by humans is that these figures have been not erased for thousands ofyears. But it has been tarnished by rain, heat and stone erosion. Rock paintings are found from the prehistoric to the historical period. Rock painting depicts the creativity, intelligence and artistic skills of human beings. Rock paintings are important archaeological evidence of the existence of primitive man. There are mainly three types of rock arts such as pictographs, petroglyphs and geoglyphs.<sup>1</sup>Pictographs paintings are made with different colors like red, white, yellow, blue, black and green etc. A wooden brush was used to paint pictures. In petroglyphs and geoglyphs, engraved figures are made. Stone tools were used to carve the images. In rock art, paintings are depicted in different styles such as representational style, decorative style, naturalistic style and geometrical style etc.2 In rock paintings, figures are made in single line drawing and some in some rock arts shaded figures are also depicted. In some paintings, human and animals are depicted with the decoration of geometrical designs. In prehistoric period, the art skills of man continued to develop, time to time. The human of prehistoric times were not only adept at making stone tools but were also fabulous in making the rock paintings. Human painted rock paintings in



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डॉ. नितेश कुमार मिश्र (सहायक प्राघ्यापक) ढालसिंह देवांगन (शोधार्थी) भाग्यश्री दीवान (शोधार्थी) प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्त्व अध्ययनशाला, पंरविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

### प्रस्तावना

भारतीय उपमहाद्वीप के प्रगति सम्पन्न प्रदेशों में छत्तीसगढ़ की महती भूमिका रही है। छत्तीसगढ़ भारत के 26 वे राज्य के रुप में 1 नवम्बर 2000 को मध्यप्रदेश से पृथक होकर नये राष्ट्र के रुप में अस्तित्व में आया। प्राचीन भारत के राजनीतिक एवं सांस्कृतिक इतिहास में वर्तमान छत्तीसगढ़ की सीण (PDF) खारून नदी घाटी से प्राप्त प्रमुख जैन पुरास्थल एवं शिल्प

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कृपा रही है। घने वन, पर्वत प्रदेश, नदियाँ, खनिज एवं जीवन निर्वाह के लिए खाद्य सामाग्री अर्थात मानव के प्रारंभिक आवश्यकताओं को पूर्ण करने के लिए साधनों की उपलब्धता पर्याप्त मात्रा में थी एवं इनके सर्वांगीण विकास के लिए यही कारक अधिक समचिन प्रतीत होते हैं। कालान्तर में इसी पृष्ठभूमि का प्रयोग मनुष्य ने अपने रहने के लिए किया।

इस प्रदेश में प्रागैतिहासिक काल से ही मानवीय गतिविधियों के होने के साक्ष्य उपलब्ध हैं एवं यह अनुव्रत कम बाद के कालों में भी जारी रहा। ऐतिहासिक काल में इस मू—भाग में मौर्य, कुषाण, गुप्त, वाकाटक, नल, शरभपुरीय, पाण्डु—वंशी, कलचूरि एवं नाग वंश के शासकों ने प्रत्यक्ष एवं अप्रत्यक्ष रुप से शासन किया इनके पुरातात्त्विक प्रमाणों में इनके द्वारा जारी किया गये अभिलेख, सिक्के एवं बनवाये गये स्थापत्य एवं मंदिर के नमूने तथा मूर्ति अभी शेषहैं। प्राचीन काल में इस अंचल के लिए विभिन्न नामों का उल्लेख किया गया है। दक्षिण कोसल की स्थिति एवं नाम के संबंध में अनेक विवरण रामायण<sup>2</sup>, महाभारत<sup>3</sup> एवं पुराणों<sup>4</sup> में मिलते हैं। इस स्थल का नाम समय एवं काल के अनुसार बदलते रहे हैं। इस राज्य के प्राचीन नाम कोसल, दक्षिण कोसल, दण्डकारण्य, महाकान्तार, चेदिसगढ तथा महाकोसल इत्यादि मिलते हैं।

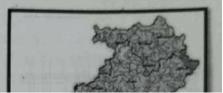
मानव अपने विकास कम में तीव्रता के साथ आगे बढ़ रहा था। आवास के साथ ही भोजन एवं जल इनकी प्रारंभिक आवश्यकताएं थी। इन अवाश्यकताओं की पूर्ति के लिए ये कभी जंगलों में, पहाड़ों की कन्द्राओं तो कभी मैदानी भू—भागों में निवास एवं भ्रमण करता रहता था सम्भवतः इन आवश्यकाताओं की अधिकतम पूर्ति प्राकृतिक झीलों एवं नदियों के तट पर हुई होगी जहाँ जल की मात्रा अन्य स्थलों से अधिक थी। चूकिं सभी कारकों में जल का प्रयोग सर्वाधिक होता था एवं उपयोगिता की दृष्टि से भी अधिक महत्वपूर्ण थी। बाद में जब जल के महत्व को समझा गया होगा तो इनके संग्रहण की समस्या जरुर उत्पन्न हुई होगी इस कारण इनका झुकाव नदियों एवं झीलों की ओर हुआ होगा एवं इनके समीप आवास स्थान बनाये गये जहाँ इन्हें पर्याप्त मात्रा में जल के साथ अन्य वस्तुओं की पूर्ति हुई होगी।

जिस प्रकार से मानव के शरीर में रक्त वाहिकाएं प्रसारित होती है एवं इसका सीधा संबंध हृद्य से होता है उसी प्रकार छत्तीसगढ़ को भारत का हृदय स्थल कहा गया है एवं यहाँ बहने वाली विभिन्न नदियों का संबंध छत्तीसगढ़ के भूमि से है। यह निश्चित तौर पर कहाँ जा सकता है कि प्रारंभिक सभ्यताएं जिस स्थान पर पुष्पित एवं पल्लवित हुई वह नदियाँ ही थी। नदियाँ अपने साथ बहाकर ऊर्वर मिट्टी लाती है इन मिट्टी की ऊर्वरता का पता सम्भवतः मानव ने नवपाषाण काल में ही लगा लिया था जब इन्होनें प्रारंभिक कृषि करना प्रारंभ किया होगा। धीरे–धीरे इनकी आवश्यकताएं और बढ़ती गयी एवं

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नदियाँ इनकी सभी आवश्यकताओं की पूर्ति करने में सक्षम थी। नदियों के तटवर्ती मू-भागों पर आवास स्थान बनाये गये एवं ग्रामीण जीवन से विकसीत नगरीकरण के प्रमाण मिलने लगे।

छत्तीसगढ़ में बहने वाली नदियों में महानदी, शिवनाथ, इन्द्रावती, हसदो, मांड, तेल, पैरी, जॉख आदि प्रमुख है। प्रायः सभी प्राचीन पुरास्थल, मंदिर, स्थापत्य खण्ड, प्रतिमा एवं अन्य भग्नावशेष नदियों



आदि अपवाह क्षेत्र से ही प्राप्त होते है एवं कही न कही इनका सीधा संबंध किसी मानवीय सभ्यता से होता है अतः हम कह सकते है कि मनुष्य के कमिक एंव सांस्कृतिक विकास में नदी घाटियों की महत्वपूर्ण भूमिका है इन नदियों के तट पर शैव, वैष्णव एवं बौद्ध धर्म के साथ ही जैन धर्म का भी विकास देखते को मिलता है। See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/390754938

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डॉ. नितेश कुमार मिश्र

## श्री ढालसिंह देवांगन

## भाग्यश्री दीवान

सती प्रथा का प्रचलन भारत में प्राचीन काल से ही देखा गया है। सती प्रथा कुछ पुरातन समुदाय विशेष में प्रचलित एक ऐसी धार्मिक प्रथा थी, जिसमें किसी पुरुष के मृत्यु उपरान्त उनकी पत्नी अपने पति के अंतिम संस्कार के दौरान उनकी चिता में प्रविष्ट होकर आत्मदाह कर लेती थी जो सम्भवतः स्वेक्छापूर्ण होता था। साहित्यिक एवम् पुरातात्विक स्रोतों के माध्यम से इस बात की पुष्टि होती है।

सती प्रथा का प्रारंभ माँ सती जो कि राजा दक्ष् की पुत्री थी, के समय से माना जाता है। मान्यताओं के अनुसार जब सती अपने पिता द्वारा अपने पति शिव के अपमान करने पर नाराज होकर अग्नि में प्रविष्ट हो जाती है एवम् आत्मदाह कर लेती है।सम्भवतः इस घटना ने इस प्रथा को जन्म दिया होगा किन्तु निश्चित तौर पर यह कहना उचित नहीं होगा क्योकि इसमें शिव जीवित रहते हैं और सती होने के लिये पति की मृत्यु आवश्यक मानी गई है। रामायण एवम् महाभारत में भी इस प्रकार की घटना का उल्लेख मिलता है। रामायण काल में रावण के पुत्र मेघनाथ की मृत्यु के पश्चात् उनकी पत्नी सुलोचना के सती होने के प्रमाण मिलते हैं एवं महाभारत कालीन कुरु वंशी पांडु के मृत्यु के उपरांत उनकी छोटी रानी माद्री ने अपने पति के साथ अग्नि में समाहित हो गयी थी।

अभिलेखों में सती होने की सर्वप्रथम सूचना गुप्त कालीन अभिलेख भानुगुप्त के "एरण अभिलेख" से मिलता है। इस अभिलेख से ज्ञात होता है कि युद्ध में गोपराज की मृत्यु के बाद उनकी पत्नी सती हुई थी। छत्तीसगढ़ अंचल में मल्हार, सेमरसल (बिलासपुर) एवं आतुरगाँव (कांकेर) से अभिलिखित स्मृति-प्रस्तर के प्रमाण मिलते है किन्तु इनमें दुर्ग जिले के छातागढ़ (मोहलई) से प्राप्त प्रस्तर लेख महत्त्वपूर्ण जान पड़ता है। इस लेख में प्रथम एवम् द्वितीय सदी ई की ब्राह्री लिपि एवं प्राकृत भाषा का प्रयोग किया गया है।3 इस अभिलेख में निशा एवम् समिनिका नामक गृहणी के पंचत्त्व में विलीन होने की सूचना मिलती है।

मध्यकाल एवम् उत्तर मध्यकाल में बाह्य आक्रमणों की सर्वाधिक सूचना मिलती है इस दौरान पुरुषों की मृत्यु हो जाने पर उनकी पत्नी अपनी अस्मिता व आत्मसम्मान को महत्त्वपूर्ण समझते हुए भी अपने पति की चिता में खुद को झोंक देती थी अथवा विवशतावश आत्मदाह को उचित समझती थी। किन्तु कालांतर में इस प्रथा में कई कुरीतियों का समावेश हुआ एवं इसने एक कुप्रथा का रूप धारण कर लिया। सती स्तम्भ, सती चौरा एवम् योद्धाओ की प्रतिमा यें छत्तीसगढ़ राज्य के अनेक पुरास्थलों से प्राप्त हुए है, जिनसे यह अनुमान लगाया जा सकता है कि इस प्रथा का चलन या प्रभाव इस अंचल में भी रहा होगा। इन सही स्तंभों को मुख्य रुप से गाँव के मुख्य चौराहे, तालाब के किनारे एवं नदी के तटवर्ती भू-भागों में गडाया जाता था। छत्तीसगढ़ राज्य के प्रमुख पुरास्थल जैसे राजिम<sup>4</sup>, भोरमदेव<sup>5</sup>, तरपोंगा (देवबलोदाआदि से सती स्तंभ एवम् योद्धाओं की प्रतिमाओं की प्राप्ति हुई है। बस्तर क्षेत्र के विभिन्न स्थलो जैसे बड़ेडोंगर, छोटेडोंगर, बांगोली, तीर्थगढ, चपका, टेमरा सेभी सती स्तंभों की प्राप्ति हुई है।

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## Investigation of Pictographs – Special Reference to the Amajhola, Kanker District (C.G.)

Nitesh Kumar Mishra, Bhenu

### Abstract

For the region. The paper will also discuss the rituals and other performative traditions developed around these sites. It will study the correlation between the social dimensions of primitive rock art forms and the active cultural traditions practised among local tribal communities.

Keywords: Rock art, tribes, tradition, ancestors, Amajhola, Prehistoric, pictograph, crisscross

### Introduction

It is challenging to understand the human behaviour of early man. To make life easier, early man used organic and inorganic materials for their daily uses. The organic materials were degradable and erased over time, so it is difficult to search the shreds of evidence of those materials. However, inorganic material like stone tools is still scattered all over the surface. Stone tools are one of the significant materials used by prehistoric man, which have been discovered in various prehistoric sites in India.

Rock art is one of the magnificent arts of early man, which expresses the views of various aspects of human society like social, cultural, emotional, economic and human behaviour.

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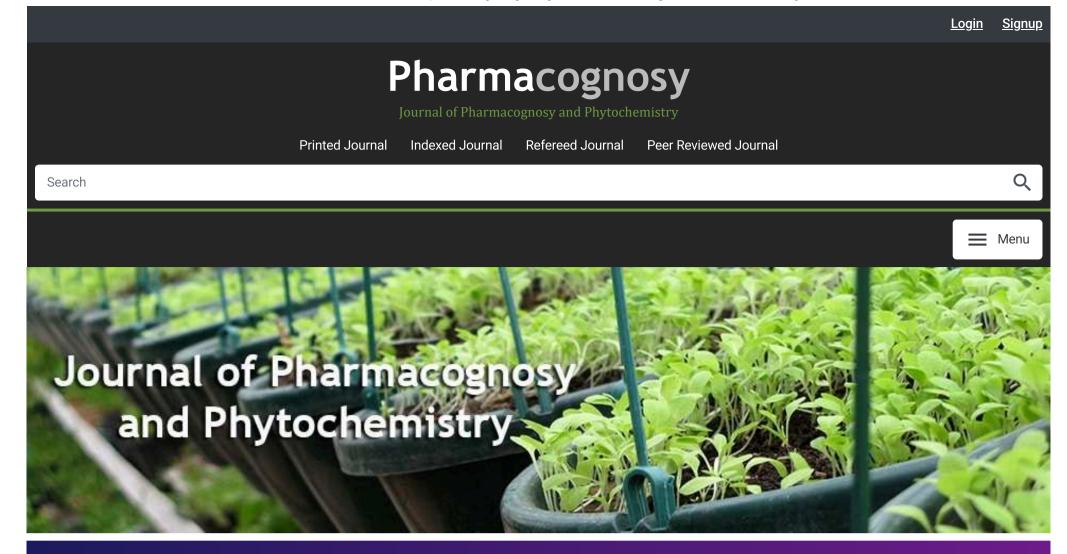
### छत्तीसगढ़ के विमुक्त अनुसूचित जाति नट एवं उनके खेल-तमाशा का नृजातिवृतांतात्मक अध्ययन

सारांश:- निम्न आलेख ''छत्तीसगढ़ के विमुक्त अनुसुचित जाति नट एवं उनके खेल-तमाशा का नृजातिवृतांतात्मक अध्ययन '' पर आधारित है । निम्न अध्ययन का उददेश्य नृजाति समूह 'नट' के सामाजिक-आर्थिक, राजनैतिक एवं शैक्षणिक स्थिति का अध्ययन करने के साथ-साथ नुजाति समूह 'नट' के खेल-तमाशा पर आधुनिकता के प्रभाव का अध्ययन करना था। 'नट' संस्कृत शब्द के 'नाट' से लिया गया शब्द है जो न +ट दो शब्दों से मिलकर बना है । जिसका अर्थ नृत्य, नाटक अथवा अभिनय करना रहा है । नृजाति समुह 'नट' को छत्तीसगढ़ राज्य में ''डंगचगहा'' के नाम से पहचाना (जाना) जाता है । ''डंगचगहा'' शब्द मुख्य रूप से दो शब्द डंग +चगहा से मिलकर बना है । 'डंग' का अर्थ ''बाँस'' से है और ''चगहा'' का अर्थ ''चढ़ना'' से है अर्थात् बाँस के सहारे रस्सी पर चढ़कर विभिन्न प्रकार के खेल-तमाशा, करतब दिखाने से है। भारत सरकार की जनगणना 2011 के अनुसार नट, कालबेलिया, सपेरा, नवदिगार, कुबुतर की कुल जनसंख्या 486058 थी । NCDNST, 2008 के अनुसार दक्षिण एशिया में विश्व के सर्वाधिक धुमन्तु/अर्धघुमन्तु नृजाति समूह निवास करती है । जिसमें से लगभग पाँच सौ प्रकार के विमुक्त घुमन्तु/अर्धघुमन्तु आपराधिक जाति-जनजाति भारत में निवास करती है जो भारत की जनसंख्या का सात प्रतिशत का प्रतिनिधित्व करता है। प्रस्तुत अध्ययन से पता चलता है कि छत्तीसगढ़ के विमुक्त घुमन्तु/अर्धघुमन्तु 'नट' जाति का सामाजिक-आर्थिक, राजनैतिक एवं शैक्षणिक स्थिति अन्य जाति समूहों के अपेक्षा निम्न स्तर पर है । नृजाति समूह 'नट' के खेल-तमाशा पर आधुनिकता का प्रभाव स्पष्ट रूप से देखा जा सकता है । पहले 'नट' जाति में खेल-तमाशा परम्परागत रूप से ढ़ोल , थाली, डमरू, कुत्ता, बन्दर इत्यादि के माध्यम से खेल-तमाशा करते थे । लेकिन वर्तमान समय में आधुनिक साऊड बॉक्स, नवीन गीत-संगीत के साथ-साथ विभिन्न प्रकार के नवीन खेल-तमाशा, सर्कस करने लगा है। अर्थात् नृजाति समूह 'नट' अपनी परम्परागत खेल-तमाशा को धीरे-धीरे बिसराने (भूलने) लगा है। कुंजीशब्द:- छत्तीसगढ़, नृजाति समूह नट, विमुक्त घुमन्तु/अर्धघुमन्तु जाति, खेल-तमाशा।

### हेमन्त कुमार<sup>1</sup> डॉ.जितेन्द्र कुमार प्रेमी<sup>2</sup>

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प्रस्तावना:- भारत विभिन्नताओं का राष्ट्र है । विभिन्नताओं से भरा राष्ट्र का निर्माण विभिन्न प्रकारों के भाषा-बोली के आधार पर किया गया है । जैसे मराठी भाषा-बोली बोलने के कारण महाराष्ट्र , तेलगू बोलने के कारण आन्धप्रदेश , तेलंगाना उसी प्रकार से छत्तीसगढ़ही बोली बोलने के कारण छत्तीसगढ़ राज्य को छत्तीसगढ़ के नाम से जाना जाता है । छत्तीसगढ राज्य अपनी राज्य सम्पदा खनिज, लौह, धान, जाति-जनजाति, घुमन्तु/अर्धघुमन्तु जाति-जनजाति, रीति-रिवाज, परम्पराओं इत्यादि के लिए अन्य राज्यों से भिन्नता रखते हुये अपना अलग पहचान रखता है । छत्तीसगढ राज्य में लगभग 42 प्रकार के जनजातियाँ निवास करती है, जिनमें से 7 प्रकार के विशेष पिछड़ी जनजाति भी शामिल है । इस जाति-जनजातियों की श्रेणी में विमुक्त घुमन्तु/अर्धघुमन्तु 'नट' (डंगचगहा) जाति



## **Peer Reviewed Journal**

### Journal of Pharmacognosy and Phytochemistry

Vol. 13, Issue 2 (2024)

## Ethnomedicinal practices regarding curing of chronic fever among the tribes of North Chhattisgarh, India

### Author(s):

Oshin Bajrang and Dr. Jitendra Kumar Premi

### Abstract:

**Introduction:** The Present article is an empirical investigation of the traditional health seeking practice among the tribal people of North Chhattisgarh of India. It is an attempt to explore the traditional healing practice and traditional knowledge system of the medicinal plant species utilized by traditional healers of North Chhattisgarh for the treatment of chronic fever.

**Objective**: The objective of the present research is to discover and analyses the traditional medicinal practice to cure chronic fever and to find out the phytochemical and medicinal properties of traditional medicine among the tribal of North Chhattisgarh, India for curing chronic fever.

**Methodology:** The traditional healers among the various tribes of North Chhattisgarh were chosen as key informants by using purposive sampling techniques from Raigarh and Korba district of Chhattisgarh, India. The intensive interview was taken to the selected traditional healer by using the interview guide and focused group discussion (FGD).

**Result**: Total 25 medicinal plants and 11 type of medicine are being used for the treatment of chronic fever by the tribal healers of North Chhattisgarh. The quantum of used herbs, method of preparation, direction of use of medicine, and prohibition during medication are discussed in present article. The medico-religious practices are also described in this article which is used to treat chronic fever. The phytochemical and medicinal properties of the medicinal plants which are used for curing chronic fever are find out with the help of earlier published sources. Most of the medicinal plants which have been used for curing of chronic fever are showed appropriate phytochemical and medicinal properties.

Conclusion: Present article explores abundance of traditional knowledge on medicinal plants and magico-religious belief which are responsible in treating chronic fever among the tribal and it also shows the trust and relation between nature and tribal hence it can be concluded that knowledge of medicine related with plants and spiritual practice is a part of folk medicine or ethno-medicine, on the basis of above mentioned data described in present article, it can infer that folk medicinal knowledge among tribal of North Chhattisgarh is eventually rich and commendable even though considered as backward socio-economic ethnic groups, hence medicinal plants represented in present article should be given a scientific recognition by executing phytochemical, pharmacological and molecular test and with those results it should be introduced as a drug to cure chronic fever and

accompanying with this, royalty should be given to the tribal of these medicine and therefore further studies in this topic appear necessary.

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## The Food Habits, Dietary Patterns, and Reproductive Health Status of the Agariya Women of Patrapali Panchayat of Korba District, Chhattisgarh

### Pratibha Tripathi and Ashok Kumar Pradhan

Department of Anthropology Pt. Ravishankar Shukla University; corresponding author <pratibhatripathi999@gmail.com>.

KEYWORDS	ABSTRACT
Reproductive health, Tribal women, food habits, Agariya tribe	Women's health is the foundation of society's health. Preserving and improving women's health is not only a basic human right, but it is also essential for the health of all nations. Reproductive health has become one of the major issues today because of the fact that population control policies are being enforced through women's bodies as they are seen as the cause and solution for population growth and alarmingly increasingly the problem of HIV and AIDS in India. The main purpose of this study was to understand the nature of various sexual and reproductive health issues like knowledge and perception, and health services available to, and accessed by tribal women in Korba District of Chhattisgarh. It was clear from the study that most of the tribal women have poor knowledge about reproductive health as well as they were unaware of its importance. Education on human sexuality with all the aspects, prevention, and treatment of STDs and AIDS is a direct necessity among tribal women to help them reduce high-risk behavior to seek proper treatment for treatable ailments.

### Introduction

Reproductive health is a crucial part of general health and a central feature of human development. It is a reflection of health during childhood and crucial during adolescence and adulthood, sets and stage for health beyond the reproductive years for both women and men, and affects the health of the next generation (Raman & Rani Usha 2014). At the International Conference on Population and Development (ICPD) in Cairo in 1994, a consensus was reached on a new agenda for population and development. The ICPD was a triumph for those seeking an end to the great debate that had plagued the population field since the first World Population Conference at Bucharest in 1974; a debate between advocates of development who believed that development is the best contraceptive and, therefore, a necessary precondition to sustained fertility decline and those who asserted that family planning services must be implemented to meet the high demand for fertility control which they believed existed.

Soon after the Cairo conference, the Government of India set in motion a process to translate the ICPD Programme of Action within the national context. In November 1994, a joint mission of the Government of India and the World Bank was set up to undertake a sectorial review. In 1995, the World Bank submitted a report entitled 'India's Family Welfare Program: Toward a Reproductive and Child Health Approach' to the Government of India (World Bank 1995).

**4**27

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### Title

Eating Behaviour and Nutritional Status of the Tribal Population in India: An Overview.

### **Authors**

### Bhoi, Ankita; Kumar<mark>, Shailendra</mark>

### Abstract

A healthy existence depends on adequate nutrition, which is a basic human need. As a result of their economic, social and cultural activities, indigenous peoples have different dietary habits that vary throughout the world. The nutritional status of tribal groups is inadequate because they do not know about their food and the nutrients associated with it. Numerous factors influence their knowledge, including their level of education and their proximity to government institutions. However, they also have a strong traditional knowledge about their environment, food availability, health problems, etc. This paper is based on some studies and articles dealing with the traditional knowledge and food habits of the tribal groups. It also deals with the food available to the people in different places, the nutrients they get, their impact on health and the risk factors arising from nutritional deficiency. It also covers the details of research publications that have been published and analysed by specific time periods, groups and areas. The current review includes data from the research articles available on Google Scholar, Pub Med and J-Store. According to the research papers, we can say that the tribal community has a distinct knowledge about the availability of food in their environment.

### **Subjects**

INDIA; FOOD habits; NUTRITIONAL status; HABIT; TRADITIONAL knowledge; CULTURAL activities; INDIGENOUS peoples

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## *In vitro* Propagation of *Curcuma caesia* Roxb. via Bud Culture Technique and ISSR Profiling of the Plantlets for Genetic Homogeneity

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### Abstract

An in vitro propagation protocol has been developed for Curcuma caesia Roxb., an endangered medicinal plant by Foundation for Revitalisation of Local Health Traditions and Central Forest Department of India. The plant bears poorly germinated seeds and produces two-storage organs: rhizomes and multiple root tubers. Only rhizomes have medicinal-economic values. They serve as propagules too, which results in a shortage of planting material. Therefore, a complete one-year production cycle of C. caesia has been standardized through in vitro propagation including explants establishment (one month), subculture cycles (seven months), rooting (one month) followed by primary hardening (one month) and secondary hardening (two months).

Dormant shoot buds on rhizome served as explants for culture initiation on Murashige and Skoog (MS) medium supplemented with different concentrations of 6-benzyladenine (BA) and kinetin (KIN) in combination with citric acid (CA), adenine sulfate (AdS) and indole-3-acetic acid (IAA). Maximum bud break (70%) was obtained on MS with 8 mg  $L^{-1}$  BA, 8 mg  $L^{-1}$  KIN, 100 mg  $L^{-1}$  CA, 200 mg  $L^{-1}$  AdS and 2 mg  $L^{-1}$  IAA (standard medium). Shoot production potential continued on this medium during the subsequent seven-month-long subculture cycle. The in vitro raised shoots rooted best on  $\frac{1}{2}$ -strength MS containing 1 mg  $L^{-1}$  indole-3-butyric acid. Plantlet survival rate was >95% after acclimatization. The genetic homogeneity of plantlets with the mother plant was analyzed using Inter Simple Sequence Repeats which generated a monomorphic banding pattern to confirm the uniformity of in vitro raised plantlets of C. caesia.

**Keywords:** Meristem culture, Kali Haldi, Subculture, Rooting, Acclimatization.

### Introduction

*Curcuma caesia* Roxb., popularly known as 'Kali Haldi' ('Black Turmeric' in English), is a perennial, tuberous rhizomatous herb belonging to the family Zingiberaceae<sup>28</sup>. It is an endangered plant native to Central and North-East India<sup>23</sup> where it is used as a spice and in food preservation. The rhizome is rich in camphor curcuminoids, phenolics, flavonoids, certain proteins, amino acids, essential oil and alkaloids<sup>30</sup>. Sesquiterpenes and monoterpenes from the extract of *C. caesia* rhizomes have good antioxidant, anti-inflammatory and tumor cell inhibitory activities<sup>2,6,10,20</sup>. The essential oil from leaves of *C. caesia* also possesses the potential and biologically important activity and can be used as natural antioxidants, anti-inflammatory and antimicrobial agents in pharmaceutical industries<sup>7</sup>.

The Central Forest Department of India has declared this species an 'endangered herb' due to biopiracy<sup>21</sup>. It is categorized as a critically endangered species of Central India<sup>14</sup>. C. caesia bears seeds that are poorly germinated<sup>10</sup>. Therefore, the plant is commonly propagated through underground rhizomes only<sup>4</sup>. Medicinal and economic values reside in these rhizomes. Moreover, the plant produces many underground root tubers too. These root tubers have no market value. Thus, due to the production of two storage organs, the yield of the desired part- rhizome becomes low during its cultivation. The harvested rhizomes, after cultivation, are sold for the recovery of cultivation cost and profit-making. Hence, lower yields of the rhizomes create a shortage of the propagules for cultivation resulting in very high costs for its saplings<sup>16</sup>. Low rhizome productions result in the propagule unavailability for cultivations.

Hence, to fulfil the demand, it is directly harvested from the forests pushing the plant into endangered status<sup>22</sup>. *In vitro* culture technique facilitates the production of planting materials to propagate species<sup>27</sup>. Reports are there for plantlet regeneration of *C. caesia* via meristem culture<sup>3,4,5,29,35</sup> or via callus too<sup>31,37</sup>. However, all these reports neither examine the regeneration efficiency during subculture cycles nor analyze the genetic fidelity of the regenerants. The present study reports a complete one-year *in vitro* production cycle and genomic template stability of the plantlets of *C. caesia*.

### **Material and Methods**

Healthy rhizomes of *C. caesia* were collected from the National Center for Natural Resources, Pandit Ravishankar Shukla University, Raipur (India) in June 2019. Rhizomes were first washed with running tap water to remove soil particles followed by treatment with surfactant tween-20 for 5 to 10 min and a fungicide solution containing 0.1% (w/v) Bavistin 50WP (BASF India Ltd., Mumbai, India) and 0.25% (w/v) Carbendazim 50WP (Hindustan Insecticides Ltd., Bathinda, India) for 20 minutes. The dormant shoot buds (explants) on the rhizome were chopped off; the surface

### **GENETICS & EVOLUTIONARY BIOLOGY - ORIGINAL ARTICLE**



## Screening of a new candidate tree legume- *Pithecellobium dulce* (Roxb.) Benth., for lead remediation

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### Abstract

A fast-growing, leguminous tree species- *Pithecellobium dulce* (Roxb.) Benth., was screened in vitro against Pb-stress for the first time. In the current study, Pb toxicity affected the seedlings growth, lipid peroxidation, hydrogen peroxide production, antioxidant enzymes activity, proline content, and genomic template stability in a dose-dependent manner. The plant showed a high Pb tolerance, uptake and accumulation (> 2300 mg Kg<sup>-1</sup>). Citric acid application could mitigate Pb-stress in the seedlings exhibited by the examined morphological, biochemical, and molecular parameters, including remarkably enhanced Pb uptake by the roots. Citric acid addition to the Pb solution reduced lipid peroxidation and ROS production in the seedlings roots, stem, and leaves. Citric acid also induced the antioxidant enzymes activities in the seedlings that were reduced by Pb exposure. Citric acid-mediated recovery under Pb-stress was evidenced by the growth and development of the seedlings, higher chlorophyll pigments, lower proline content and maximum tolerance index. The Pb exposure altered the genomic template stability that was also recovered by citric acid. Thus, after further field studies, *P. dulce* with citric acid mitigation may prove suitable for Pb remediation from contaminated sites.

Keywords Antioxidant enzymes  $\cdot$  Genomic template stability  $\cdot$  Lipid peroxidation  $\cdot$  Pb-stress  $\cdot$  Pb-accumulation  $\cdot$  Phytoremediation

### 1 Introduction

Globally, lead (Pb) contamination in soils is a growing concern (Wang et al. 2021). Pb is highly toxic, non-biodegradable and long half-life heavy metal that is present in abundance (Frank et al. 2019; Latif et al. 2020). It can cause severe damage to ecosystems as well as human health (Cano-Ruiz et al. 2020). Excessive use of paints, mining, sludge, industrial waste, and agricultural activities are mainly responsible for Pb contamination of the environment (Frank et al. 2019; Samreen et al. 2021; Raju et al. 2021). Patra et al. (2020) stated that Pb contamination of agricultural land is a major environmental concern. Pb may enter the human body through ingestion and inhalation, this first one being directly linked with the food chain and can

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<sup>2</sup> National Center for Natural Resources, Pt. Ravishankar Shukla University, Raipur 492010, India cause severe diseases (Iheanacho et al. 2017; Vladimirovich et al. 2021). Pb toxicity showed a negative relationship with nutrient uptake, antioxidant activity, and photosynthesis in plants. In response to metal-induced toxicity, Plants have evolved defense mechanisms including synthesis of antioxidant enzymes (Giannakoula et al. 2021) such as SOD, CAT, and APX that help to maintain cellular redox homeostasis. This redox equilibrium may be disturbed due to the excess generation of reactive oxygen species under Pb-stress (Giannakoula et al. 2021). ROS induces oxidative stress and lipid membrane peroxidation that damages the biological molecules and alters normal metabolic pathway resulting in cellular destruction (Pourrut et al. 2011).

Presently, several phytotechnologies are available to treat contaminated areas due to their low cost and environmentally friendly nature (Yan et al. 2020). Trees due to their long life cycle, huge biomass, and extensive root system are considered more suitable for the purpose than the grasses or other plants (Kaur et al. 2019). An ideal tree candidate must be fast-growing, multiple stress-tolerant, able to grow on poorly nutrient soils combined with high toxicant tolerance, uptake, and accumulation. *Pithecellobium dulce* 

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Contents lists available at ScienceDirect

### Plant Stress

journal homepage: www.sciencedirect.com/journal/plant-stress

## Gamma radiation: A potential tool for abiotic stress mitigation and management of agroecosystem

ABSTRACT

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*Context:* Being sessile, it is impossible for the plants to evade from the unfavourable environmental conditions prevailing due to various abiotic stresses like heat, salinity, drought, flood, heavy metals, and high radiance amongst many others. These abiotic stresses disrupt plant growth and limit crop productivity to a large extent globally. Crop plants need to acclimatize themselves in these unsuitable environmental and edaphic conditions utilizing their inherent biological mechanisms. Massive amount of pertinent researches have been done in the last few decades regarding utilization of gamma rays for improvement in traits, and management of agroecosystem by developing superior quality crops/ germplasms. It has been well established that the gamma rays promotes abiotic stress tolerance in plants at low doses (50–100 Gy). Gamma rays are also being widely used as mutation techniques in an attempt to raise abiotic stress tolerance and, disease resistant crop varieties. Furthermore, a better understanding of tolerance mechanisms induced by gamma rays involved in this are still indefinable. This review illustrates general information about gamma ray, its dose dependant responses; beneficial effects and lethality, and also the potential mechanism(s) underlying the tolerance induction and performance enhancement of plants growing under various abiotic stress conditions.

Objective: To elucidate the role of gamma rays as a potential tool for stress mitigation and management of agroecosystem.

Methods: Gamma rays have been used quite differently by various researchers for alleviation of abiotic stress imposed responses in plants.

*Results and conclusions:* Application of gamma radiation has popularly been noticed to enhance nutrient uptake, modulate biosyntheses of numerous secondary key metabolites and osmolytes, and regulate various metabolic activities to engender tolerance against environmental stresses.

*Significance:* In most of the developing and under developed nations, owing to limited development in agromanagement systems, abiotic stresses are seen to cause potential threats to growth and productivity of crops. Therefore, it is essentially to explore novel cost effective possibilities like use of low dose of gamma rays in crop plants for improvement in their performance during these rapidly changing climatic conditions.

#### 1. Introduction

Crop plants encounter various abiotic stresses in their life span owing to global warming and climatic abnormalities which majorly limits their growth and productivity. Drought, temperature extremes, salinity and acidity of soil, light intensity, submergence, and anaerobiosis are dominant abiotic stresses amongst others, and are hostile to farming and the ecosystem (Wania et al., 2016). Crop plants of approximately 90% of

cultivable area are facing one or several of the above stresses (dos Reis et al., 2012), which results in approximately 70% losses in the yield of major food grains *viz.*; *Oryza sativa, Triticum aestivum* and *Zea mays,* and hence affecting food security (Tigchelaar et al., 2018). As per the report of FAO (2007), merely 3.5% land area has left untouched by any of the environmental constrain.

Amongst the enlisted abiotic stresses, salinity becomes the most stubborn one by escalating the salt concentration in the arable land

Abbreviations: Reactive Oxygen Species, ROS.

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**GENETICS & EVOLUTIONARY BIOLOGY - ORIGINAL ARTICLE** 



## Screening of a new candidate tree legume- *Pithecellobium dulce* (Roxb.) Benth., for lead remediation

Satyam Kumar Kumbhakar<sup>1</sup> · Ravishankar Chauhan<sup>1,2</sup> · Vikram Singh<sup>1</sup> · <mark>S. K. Jadhav<sup>1</sup> · Afaque Quraishi<sup>1</sup> </mark>

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### Abstract

A fast-growing, leguminous tree species- *Pithecellobium dulce* (Roxb.) Benth., was screened in vitro against Pb-stress for the first time. In the current study, Pb toxicity affected the seedlings growth, lipid peroxidation, hydrogen peroxide production, antioxidant enzymes activity, proline content, and genomic template stability in a dose-dependent manner. The plant showed a high Pb tolerance, uptake and accumulation (> 2300 mg Kg<sup>-1</sup>). Citric acid application could mitigate Pb-stress in the seedlings exhibited by the examined morphological, biochemical, and molecular parameters, including remarkably enhanced Pb uptake by the roots. Citric acid addition to the Pb solution reduced lipid peroxidation and ROS production in the seedlings roots, stem, and leaves. Citric acid also induced the antioxidant enzymes activities in the seedlings that were reduced by Pb exposure. Citric acid-mediated recovery under Pb-stress was evidenced by the growth and development of the seedlings, higher chlorophyll pigments, lower proline content and maximum tolerance index. The Pb exposure altered the genomic template stability that was also recovered by citric acid. Thus, after further field studies, *P. dulce* with citric acid mitigation may prove suitable for Pb remediation from contaminated sites.

**Keywords** Antioxidant enzymes  $\cdot$  Genomic template stability  $\cdot$  Lipid peroxidation  $\cdot$  Pb-stress  $\cdot$  Pb-accumulation  $\cdot$  Phytoremediation

### **1** Introduction

Globally, lead (Pb) contamination in soils is a growing concern (Wang et al. 2021). Pb is highly toxic, non-biodegradable and long half-life heavy metal that is present in abundance (Frank et al. 2019; Latif et al. 2020). It can cause severe damage to ecosystems as well as human health (Cano-Ruiz et al. 2020). Excessive use of paints, mining, sludge, industrial waste, and agricultural activities are mainly responsible for Pb contamination of the environment (Frank et al. 2019; Samreen et al. 2021; Raju et al. 2021). Patra et al. (2020) stated that Pb contamination of agricultural land is a major environmental concern. Pb may enter the human body through ingestion and inhalation, this first one being directly linked with the food chain and can

Afaque Quraishi drafaque13@gmail.com cause severe diseases (Iheanacho et al. 2017; Vladimirovich et al. 2021). Pb toxicity showed a negative relationship with nutrient uptake, antioxidant activity, and photosynthesis in plants. In response to metal-induced toxicity, Plants have evolved defense mechanisms including synthesis of antioxidant enzymes (Giannakoula et al. 2021) such as SOD, CAT, and APX that help to maintain cellular redox homeostasis. This redox equilibrium may be disturbed due to the excess generation of reactive oxygen species under Pb-stress (Giannakoula et al. 2021). ROS induces oxidative stress and lipid membrane peroxidation that damages the biological molecules and alters normal metabolic pathway resulting in cellular destruction (Pourrut et al. 2011).

Presently, several phytotechnologies are available to treat contaminated areas due to their low cost and environmentally friendly nature (Yan et al. 2020). Trees due to their long life cycle, huge biomass, and extensive root system are considered more suitable for the purpose than the grasses or other plants (Kaur et al. 2019). An ideal tree candidate must be fast-growing, multiple stress-tolerant, able to grow on poorly nutrient soils combined with high toxicant tolerance, uptake, and accumulation. *Pithecellobium dulce* 

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## A comparative study of (Response surface methodology) RSM and (Artificial Neural Network and Genetic Algorithm) ANN-GA for optimization of biohydrogen production by *Pseudomonas aeuroginosa* SBT-Pa 092

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### Abstract:

This communication discusses the optimization of carbon and nitrogen sources for the enhanced bio-hydrogen production from rice mill effluent. Three critical factors, concentrations of glucose (10-20 g/l), yeast extract (1-5 g/l) and Ammonium per sulphate (1-2 g/l) were optimized by response surface methodology (RSM) with central composite design (CCD) for better production. The hydrogen produced by *Pseudomonas aeuroginosa* SBT-Pa 092 was enhanced after using RSM. The value of R<sup>2</sup> obtained by ANN after training (75%) are 14 samples, validation (15%) are 3 samples and testing (15%) are 3 samples were 0.86976, 0.78299, and 0.94523 for bio hydrogen production. The value of R<sup>2</sup> obtained by ANN after training (40%) = 10 samples, validation (25%) = 5 samples and testing (25%) = 5 samples were 0.79317, 0.8596 and 0.90984 respectively, for biohydrogen production. The % error for ANN and RSM were 0.0016 and 0.01 for biohydrogen production, which showed the authority of ANN in exemplifying the non-linear behaviour of the system. Thus, ANN/RSM together successfully identify the substantial process conditions for Biohydrogen production. The results obtained indicate that use of both RSM and ANN with appropriate experimental design can be used to optimize culture conditions for enhancement of hydrogen production.

Key words: Biohydrogen, Pseudomonas aeuroginosa SBT-Pa 092, RSM, CCD and ANN.

### Introduction:

To meet the energy requirements of the society the world economy is completely dependent upon the fossil fuel. The rising cost and harmful effect of fossil fuels on the environment has resulted in the development of eco-friendly and alternative source of energy. Hydrogen is considered as an environment friendly and clean source of energy as it does not produce any of the green house gases during combustion [Wang et al 2014; Jiang et al 2014]. Also it is having high energy content (142 kJ/g) which is 2.75 times higher than the fossil

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# Bacterial consortia mediated induction of systemic tolerance to arsenic toxicity *via* expression of stress responsive antioxidant genes in *Oryza sativa* L.



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#### ARTICLE INFO

Keywords: Antioxidative enzymes Arsenic Bacterial consortia Gene expression Oxidative stress Plant growth promotion

#### ABSTRACT

Arsenic (As) is a toxic metalloid which pollutes soil and water, and negatively affects the growth and development of plants at different levels. This study investigated the effects of As-resistant and plant growth promoting (PGP) bacterial consortia on the germination and growth attributes of two cultivars (Swarna and MTU 1010) of rice (Oryza sativa L.) under As-flooded environment. The consortium consisted of five bacterial strains; Bacillus nealsonii strain ARP2, Pseudomonas nitritireducens strain ARP3, Exiguobacterium aestuarii strain ARRP3, Bacillus tequilensis strain ART2 and Microbacterium paraoxydans strain ADT5, which were isolated from different regions of Chhattisgarh, India. Soils inoculated with the bacterial consortia and supplemented with As(V)/As(III) were used to grow rice seeds under in vitro conditions. The results ascertained that the seedlings inoculated with the bacterial consortia grew well even in the presence of As, which was marked by increased shoot and root length, biomass, and total chlorophyll content. Further, inoculation of bacterial consortia reduced the oxidative stress to a significant level by up-regulating the expressions of protective genes encoding antioxidant enzymes. This consortium could decrease the As accumulation in plants upon successful colonization in the rhizosphere, suggesting possible exploitation of it for enhanced growth of plants and in the remediation of As-contaminated soils.

#### 1. Introduction

Arsenic (As) is a toxic and non-essential metalloid for plants, leading to different phytotoxic effects (Yoon et al., 2015). It exists primarily as inorganic arsenate [As(V)] and/or arsenite [As(III)], which are the dominant species in soil environments, and their chemical behaviour is heavily influenced by the striking redox reactions of soil (Ascar et al., 2008). Although arsenic occurs naturally in the environment, irrigation with As-contaminated water has increased the risk of this metalloid being transferred and accumulating in subsequent food chains (Jablońska-Czapla et al., 2020). It is a potent carcinogen and mutagen, which raises potential hazard and concern for both public health and the environment (Kapaj et al., 2006). Having similarity with phosphate ( $PO_4^{-3}$ ), As(V) easily enters into the plant cell *via* high-affinity phosphate transporters, while As(III) is incorporated by aquaporin channels (Allevato et al., 2019). Both these result in severe toxicity, which is marked by the disturbances in various physiological and biochemical processes and genetic stability (Talukdar, 2011).

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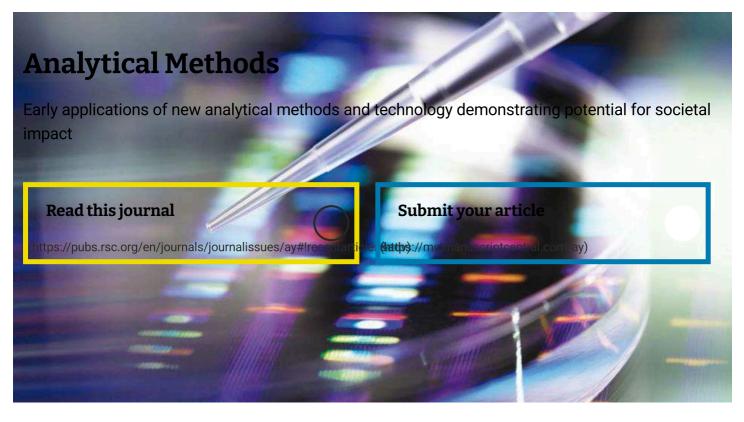
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#### Introduction 1.

In the last decade, researchers have reported that various particles directed into biological fluids are inevitably and immediately

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*†* Electronic supplementary information (ESI) available. See https://doi.org/10.1039/d2ay01088g

interlinked silver nanoparticles as a colorimetric probe<sup>†</sup> Sushama Sahu and Kallol K. Ghosh\*

Selective detection of tartaric acid using amino acid

A variety of biomolecules with different functional groups play critical roles in almost all the processes occurring in living cells. Interaction of metallic nanoparticles (NPs) with various biomolecules generates a layer of molecules on their surface, and this biomolecular rich layer formed on the NP surface is described as a "biomolecular corona". The physicochemical properties of the NPs, including size, adsorption affinity, and charge on the particles' surfaces are the major factors influencing the characteristics of this corona. The formation of various biomolecular corona has been studied well, whereas the amino acid corona is relatively new by exploring their stability. In the present study, a novel formation of an amino acid corona with a fundamental interaction mechanism for a selective detection procedure using a colorimetric platform has been proposed. Herein, amino acid-coated silver NPs (AgNPs) have been used as a template with spectroscopic (steady state UV-Vis, FTIR) and imaging (HR-TEM, DLS) techniques. Our findings demonstrated that among different amino acid coronas, glutathione (GSH) stabilized AgNPs show a rapid reaction with tartaric acid. The extent and thermodynamics of the formed complex between the GSH/AgNPs and tartaric acid have also been studied and this suggested that the complex formed is spontaneous and energy releasing in nature.

> (>0.5 min) covered by different biomolecules, including proteins, peptides, enzymes or amino acids, and these form a "corona" on the surface of the particles. The protein corona was first found by Dawson and co-workers.<sup>1-3</sup> Here, the proteins are shown to be associated with the nanoparticles (NPs) and they participate in the formation of a "biomolecular corona" found by Monopoli et al.2-4 The formation of this type of corona results in a change of the NP surfaces with an increase in their diameter.<sup>4-7</sup> The

ishankar Raipur, India, in new functionalized

methods for the quantification of biomolecules, environmental contaminants and pollutants in real samples.

Sushama Sahu has completed her M.Phil. from the School of Studies in Chemistry, Pt. Rav-Shukla University, 2018. Currently, she has submitted her PhD thesis with Prof. Kallol K. Ghosh, at the School of Studies in Chemistry, Pt. Ravishankar Shukla University. Her research interests are the development of nanoparticles, analytical studies and

aromatic hydrocarbons, hydroxamic acids, detoxification of chemical warfare simulants and reactivation kinetics of organo-

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Dr Kallol K. Ghosh is Professor

phosphate inhibited acetylcholinesterase by oxime reactivators.

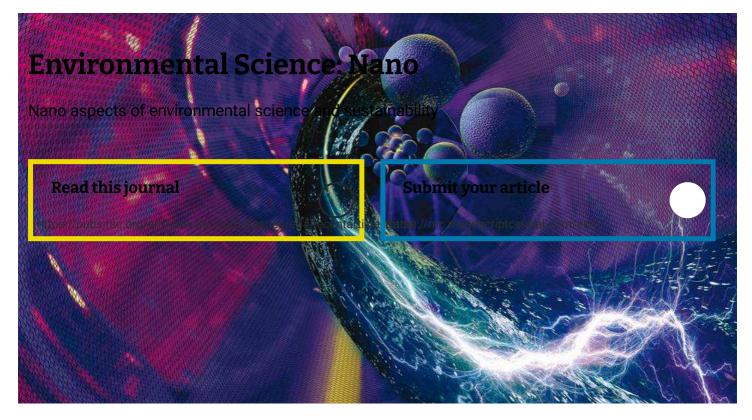


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**CRITICAL REVIEW** 



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Recent advances on gold and silver nanoparticlebased colorimetric strategies for the detection of different substances and SARS-CoV-2: a comprehensive review

Sushama Sahu, Srishti Sharma, Ramsingh Kurrey and Kallol K. Ghosh 吵 \*

Nanoparticle (NP)-based colorimetric methods are extensively used for the rapid detection of environmental contaminants, different substances and SARS-CoV-2 in various fields such as environmental science, virology, pollution research, and the food industry, as well as biomedicine. Colorimetric sensors exhibit high sensitivity and selectivity, are easy to handle, portable, safe for screening purposes and can be visualized by the naked eye. Herein, the colorimetric sensing approaches of the two most commonly used metallic NPs, *i.e.*, gold (Au) and silver (Ag), and their physicochemical methods are discussed, as metallic NPs show good efficiency due to their unique optical and chemical properties. This review summarizes the progress on colorimetric sensors based on metallic NPs as sensors and their applications, elucidating the utility and superior features of metallic-NP-based colorimetric assay for the detection of different environmental contaminants, biomolecules and SARS-CoV-2 in the environmental as well as human biological samples. An outlook with respect to the trends and future development of the proposed sensors is also provided.

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### **Environmental significance**

This review summarizes the research on gold (Au) and silver (Ag) nanoparticle (NP)-based colorimetric assays for the detection of different substances and SARS-CoV-2 in the environment as well as human biological samples. Herein, a series of fabrication methods for colorimetric sensors are discussed. In contrast to conventional techniques, nanomaterial-based colorimetric sensors exhibit enhanced selectivity and comparatively higher sensitivity, and allow onsite detection. Such nanosensors are cost-effective and show upgraded performance compared with other samples, and play a prominent role in a wide range of analytical applications. Additionally, the synthesized metallic NPs show better stability, minimal toxicity and biocompatibility, hence attributing them with superior properties compared to other sensors. Among different types of colorimetric-based assays employed for surface modification, NP-based biosensors have received tremendous attention due to their quick response and high specificity. The future scope of this field is to develop more approachable colorimetric probes with "non-aggregation" processing, driving this field toward a new trend of Au and Ag NPs-based probes. The fabrication of hand-held devices, digital imaging software and point-of-care technologies is also of great interest to researchers. Thus, this method may deliver a bright future for Au and Ag NPs-based colorimetric probes.

### 1. Introduction

The detection of environmental contaminants and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) related to various fields, either from environmental or biological samples, has been possible due to the unique and superior properties of nanomaterials (NMs). Many research studies have reported a wide range of applications for nanostructures in developing detection systems for environmental contaminant and SARS-CoV-2, with the challenges faced.<sup>1–5</sup> NMs exhibit high surface reactivity, high

surface area, strong adsorption capacity, and high catalytic efficiency.<sup>1,2</sup> A variety of NMs have been used to design efficient sensors for the detection of target species, such as metal and metal oxide nanoparticles (NPs), carbon-based NMs (as polymeric NMs) and silicon. The size-dependent properties, reactivity, large surface-to-volume ratio (S/N) and their high degree of functionalization leads to nanosensors with excellent sensitivity and selectivity.<sup>2,3</sup> Aside from different properties, functionalization is another significant factor, using a variety of organic ligands *via* covalent bond formation, that improves the responses of NPs toward the detection of environmental toxicants and SARS-CoV-2.<sup>3</sup>

Among the various NPs, the advantageous properties of gold (Au) and silver (Ag) NPs, such as unique optical,

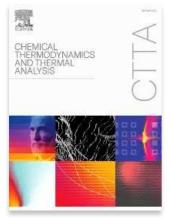
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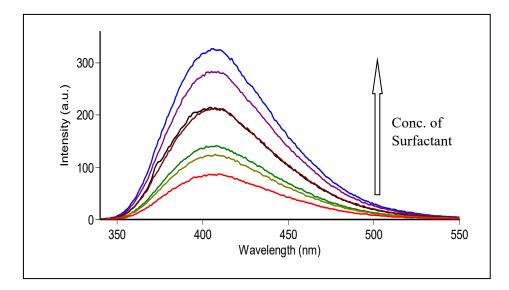
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### MicellizationProperties of Quinolinium Based Surfactants: 1-alkylquinolinium bromide and 6-hydroxy-1-alkylquinolinium-bromide by Fluorimetry, Conductivity and Surface tension measurements and its Parameters

Jyotsna Lakra<sup>1</sup>, Deepti Tikariha<sup>1</sup>, Birendra Kumar\*<sup>3</sup> and Kallol K. Ghosh<sup>2</sup>

**Graphical Abstract** 



Flourescencespectra shows that the intensity of the solution increases with increasing concentration of surfactant(1-octadecyl quinolinium bromide).

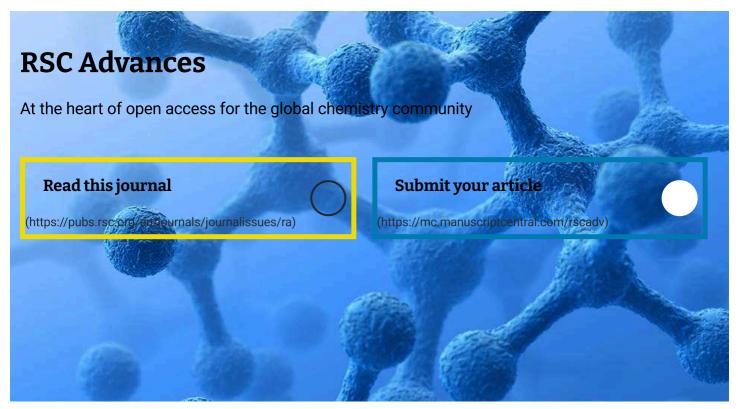


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#### Introduction 1.

Graphene quantum dots (GQDs) are new emerging members of the luminescent carbon family.<sup>1-4</sup> These are crystalline semiconductors prepared using graphene and single or 4-5 layered zero-dimensional graphene sheets with a diameter <20 nm of the exciton Bohr radius. GQDs exhibit remarkable physicochemical, electronic and optical (photoluminescence (PL) and electrochemiluminescence (ECL)) properties with good photostability. GQDs also exhibit multicolour emission, biocompatibility and chemical inertness derived from the quantum confinement and edge effects.5,6 Thus, GQDs are desirable candidates for tremendous applications, including biosensing, bioimaging, optical sensing, photocatalysis, optoelectronics, etc.<sup>7,8</sup> Naik et al.<sup>4</sup> studied the effect of pH on GQDs by developing a molecular scale rapid synthetic method for GQDs using citric acid as a carbon precursor. Li et al.2 developed sulphur and nitrogen co-doped GQD-assisted chemiluminescence for the sensitive detection of tryptophan and mercury in human plasma and water samples. Zhao et al.60 synthesized oxygenenriched N-GQDs via a green synthetic method and reported

### Facile and scalable synthesis of un-doped, doped and co-doped graphene quantum dots: a comparative study on their impact for environmental applications<sup>†</sup>

Reena Suryawanshi, Ramsingh Kurrey, Sushama Sahu and Kallol K. Ghosh 🗅 \*

In recent years, graphene quantum dots (GQDs) received huge attention due to their unique properties and potential applicability in different area. Here, we report simple and facile method for the synthesis of GQDs and their functionalization by doping and co-doping using different heteroatom under the optimized conditions. The doping and co-doping of GQDs using boron and nitrogen have been confirmed by FTIR and TEM. The UV-visible and fluorescence techniques have been used to study the optical properties and stability of functionalized GQDs. Further, the screening for enhancement of quantum yields of all GQDs were performed with fluorescence and UV-visible spectra under the optimized conditions. The average QY was obtained as 16.0%, 83.6%, 18.2% and 29.6% for GQDs, B-GQDs, N-GQDs and B,N-GQDs, respectively. The sensor was used to determine paraoxon in water samples. The LOD was observed to be 1.0  $\times$  10<sup>-4</sup> M with linearity range of 0.001 to 0.1 M. The RSD was calculated for the developed B,N-GQDs based sensor and observed to be 2.99% with the regression coefficient as 0.997. All the doped, co-doped and un-doped GQDs possess remarkable properties as a fluorescent probe.

> their advantages in pH-sensitive photoluminescence and mercury detection.

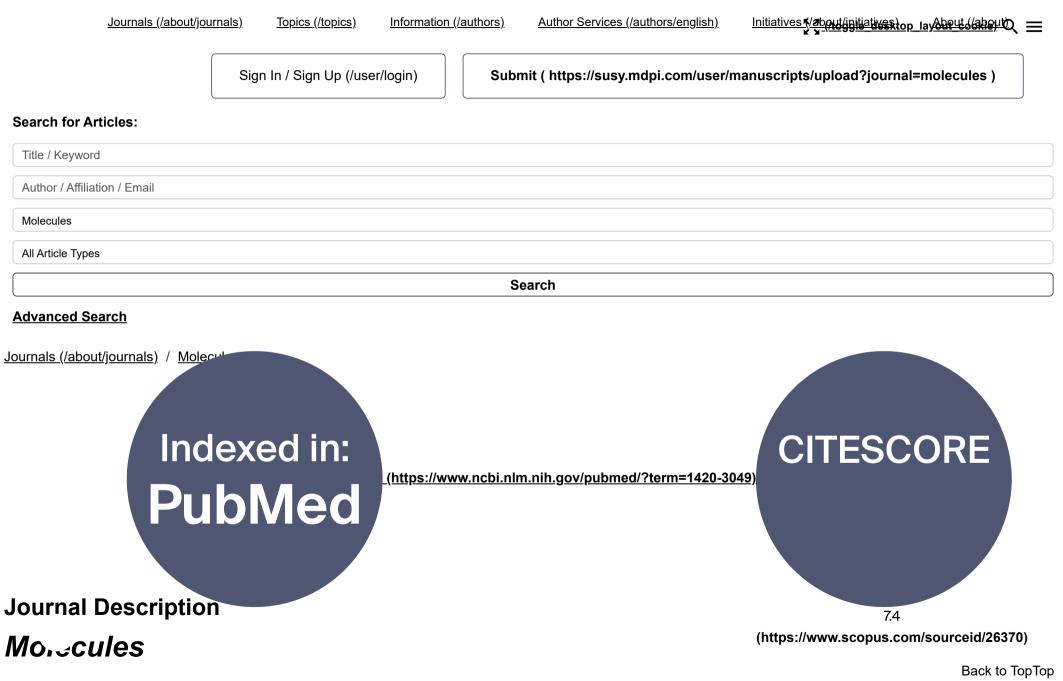
> Recently, graphene and graphene-based materials have gained wide attention owing to various applications.9 Doping and co-doping of GQDs with various heteroatoms, such as boron, sulphur, nitrogen, fluorine, chlorine, bromine, iodine, potassium and selenium, and co-dopants have proven to be effective approaches to modulate their intrinsic electronic, luminescence and reactive properties.<sup>10,11</sup> Yu et al.<sup>12</sup> studied functionalized GQDs via electrochemical exfoliation of carbon fibers for the detection of sulfide ions. Herein, GQDs show fascinating properties and size-dependent optical properties as an environmentally friendly system.

> Huang et al.13 developed a highly fluorescent nanoprobe carbon dot-desferrioxamine B (CD-DB) via the conjugate connection of CDs and desferrioxamine B for the detection of iron ions. The determination of the fluctuation of ascorbic acid induced by hypoxia in cells and in vivo system. The nanoprobe exhibited excellent sensitivity and selectivity for the detection of  $Fe^{3+}$  and AA. Since a decade, many researchers have reported the synthesis and functionalization methods of graphene based materials to enhance their application in various fields. The highly fluorescent behaviour of graphene-based materials has gained increasing attention.14-16 GQDs were synthesized by the use of citric acid as a precursor and then characterized by fluorescence and UV-visible spectroscopic techniques. Furthermore, graphene was used as sensor for sensitive and selective

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*<sup>†</sup>* Electronic supplementary information (ESI) available. See DOI: https://doi.org/10.1039/d2ra05275j.





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# Article Sustainable Phenylalanine-Derived SAILs for Solubilization of Polycyclic Aromatic Hydrocarbons

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Abstract: The solubilization capacity of a series of sustainable phenylalanine-derived surface-active ionic liquids (SAILs) was evaluated towards polycyclic aromatic hydrocarbons-naphthalene, anthracene and pyrene. The key physico-chemical parameters of the studied systems (critical micelle concentration, spectral properties, solubilization parameters) were determined, analyzed and compared with conventional cationic surfactant, CTABr. For all studied PAH solubilization capacity increases with extension of alkyl chain length of PyPheOC<sub>n</sub> SAILs reaching the values comparable to CTABr for SAILs with n = 10-12. A remarkable advantage of the phenylalanine-derived SAILs PyPheOC<sub>n</sub> and PyPheNHC<sub>n</sub> is a possibility to cleave enzymatically ester and/or amide bonds under mild conditions, to separate polycyclic aromatic hydrocarbons in situ. A series of immobilized enzymes was tested to determine the most suitable candidates for tunable decomposition of SAILs. The decomposition pathway could be adjusted depending on the choice of the enzyme system, reaction conditions, and selection of SAILs type. The evaluated systems can provide selective cleavage of the ester and amide bond and help to choose the optimal decomposition method of SAILs for enzymatic recycling of SAILs transformation products or as a pretreatment towards biological mineralization. The concept of a possible practical application of studied systems for PAHs solubilization/separation was also discussed focusing on sustainability and a green chemistry approach.

**Keywords:** surface-active ionic liquids (SAILs); enzymatic decomposition; biodegradability; sustainability; solubilization; polycyclic aromatic hydrocarbons (PAHs)

#### 1. Introduction

Ionic liquids (ILs) have been widely used in many industries [1–3] and are one of the core focuses of research over the past two decades [4,5]. ILs are proposed as more desirable than conventional volatile solvents in many physical and chemical processes, often referred as "green" solvents [6]. They can be of natural origin and be prepared by a "benign by design" approach [5,7]. Designing ILs that lead to a reduction in the losses of solvents as well as less damage to the environment is an important aspect in green chemistry [6]. Ionic liquids in general fulfil many of the 12 criteria as a green solvent related to the availability, price, recyclability, synthesis, toxicity, biodegradability, performance, stability, flammability, storage, and renewability [8]. Ionic liquids can offer a better alternative to volatile solvents, which has led to its massive use in industrial applications such as separation and purification, and as chemical catalysts, biorefinery concepts [3], extractions [1] and others [9–12]



Citation: Kapitanov, I.V.; Sudheer, S.M.; Yadav, T.; Ghosh, K.K.; Gathergood, N.; Gupta, V.K.; Karpichev, Y. Sustainable Phenylalanine-Derived SAILs for Solubilization of Polycyclic Aromatic Hydrocarbons. *Molecules* **2023**, *28*, 4185. https://doi.org/10.3390/ molecules28104185

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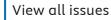
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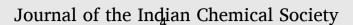
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# Analytical approaches on some selected toxic heavy metals in the environment and their socio-environmental impacts: A meticulous review

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#### ARTICLE INFO

Keywords: Heavy metals Socio-environmental impacts Analytical techniques Extraction methods Removal and remediation methods

#### ABSTRACT

Heavy metals are a group of metals and metalloids that have relatively high density and are toxic even at ppb levels. The excess intake of heavy metals in human bodies though the environment may cause various humans health problems. Analytical approaches of some selected toxic heavy metals in the environment and their socioenvironmental impacts are discussed in this review. In this present investigation, we have also discussed the design and development of nanomaterials for the detection of metal ions along with kinetic approaches. The isolation or pre-concentration and determination of heavy metals from complex matrices become challenging for analytical chemists and researchers. The fundamentals on sample preparation and analysis of some selected heavy metals employing different analytical tools for qualitative and quantitative determination of these pollutants in real samples are also discussed. In addition, this compiled work enhanced our knowledge in learning about pathway mechanisms and the degree of their risk assessment.

#### 1. Introduction

The heavy metals are considered to be one of the main sources of the pollutants in the environment, since they have significant toxic effect on its ecological and measurable quantities [1]. The metals having high densities, atomic weights, or atomic numbers are called heavy metals, and they are naturally present in environmental and biological samples in different composition of origins [2]. Any metallic chemical element with a relatively high density that is dangerous or poisonous at low concentrations is classified as heavy metal. Some heavy metals such as mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), iron (Fe), copper (Cu), cobalt (Co), vanadium (V), zinc (Zn), manganese (Mn), nickel (Ni), and lead (Pb) are very essential as nutrients for biochemicals and physiologicals functioning [3-5]. Main sources for heavy metals as environmental pollutants are industrial and agriculture waste, mining, tailing, occupational exposure and paints etc [6]. On the other hand some heavy metals are highly toxic due to their extensive use and widespread distribution in the environment [7,8]. The permissible limits of heavy metals have been reported by World Health Organization (WHO) and Environmental Protection Agency (EPA) etc to

set discharge levels of environmental pollutants into the atmosphere [9]. The permissible limits has been set by different organizations/agencies in the ranged of 10–250 mg/L. If the heavy metal cross their permissible limits may causes various human health problems such lungs, kidney and liver damage, heart attack and disturbing nervous system [10]. A Permissible limit set of different regulatory agencies for heavy metals are shown in Table 1.

Majorities of the authors have been reported that the heavy metals are easily absorbed onto biological samples due to the various chemical and physical phenomenons' [11]. In addition, industrial and agriculture waste, mining, tailing, occupational exposure and paints waste containing large amount of heavy metal are release into the environment. Heavy metals are ubiquitous distributed non-biodegradable chemical substances that lead to a greater risk to human health by its accumulation in the human body through different ways such as air, beverages, vehicle emissions, batteries, food chain, and industrial activities in which water plays a key role [12–15]. The excess intake of heavy metals though the others human activities may cause various human health problems such as cardiovascular diseases, cancer mortality, neurological disorders [16]. These are increase the environmental concentration of

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Preface

Roberto Gobetto, Alceo Macchioni, Maurizio Peruzzini, Riccardo Pettinari, Valerio Zanotti Article 100495





Research article Open access NIR-emission from Yb(III)- and Nd(III)-based complexes in the solid state sensitized by a ligand system absorbing in a broad UV and visible spectral window Enrico Cavalli, Silvia Ruggieri, Silvia Mizzoni, Chiara Nardon, ... Fabio Piccinelli Article 100388

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Abstract

# Abstract

In this contribution, we present the synthesis, characterization and spectroscopic investigation of the heteroleptic (R,R)-YbL1(tta) and (R,R)-NdL1(tta) complexes (with tta=2-thenoyltrifluoroacetonate and L1=N,N'-bis(2-(8hydroxyquinolinate)methylidene)-1,2-(R,R or S,S)-cyclohexanediamine) in the solid state. The *f*-*f* metal-centered NIR luminescence emission of Nd(III) and Yb(III) is efficiently sensitized by both chromophoric ligands in a very broad range of wavelengths [from 250 to 600nm, in the case of Nd(III) and from 250 to 650nm, for Yb(III)]. A possible energy transfer mechanism is proposed: for (R,R)-NdL1(tta) complex a classical Ligand-to-Metal Energy Transfer (LMET) mechanism (*antenna effect*) is suggested, whilst in the case of the (R,R)-YbL1(tta) complex, the presence of a ligandto-metal charge transfer (LMCT) state determines the sensitization of Yb(III)



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# Recent advances on analytical methodologies for screening and detection of biophenols and their challenges: A brief review

Ramsingh Kurrey<sup>a,\*</sup>, Anushree Saha<sup>a</sup>, Shubhra Sinha<sup>a</sup>, Yogeshwari Sahu<sup>a</sup>, Madhuri Khute<sup>b</sup>, Bhuneshwari Sahu<sup>a</sup>, Manas Kanti Deb<sup>a</sup>

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#### ARTICLE INFO

Keywords: Biophenols Phytochemical study Sources, analytical methodologies Problem and challenges

#### ABSTRACT

Biophenols (BPs) are one of the natural phytochemical products, found majorly in fruits, cereals, vegetables and beverages. BPs has gotten a lot of press in recent years due to their abundance in nature as well as biological activities. Furthermore, they are potential targets for food and pharmaceutical industries. Many extraction techniques are presented in this paper. Among all the techniques presented in this paper, pressing and solvent extraction methods are considered as traditional techniques while supercritical fluid extraction, solid phase microextraction, microwave assisted extraction, and Enzyme assisted extraction are considered as advanced techniques. The fundamentals on analysis of BPs employing different analytical instrumental techniques for qualitative and quantitative determination in environmental samples are also discussed. Only a few specific polyphenolic chemicals have had their safety and health claims formally sanctioned, therefore recent international regulatory laws are examined. In addition to the health claims and marketing of polyphenols as a functional food, the effects of food processing on polyphenol bioavailability are investigated. A number of investigational agents or polyphenol-rich content like HQC/QC and honey, from photochemistry are being also explored for recent antiviral treatment of COVID-19 and their treatment strategies. The day-by-day advancement in the analytical methodologies for BPs detection provides the platform to find out the health favorable components. This review focuses on the various extraction techniques, structure identification of plant extracts and quantification of BPs.

#### Introduction

It was once said, "you are what you eat" and "let food be the medicine and medicine be the food". Although these were said years ago, but they still sustain their core meanings. It is noteworthy and widely accepted fact that a healthy diet and better health are closely related [1]. Phytochemicals refer to the plant chemicals which are non-essential nutrients which play essential defensive properties against diseases. It is believed that these chemicals are produced by the plants to protect themselves. However, according to the recent studies, these chemicals can also protect humans against diseases. Biophenols (BPs) are one of the natural phytochemical products, found majorly in fruits, cereals, vegetables and beverages. Researchers have studied many health benefits of several phenolic rich fruits and vegetables etc. Phenols are basically secondary metabolites of the plants. Secondary metabolite components generally participate in defense systems against radiation or aggression by pathogens. In food, polyphenols may possibly contribute to the flavor, color, acidity, bitterness, odor and oxidative stability [2]. BPs which are found everywhere in plant-based foods, include a gamut of molecules which contain an aromatic ring along with one or more hydroxyl groups on it [3]. Regular intake of phenolic group-based products may help in reducing the incidence of cardiovascular disease, colon cancer, liver disorders, obesity, diabetes etc. These have been discussed by many researchers [1] (see Table 1).

The advantages of BPs include their accessibility and low toxicity while low bioavailability and swift metabolism are their disadvantages [4,5]. It is an interesting fact that the number of literature citations on BP has grown logarithmically in all journals [3]. In the last few decades, compounds from natural sources have proved out to be of potential use in the pharmaceutical as well as others industries and are now being used for the design and development of new pharmacological drugs [4]. Various surveys have been done on BPs, covering many literatures over

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# Analytical approaches on some selected toxic heavy metals in the environment and their socio-environmental impacts: A meticulous review

Alka Patle<sup>a</sup>, Ramsingh Kurrey<sup>b</sup>  $\stackrel{\diamond}{\sim} \boxtimes$ , Manas Kanti Deb<sup>b</sup>, Tarun Kumar Patle<sup>b</sup>, Deepak Sinha<sup>a</sup>  $\stackrel{\diamond}{\sim} \boxtimes$ , Kamlesh Shrivas<sup>b</sup>

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# Abstract

<u>Heavy metals</u> are a group of metals and <u>metalloids</u> that have relatively high density and are toxic even at ppb levels. The excess intake of heavy metals in human bodies though the environment may cause various humans health problems. Analytical approaches of some selected toxic heavy metals in the environment and their socio-environmental impacts are discussed in this review. In this present investigation, we have also discussed the design and development of <u>nanomaterials</u> for the detection of <u>metal ions</u> along with kinetic approaches. The isolation or pre-concentration and determination of heavy metals from complex matrices become challenging for analytical chemists and researchers. The fundamentals on sample preparation and analysis of some selected heavy metals employing different analytical tools for qualitative and quantitative determination of these pollutants in real samples are also discussed. In addition, this compiled work enhanced our knowledge in learning about pathway mechanisms and the degree of their risk assessment.



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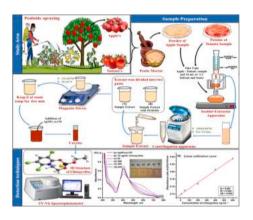
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# $\alpha$ -Cyclodextrin functionalized silver nanoparticles as colorimetric sensor for micro extraction and trace level detection of chlorpyrifos pesticide in fruits and vegetables

Bhuneshwari Sahu, Ramsingh Kurrey<sup>\*</sup>, Beeta Rani Khalkho, Manas Kanti Deb<sup>\*</sup>

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#### G R A P H I C A L A B S T R A C T



#### ARTICLE INFO

Keywords: Silver nanoparticles Alpha-cyclodextrin UV–visible spectrophotometry Chlorpyrifos pesticide Fruits and vegetables samples

#### ABSTRACT

We report a novel UV-Vis spectrophotometry combined with micro Soxhlet extraction method for the detection of CPS pesticide in fruits and vegetables based on alpha-cyclodextrin capped silver nanoparticles (AgNPs/ $\alpha$ -CD). Recently, CPS pesticide has been used as a disinfectant in post-harvesting agriculture to prevent or inhibition of recent outbreaks (COVID-19) with pathogens contamination resulting in an increased concentration of pesticides in the environment. Therefore, we developed an AgNPs/ $\alpha$ -CD as a chemical sensor for the detection of CPS loaded on agricultural products. The sensing mechanism for the detection of CPS pesticide is based on the change in color of the AgNPs/ $\alpha$ -CD from yellow to red followed by the redshift of the LSPR absorption band (410/570 nm) in the UV-Vis region after the addition of the analyte into the NPs solution. The changes of color and LSPR band shifting of AgNPs are observed only in CPS pesticides use to the H-bonding and non-covalent interactions of 4.0 and 13.0 ngmL<sup>-1</sup> have been achieved for CPS pesticide using AgNPs/ $\alpha$ -CD, respectively. These data establish the potential for this sensor for the use CPS pesticide analysis at trace levels.

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# Cationic Polystyrene Resin Bound Silver Nanocomposites Assisted Fourier Transform Infrared Spectroscopy for Enhanced Catalytic Reduction of 4-Nitrophenol in Aqueous Medium

Anushree Saha <sup>1</sup>, Ramsingh Kurrey <sup>1,2</sup>, Santosh Kumar Verma <sup>3</sup> and Manas Kanti Deb <sup>1,2,\*</sup>

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**Abstract**: The present work reported a novel strategy to construct supported cationic-polystyreneresin-bound silver nanocomposites for enhanced catalytic reduction of 4-nitrophenol in an aqueous medium. The Fourier transform infrared spectroscopy (FTIR) was used as a model instrument for the study of catalytic reduction of 4-nitrophenol using cationic-polystyrene-resin-bound silver nanocomposite materials. The mechanism is based on the reduction of 4-nitrophenol to 4-aminophenol due to the electron transfer process that occurred between donor borohydride (BH<sub>4</sub><sup>-</sup>) and acceptor 4-nitrophenol. The polystyrene resin provides support and surface area to increase the catalytic activity of silver nanoparticles. The diffused reflectance-Fourier transform infrared spectroscopy revealed the binding of silver particles onto the surface of cationic polystyrene resin beads. Furthermore, the catalyst was easily separated by the filtration and drying process and was able to reuse. A quantitative analysis of this work has also been performed. The linearity range, the limit of detection, and the limit of quantification obtained for the present method were  $0.1 \times 10^{-4}$  to 1.0 M, 0.6 M, and 2.1 M, respectively. Moreover, a good catalytic efficiency was found to be 96.8%. The advantages of the current method are its simplicity, sensitivity, rapidity, low cost, ease of preparation, and excellent catalytic efficiency to reduce 4-nitrophenol from an aqueous solution.

Keywords: nitro-aromatic compound; composite materials; CR-AgNCs; catalysis; FTIR

#### 1. Introduction

The nitro-aromatic compounds (NAC) are important primary resources for fabricating different types of industrial chemicals, dyes, insecticides, fungicides, pharmaceuticals, and volatile products. The NAC mainly includes nitrophenol and nitrobenzene constituents, which have toxic and perilous properties [1]. The exposure of nitrophenol compounds to environmental parts may cause different types of health problems. According to the US Environmental Protection Agency, nitrophenol has been considered one priority pollutant [2,3]. It causes eye irritation, nausea, headaches, tiredness, and cyanosis in humans [3,4]. Many techniques, such as degradation, adsorption, electrochemical cure, etc., have been proposed regarding its removal from aquatic resources [4,5]. On the other hand, the shortcomings of these conventional managements include high cost, strict operating conditions, slow degradation rate, and efficiency can remarkably slow down their applications on a large scale [4,5]. The nitrophenol conversion or reduction product aminophenol has an essential role in manufacturing palliatives, antipyretics, and different cosmetic products [3,6]. Therefore, the current reduction methods of hydrogenating reduction may be eye-catching for researchers in several fields because it is necessary to convert the pollutants to renewable and reliable resources.

In the past few years, nanotechnology has received enormous attention due to its several potential applications [7]. Further, recent studies of composite materials fabrication and



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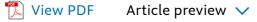
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# Nitrogen and Sulphur co-doped Graphene: A Robust Material for Methylene Blue Removal

Shubhra Sinha<sup>a</sup>, Indrapal Karbhal<sup>a,\*</sup>, Manas Kanti Deb<sup>a,\*</sup>, Anushree Saha<sup>a</sup>, Rajiv Nayan<sup>a</sup>, Ramsingh Kurrey<sup>a</sup>, Shamsh Pervez<sup>a</sup>, Kallol K. Ghosh<sup>a</sup>, Santosh Singh Thakur<sup>b</sup>, Manish K. Rai<sup>a</sup>, Manmohan L. Satnami<sup>a</sup>, Kamlesh Shrivas<sup>a</sup>

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In the recent past, heteroatom (N, P, B and S) doping on graphene and its budding application opportunities have attained great attention. It is noteworthy that chemical doping helps to modify the properties of graphene and unlocks various potential features that have widespread applications like water purification, energy storage, biomarker, catalyst and many more. It is seen that in the case of undoped graphene, the antibonding  $(\pi^*)$  and bonding  $(\pi)$  orbitals (which make up its conduction and valence bands respectively) are degenerate. Furthermore, it is remarkable that supreme, undoped graphene is chemically inert in nature. This is because, its delocalized  $\pi$  system tightly binds and passivates its unpaired electrons, which hinder its certain properties like reactivity and absorptivity. Providentially, doping on graphene with heteroatoms can confer it with plentiful active sites. In addition, its adaptable nature allows it to be used as a part of composite materials since chemical modifications facilitate favourable adjustment of its surface properties [1–3]. The dopant atoms exert local chemical changes in the conventional structure of graphene, thereby, improving its electrical and thermal conductivities and also its charge carrier densities. These chemical treatments eventually cause various structural defects and the formation of new functional groups on graphene. Hence, doping on graphene with heteroatoms has eventually opened up new opportunities in the field of dye removal and various other fields [4–6].

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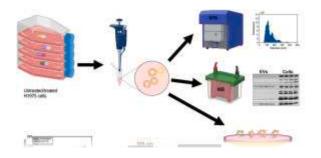


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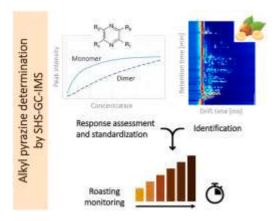
Monitoring alkyl pyrazines in roasted hazelnuts by SHS-GC-IMS: IMS response assessment and standardization

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# Recognition of malathion pesticides in agricultural samples by using $\alpha$ -CD functionalized gold nanoparticles as a colorimetric sensor

Bhuneshwari Sahu, Ramsingh Kurrey, Manas Kanti Deb<sup>\*</sup>, Beeta Rani Khalkho, Suryakant Manikpuri

ABSTRACT

School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur, CG-492010, India

# Herein, a rapid, precise alpha-cyclodextrin ( $\alpha$ -CD) based gold nanoparticles (AuNPs) for selective detection of malathion pesticides has been reported. These are organophosphorus pesticides (OPPs), that can cause a neurological disease by inhibiting the activity of acetylcholinesterase (AChE). It is important to exploit a quick and sensitive approach for monitoring OPPs. Hence in the present work, a colorimetric assay for the detection of malathion has been developed as a model of OPPs from the environmental sample matrices. The physical and chemical properties of synthesized alpha-cyclodextrin stabilized gold nanoparticles (AuNPs/ $\alpha$ -CD) were studied with various characterization techniques, including UV–visible spectroscopy, TEM, DLS and FTIR. The designed sensing system displayed linearity in the broad range of malathion pesticide determination in real samples such as vegetables, which resulted in almost 100% recovery rates in all the spiked samples. Thus, due to these advantages, the present study established a selective, facile and sensitive colorimetric platform for the direct detection of malathion within a very short time (5 min) with a low detection limit. The practicality of the constructed platform was further executed by the detection of the pesticide in vegetable samples.

#### 1. Introduction

Malathion is an organophosphate pesticide (OPPs) commonly used in agriculture to control boll weevils and fruit flies. This pesticide is classified as Class III (moderately toxic) by the Environmental Protection Agency (EPA), with evidence of carcinogenicity. The maximum residue limit (MRL) for this pesticide in foods has been set at 8 mg  $L^{-1}$  by the Food and Drug Administration [1]. OPPs are widely applied to improve agricultural products due to their effectiveness against pests destroying crops [2,3]. However, the improper use of OPPs may cause various environmental pollution, such as water and soil, which further lead to food safety issues. According to the World Health Organization (WHO) reports, approximately 1.5 billion children are suffering from diarrhea as a result of taking contaminated food per year, which directly results in more than 3 million deaths [4]. The toxicity of pesticides is directly proportional to their ability to inhibit the enzymatic activity of acetylcholinesterase (AChE). AChE is an important enzyme for the nervous system and it plays a very important role in the decomposition or may cause the failure of organs [6]. To confirm foodstuffs' safety, maximum residue limits (MRLs) of the pesticides have also been established. In this framework, the European Commission (EC) has established a general MRL of 0.01 mg/kg for pesticides in food, and also MRL is recognized for malathion 1 mg/kg by FAO in the fruits [7]. Consequently, there is a need to develop a sensitive method for the detection of OPPs. The conventional analytical methods for the determination of mal-

degradation of acetylcholine [5]. The accumulation of acetylcholine

The conventional analytical methods for the determination of malathion like enzyme-linked immune sorbent assay (ELISA) [8], surface-enhanced Raman scattering (SERS) technique [9], gas chromatography (GC) [10], colorimetric detection method and molecular imprinting technique [11,12] that have been applied for the determination of pesticides from the environmental samples. All these analytical techniques require sample pre-treatments, and are time-consuming, complicated and expensive to implement. Currently, because of the ease of use, the ability to perform on-site analysis, and to provide naked-eye visual detection, the colorimetric method has been found as a

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# **BTEX in Ambient Air of India: a Scoping Review of their Concentrations, Sources, and impact**

Aishwaryashri Tamrakar · Shamsh Pervez · Madhuri Verma · Dipanjali Majumdar · Yasmeen Fatima Pervez · Carla Candeias · Princy Dugga · Archi Mishra · Sushant Ranjan Verma · Manas Kanti Deb · Kamlesh Shrivas · Manmohan L. Satnami · Indrapal Karbhal

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Abstract Toxic gaseous organic air pollutants such as benzene, toluene, ethylbenzene, and xylene isomers (m, p, and o-x) (BTEX) are considered hazardous due to its adverse impacts on human health and on climate change. This review identifies the major research questions addressed so far and the research gap in research articles, published between 2001 and 2022, focusing on the ambient BTEX concentrations in different locations in India along with its sources, ozone formation potential (OFP), and associated health risks. The ambient levels of BTEX were also compared with those of other Asian countries. A comparison of ambient BTEX levels with different microenvironments in India is also presented. BTEX concentrations were found in the range of 30.95 to 317.18  $\mu$ g m<sup>-3</sup> and multi-fold higher in urban environments than those measured in the rural air. In most

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#### D. Majumdar

CSIR-National Environmental Engineering Research Institute, EKDP, E. M. Bypass, Kolkata Zonal Laboratory, i-8, Sector CKolkata-700 107, Kolkata, India reported studies, the order of occurrence of BTEX compounds was toluene>benzene>xylene isomers>ethylbenzene and winter had higher concentrations than in other seasons, including summer. As far as BTEX levels in classified areas of urban environments are concerned, traffic locations have shown the highest BTEX concentrations, followed by residential, commercial, and industrial locations. OFP indicated that xylene isomers and toluene contributed to ozone formation. The major gaps in reported studies on BTEX measurement are (1) source apportionment; (2) impact on lower tropospheric chemistry, human health, and climate change; and (3) removal techniques from air.

**Keywords** BTEX · Ozone formation potential (OFP) · Volatile organic compound (VOCs)

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In the recent past, heteroatom (N, P, B and S) doping on graphene and its budding application opportunities have attained great attention. It is noteworthy that chemical doping helps to modify the properties of graphene and unlocks various potential features that have widespread applications like water purification, energy storage, biomarker, catalyst and many more. It is seen that in the case of undoped graphene, the antibonding  $(\pi^*)$  and bonding  $(\pi)$  orbitals (which make up its conduction and valence bands respectively) are degenerate. Furthermore, it is remarkable that supreme, undoped graphene is chemically inert in nature. This is because, its delocalized  $\pi$  system tightly binds and passivates its unpaired electrons, which hinder its certain properties like reactivity and absorptivity. Providentially, doping on graphene with heteroatoms can confer it with plentiful active sites. In addition, its adaptable nature allows it to be used as a part of composite materials since chemical modifications facilitate favourable adjustment of its surface properties [1-3]. The dopant atoms exert local chemical changes in the conventional structure of graphene, thereby, improving its electrical and thermal conductivities and also its charge carrier densities. These chemical treatments eventually cause various structural defects and the formation of new functional groups on graphene. Hence, doping on graphene with heteroatoms has eventually opened up new opportunities in the field of dye removal and various other fields [4–6].

However, it is worth mentioning that if pure catalysts are employed for the decomposition of such stubborn dyes, then it would require a longer reaction time and larger reactor volume to achieve an acceptable amount of adsorption. Therefore, doping can be employed as an efficient alternative approach to enhance the catalytic property of catalysts and modulate their optical and other properties [7,8]. Among various heteroatoms, nitrogen and sulphur are two of the most commonly used dopants in the case of graphene and its derived materials due the presence of active lone pair of electrons in nitrogen and sulphur [9].

Methylene blue (MB), which is also known as methylthioninium chloride, is a synthetic basic dye. It is an organic chloride salt that has 3,7-bis(dimethylamino)phenothiazine-5-ium as the counter ion (Fig. 1).

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# **BTEX in Ambient Air of India: a Scoping Review of their Concentrations, Sources, and impact**

Aishwaryashri Tamrakar · Shamsh Pervez · Madhuri Verma · Dipanjali Majumdar · Yasmeen Fatima Pervez · Carla Candeias · Princy Dugga · Archi Mishra · Sushant Ranjan Verma · Manas Kanti Deb · Kamlesh Shrivas · Manmohan L. Satnami · Indrapal Karbhal

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**Keywords** BTEX · Ozone formation potential (OFP) · Volatile organic compound (VOCs)

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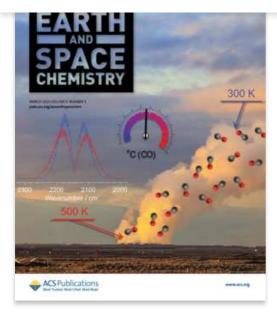
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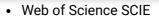
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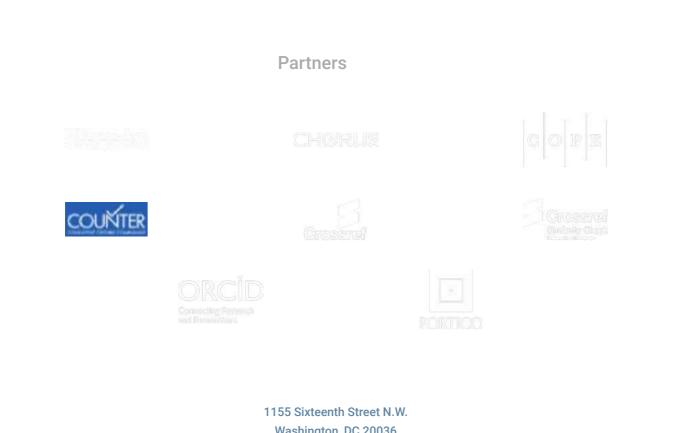
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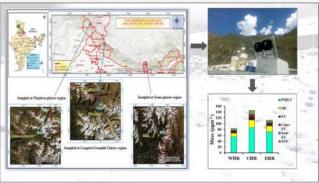
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# Atmospheric Abundance of PM<sub>2.5</sub> Carbonaceous Matter and Their Potential Sources at Three High-Altitude Glacier Sites over the Indian Himalayan Range

Sushant Ranjan Verma, Shamsh Pervez,\* Papiya Mandal, Judith C. Chow, John G. Watson, Syed Muzaffarali Andrabi, Madhuri Verma, Princy Dugga, Noor Afshan Khan, Yasmeen Fatima Pervez, Archi Mishra, Manas Kanti Deb, Indrapal Karbhal, Suresh Tiwari, Kallol K. Ghosh, Kamlesh Shrivas, and Manmohan Lal Satnami



ABSTRACT: This study inspects the concentrations of fine particulate matter (PM<sub>2.5</sub>) mass and carbonaceous species, including organic carbon (OC) and elemental carbon (EC), as well as their thermal fractions in the Indian Himalayan glacier region at the western Himalayan region (WHR; Thajiwas glacier, 2799 m asl), central Himalayan region (CHR; Gomukh glacier, 3415 m asl), and eastern Himalayan region (EHR; Zemu glacier, 2700 m asl) sites, throughout the summer and winter periods of 2019–2020. Ambient PM<sub>2.5</sub> samples were collected on quartz fiber filters using a low-volume sampler, followed by carbon (OC and EC) quantification using the IMPROVE A thermal/optical reflectance methodology. Different seasonal variations in PM25 and carbonaceous species levels were found at all three sites



investigated. Averaged PM<sub>2.5</sub> mass ranged 55–87  $\mu$ g m<sup>-3</sup> with a mean of 55.45 ± 16.30  $\mu$ g m<sup>-3</sup> at WHR, 86.80 ± 35.73  $\mu$ g m<sup>-3</sup> at CHR, and 72.61  $\pm$  24.45  $\mu$ g m<sup>-3</sup> at EHR. Among the eight carbon fractions, high-temperature OC4 (evolved at 580 °C in the helium atmosphere) was the most prevalent carbon fraction, followed by low-temperature OC2 (280 °C) and EC1 (580 °C at 2% oxygen and 98% helium). Char-EC representing incomplete combustion contributed to 56, 67, and 53% of total EC, whereas soot-EC contributed to 38, 26, and 43% of total EC in WHR, CHR, and EHR, respectively. The measured OC/EC ratios imply the presence of secondary organic carbon, whereas char-EC/soot-EC ratios suggested that biomass burning could be the predominant source of carbon at CHR, whereas coal combustion and vehicular emission might be dominant sources at WHR and EHR sites. KEYWORDS: PM<sub>2</sub>, Himalayan glacier aerosol, carbonaceous matters, char-EC and soot-EC, secondary organic aerosol, biomass burning

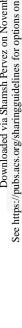
### 1. INTRODUCTION

Carbonaceous aerosols, including organic and elemental carbon, are important components of suspended particulate matter (PM), especially in the respirable fraction with aerodynamic diameters less than 2.5  $\mu$ m(PM<sub>2.5</sub>).<sup>1</sup> These carbonaceous aerosols work as climate forcing<sup>2</sup> agents and contribute to glacier retreat via interactions with solar radiation in the atmosphere.<sup>3,4</sup> The Himalayan glacier contains the most extensive glacial area outside the polar regions and is also known as the "Third pole".<sup>5</sup> Severe glacier retreat in the Himalayan region has the potential to disrupt water availability to billions of residents living in the Indo-Gangetic plain.<sup>5-11</sup> Because of lower population density and minimal industrial activities, the Himalayan region is considered to be one of the most pristine region, alongside the Arctic and Antarctic.

However, the emergence of atmospheric brown clouds (ABCs) over south Asia raised environmental concerns.<sup>12–14</sup> Numerous studies have suggested that long-range transport of pollutants from the Indo-Gangetic plain to the Himalayan region during premonsoon is the vital factor.<sup>15,16</sup> In addition. local sources from low lands of the Himalayan region also contribute to air pollution.<sup>17</sup> Most of studies were conducted in the foothills<sup>18-20</sup> rather than high altitudes of the Himalayan region.<sup>21-23</sup> This study measures ambient PM<sub>2.5</sub> and carbonaceous matter (OC and EC) over three subregions of Himalayan glacier locations to evaluate associated spatiotem-

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# Nitrogen and Sulphur co-doped Graphene: A Robust Material for Methylene Blue Removal



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#### ARTICLE INFO

Keywords: Graphene Adsorption Doping Methylene blue and removal

#### ABSTRACT

N, S co-doped graphene (NSG) has been synthesized by using graphene oxide, cyanamide and sodium sulphide as a source of C, N and S respectively. Due to its excellent electronic properties and stability, NSG has been used as an adsorbent for methylene blue (MB) removal from aqueous solution. Adsorption efficiencies of Graphene, N-doped graphene, S-doped graphene and NSG were compared during the study and it was found that NSG was the most efficient material for the adsorption of MB. The study was carried out in the UV-visible region by observing the changes in absorbance. NSG has excellent properties to adsorb the MB dye with a removal efficiency of  $93.76\pm0.2\%$ . Additionally, desorption studies were also carried out using 0.1 M cetylpyridinium chloride as cationic surfactant and the desorption% was found to be  $50.28\pm0.1\%$ , signifying its reusability as an adsorbent. This indicates that NSG opens a new window for the design of heteroatom-doped carbon material as well as its application in the adsorption studies. Accordingly, the synthesized material will be employed for wastewater treatment as a reusable adsorbent of MB in the near future with high efficiency and appreciable stability. In addition, the material has several other future applications such as electrode material for supercapacitor battery, sensor, adsorbent for metal ions and biomolecules, etc.

#### 1. Introduction

In the recent past, heteroatom (N, P, B and S) doping on graphene and its budding application opportunities have attained great attention. It is noteworthy that chemical doping helps to modify the properties of graphene and unlocks various potential features that have widespread applications like water purification, energy storage, biomarker, catalyst and many more. It is seen that in the case of undoped graphene, the antibonding  $(\pi^*)$  and bonding  $(\pi)$  orbitals (which make up its conduction and valence bands respectively) are degenerate. Furthermore, it is remarkable that supreme, undoped graphene is chemically inert in nature. This is because, its delocalized  $\pi$  system tightly binds and passivates its unpaired electrons, which hinder its certain properties like reactivity and absorptivity. Providentially, doping on graphene with heteroatoms can confer it with plentiful active sites. In addition, its adaptable nature allows it to be used as a part of composite materials since chemical modifications facilitate favourable adjustment of its surface properties [1-3]. The dopant atoms exert local chemical changes in the conventional structure of graphene, thereby, improving its electrical and thermal conductivities and also its charge carrier densities. These chemical treatments eventually cause various structural defects and the formation of new functional groups on graphene. Hence, doping on graphene with heteroatoms has eventually opened up new opportunities in the field of dye removal and various other fields [4–6].

However, it is worth mentioning that if pure catalysts are employed for the decomposition of such stubborn dyes, then it would require a longer reaction time and larger reactor volume to achieve an acceptable amount of adsorption. Therefore, doping can be employed as an efficient alternative approach to enhance the catalytic property of catalysts and modulate their optical and other properties [7,8]. Among various heteroatoms, nitrogen and sulphur are two of the most commonly used dopants in the case of graphene and its derived materials due the presence of active lone pair of electrons in nitrogen and sulphur [9].

Methylene blue (MB), which is also known as methylthioninium chloride, is a synthetic basic dye. It is an organic chloride salt that has 3,7-bis(dimethylamino)phenothiazine-5-ium as the counter ion (Fig. 1).

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# Chemical fractionation of particulate-bound metal(loid)s to evaluate their bioavailability, sources and associated cancer risk in India



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#### HIGHLIGHTS

lates

mode.

mode.

tions

Keywords.

Cancer risk

in Indian ambient fine and coarse particu-

• PM<sub>2.5</sub> metal(loid)s bioavailable fractions are 2.4-fold higher than those for coarse

• Mn has shown highest bioavailable fraction in both fine and coarse particulate

 Source apportionment of fine and coarse particulate metal(loid)s bioavailable frac-

Bioavailable index, contamination factors and Carcinogenic risks were estimated.

ARTICLE INFO

Editor: Philip K. Kopke

Chemical fractionation

Source apportionment

Bioavailable fraction

Health risk index

Source markers

### Chemical fractionation of 11 metal(loid)s

Bioavailability of particulate toxic elements, source and associated toxicity

#### ABSTRACT

Eleven potentially toxic metal(loid)s (Al, As, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, and Zn), proven source markers of mineral based coal-fired industrial emissions and vehicular exhausts, were analysed using the four steps sequential extraction method to evaluate metal(loid)s concentration, in total and fractions of bioavailable and non-bioavailable for fine (PM<sub>2.5</sub>) and coarse (PM<sub>10-2.5</sub>) particulate modes. A total of 26-day-wise samples with three replications (total number of samples = 78) were collected in January–December 2019 for each PM<sub>10</sub> and PM<sub>2.5</sub> at an urban-residential site in India. In both the coarse and fine particulate modes, Pb and Cr have respectively shown the highest and lowest total concentrations of the measured metal(loid)s, indicating the presence of coal-fired power plants and heavy vehicular activities near to study area. In addition, Mn has shown highest bioavailable fraction for both coarse and fine particulate modes. More than 50 % of metal(loid)s concentration, in total to a bioavailable fraction (BAF) were observed in case of As, Cd, Cr, Co, Mn, Ni, and Pb of PM<sub>2.5</sub>. Mn and Zn have shown similar behaviour in the case of coarse particulate mode. Source apportionment of metal(loid)s bioavailable fractions using positive matrix factorization (PMF 5.0) has found three significant sources: crustal and natural dust (30.04 and 39 %), road traffic (49.57 and 20 %), and industrial emission (20.39 and 41 %) for coarse and fine particulate mode, respectively. Cancer risk through the inhalation pathway was high in total concentration but lower in BAF concentration in both age groups (children and adults).

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#### HIGHLIGHTS

lates

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Keywords:

Cancer risk

Health risk index

Source markers

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 Mn has shown highest bioavailable fraction in both fine and coarse particulate

 Source apportionment of fine and coarse particulate metal(loid)s bioavailable frac-

 Bioavailable index, contamination factors and Carcinogenic risks were estimated.

ARTICLE INFO

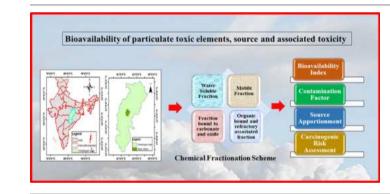
Editor: Philip K. Kopke

Chemical fractionation

Bioavailable fraction

Source apportionment

GRAPHICAL ABSTRACT



#### ABSTRACT

Eleven potentially toxic metal(loid)s (Al, As, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, and Zn), proven source markers of mineral based coal-fired industrial emissions and vehicular exhausts, were analysed using the four steps sequential extraction method to evaluate metal(loid)s concentration, in total and fractions of bioavailable and non-bioavailable for fine (PM<sub>2.5</sub>) and coarse (PM<sub>10-2.5</sub>) particulate modes. A total of 26-day-wise samples with three replications (total number of samples = 78) were collected in January–December 2019 for each PM<sub>10</sub> and PM<sub>2.5</sub> at an urban-residential site in India. In both the coarse and fine particulate modes, Pb and Cr have respectively shown the highest and lowest total concentrations of the measured metal(loid)s, indicating the presence of coal-fired power plants and heavy vehicular activities near to study area. In addition, Mn has shown highest bioavailable fraction for both coarse and fine particulate modes. More than 50 % of metal(loid)s concentration, in total to a bioavailable fraction (BAF) were observed in case of As, Cd, Cr, Co, Mn, Ni, and Pb of PM<sub>2.5</sub>. Mn and Zn have shown similar behaviour in the case of coarse particulate mode. Source apportionment of metal(loid)s bioavailable fractions using positive matrix factorization (PMF 5.0) has found three significant sources: crustal and natural dust (30.04 and 39 %), road traffic (49.57 and 20 %), and industrial emission (20.39 and 41 %) for coarse and fine particulate mode, respectively. Cancer risk through the inhalation pathway was high in total concentration but lower in BAF concentration in both age groups (children and adults).

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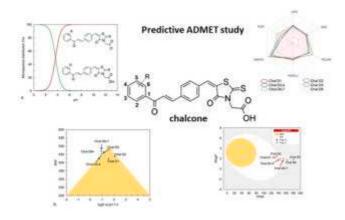
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### Diazotized reagent for spectrophotometric determination of glyphosate pesticide in environmental and agricultural samples

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#### ARTICLE INFO

Keywords: Spectrophotometry Glyphosate p-dimethyl amino benzaldehyde Diazotization Environmental samples

#### ABSTRACT

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#### 1. Introduction

Glyphosate N-(Phosphonomethyl) glycine is a biocide and herbicide with broad spectrum activity that was used in agricultural fields in 1974 for weed control [1]. Herbicides based on glyphosate became available in 1974 and first marketed as round up, these days it is extensively used broad spectrum herbicide. In 2017, state members of the European union gives the re-approval of glyphosate for 5 years and was preceded through intense analysis and discussion that came to light as a consequences due to its impact on ecosystems its potential carcinogenicity, poorly understood fate in environment and human exposure [2,3]. In the urban areas glyphosate is the second most used herbicide and at present it is the most extensively used herbicide in the agricultural sector [4]. The chemical structure of glyphosate is small in size it has three functional groups which is polar (carboxyl, amino, phosphonate) because of that it is heavily retained on soil mineral compounds [5].

Glyphosate products are utilized firstly before plating of traditional agricultural crops and after planting of genetically modified glyphosate resistant crops. Progressively, glyphosate have been applied for

desiccation as a "harvest aid". Additionally, they have been extensively used between trees in groves and orchards. Also it is used for weed control in urban areas along parks and streets. It has also been utilized in waterways to remove aquatic plants. In 2021, about 700,000 tons of glyphosate were used worldwide and 127,000 tons in USA. At present glyphosate is widespread utilize for agricultural production both in developing and industrialized countries. Because of the broad and intensive application of glyphosate and its accumulation in environment and its edible products various major concerns came to light in recent years about ill effects of glyphosate on animals, plants, human health and AMPA for water and soil quality [6].

Various adverse effect of glyphosate including mutagenesis, teratogenesis etc. are the most carcinogenic [7-12]. In 2015, the World Health Organization re-categorizes the herbicide glyphosate as carcinogenic to human [6]. Therefore for environmental point of view, by understanding adsorption of this herbicide is eminent for the prediction of its movement in aquifers and soil. So, it is very important to determine its residues on environmental samples for monitoring health hazard and pollution [13]. Different analytical methods have been reported for the

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**Keywords** BTEX · Ozone formation potential (OFP) · Volatile organic compound (VOCs)

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#### HIGHLIGHTS

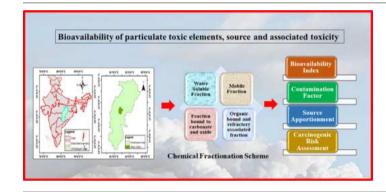
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Editor: Philip K. Kopke

Keywords: Chemical fractionation Bioavailable fraction Source apportionment Cancer risk Health risk index Source markers



#### ABSTRACT

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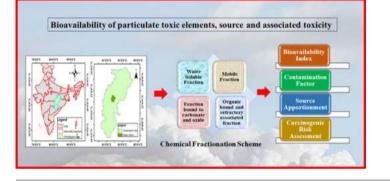
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# Kinetic Study of Solvent Effect on the Hydrolysis of Mono-3, 5-Dimethylaniline Phosphate

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#### Abstract:

The hydrolysis of phosphate esters is one of the most fundamental chemical and biochemical reaction. The kinetic solvent effect on the hydrolysis of mono-3, 5-dimethylaniline phosphate has been studied in aqueous mixtures of varying compositions (0-40% v/v) of some protic and aprotic solvents at four different temperatures. The rate of reactions increases with increasing proportion of solvents. Activation parameters ( $E_a$ ,  $\Delta H^{\neq}$ ,  $\Delta G^{\neq}$ ,  $-\Delta S^{\neq}$ ) have been evaluated. The significance of these parameters have been explained on the basis of solvent-solute interaction, solvent of the transition state of the medium.

**Keywords**: Hydrolysis, mono-3, 5-dimethylaniline phosphate, Solvent effect, Activation parameters.

#### Introduction

Phosphorus is an essential element for all life as the building block of many structural and functional components of living organisms<sup>1,2</sup>. Phosphorus has a significant role in living systems, and so the reactions of phosphate esters in solution and in enzyme are of the great importance<sup>3</sup>. Most of the phosphorus in living system exists in the form of phosphate. Phosphate based compounds are key ingredients in biological system<sup>4</sup>. They play a key role in life processes<sup>5</sup>, in living organism for growth, development and maintenance of all plants and animals. Phosphate esters are the building blocks of life, and are involved in facilitating all cellular processes, from cellular signaling to protein synthesis<sup>6</sup>. Phosphate esters are widely used in variety of industries, including plastics, foams, paints, furniture building materials<sup>7</sup> and electronics<sup>8</sup>. They are used as plasticizers, as flame retardants, as stabilizer for antifoaming and additives to floor polishes, lubricants, lacquers and hydraulic fluids<sup>9</sup>. Most chemical reactions are carried out in solution. Solvent play an important role in determining chemical reactivity<sup>10</sup>. Chemical reactions can be affected by the solvent through several kinds of interactions. Studies on solvent effects are generally carried out by means of relationships between reactivity properties that is reaction rate or several types of selectivity and empirical parameters representing different kinds of solutesolvent interactions<sup>11</sup>. The rate of an elementary chemical reaction may change by order of magnitude when the solvent is changed The role of the solvent in governing a chemical reaction is far from passive<sup>12</sup>. Therefore a proper understanding of solvent effects is essential to any model of chemical reactivity. Solvent influence both chemical reactivity and reaction rates. The importance of solvent effects has long stimulated attempts to define solvent polarity in terms of



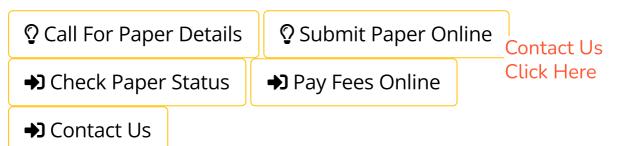
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# SPECTROPHOTOMETRIC DETERMINATION OF TRICHLORFON INSECTICIDE AND ITS APPLICATION IN AGRICULTURAL AND ENVIRONMENTAL SAMPLES

<sup>1</sup>Chhaya Bhatt, <sup>2</sup>Anushree Saha, <sup>3</sup>Suryakant Manikpuri and <sup>4</sup>Manish Kumar Rai

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Abstract: A spectrophotometric method has been developed based on the modification of the Fujiwara reaction for the determination of trichlorfon at ppm level. Trichlorfon on its alkaline hydrolysis gives chloroform, which react with pyridine to produce pink color. In the present method the pink color acquired in the preceding reaction is discharged with a few drops of acetic acid, followed by the addition of p-nitro aniline reagent, which produces a yellow color dye. The absorption maxima of the yellow color dye formed is measured at 430 nm. Beer's law is obeyed in the range of 2.0-5.0 µg/10 mL of Trichlorfon. The molar absorptivity of the colored system is  $4 \times 10^{-5}$  L mol<sup>-1</sup>cm<sup>-1</sup> and Sandell's sensitivity is  $0.20 \times 10^7$  µg cm<sup>-2</sup>. This method is free from interference by other pollutants and can be successfully applied for the determination of trichlorfon in various environmental samples.

#### Index Terms - Pesticide, Trichlorfon, Detection Techniques, Environmental Samples.

#### I. INTRODUCTION

Pesticides are organic toxic compounds used against a wide range of pests that can enter the food chain through a variety of routes, creating health issues in both human and animals. Varieties of ailments are caused due to pesticide exposure [1]. These have been widely utilized to prevent or reduce damage caused by pests, weeds, and illnesses, so benefiting agricultural manufacturing. These are used by farmers in the agriculture industry for crop protection, pre- and post-harvesting. Pesticide use is expected to protect roughly 30% of global agricultural production. [2]. Organophosphate insecticides have significantly increased agricultural output. These are commonly employed in pre and post harvest treatments to combat fruit and vegetable diseases [3]. Because pesticides are among the most dangerous chemical industry products, there is a high demand for disposable, low-cost, and simple monitoring instruments [4].

Organophosphate pesticides have been widely used in recent decades. Apart from agricultural benefits, OPs have negative toxicological consequences on both animal and human populations [5]. Neurotoxins derived from organophosphates are amongst the most dangerous chemicals known. These chemicals have been extensively utilized in modern agriculture as pesticides and insecticides, as well as chemical warfare agents in terrorist attacks or military operations [6]. Trichlorfon [O,O-dimethyl-(2,2,2trichloro-1-hydroxyethyl)-phosphonate] is an organophosphate insecticide that is used to combat cockroaches, crickets, silverfish, bedbugs, cattle grubs, flies, ticks, leaf-miners, and leaf-hoppers [7]. It is crucial for the non-destructive and quick detection of trichlorfon insecticide in fruits, because of the intricacy of the matrix found in vegetables, particularly spicy foods, determining tiny levels of trichlorfon is difficult. [7,8]. However, it is toxic to humans via ingestion and dermal absorption and has the potential to cause tumors, genetic mutations and to affect the reproductive system. Trichlorfon is an organophosphorus ester insecticide that is mildly toxic. Overexposure from manufacturing or use, as well as accidental or purposeful intake, can result in serious poisoning. Trichlorfon is unlikely to constitute a hazard to persons who are occupationally exposed if acceptable work practices, hygienic measures, and safety precautions are followed. Despite its severe toxicity to non-target arthropods, trichlorfon has been utilized with few or no detrimental impacts on environmental creature populations. Trichlofon has very strong dermal and inhalation effects. It is poisonous to humans and other warm-blooded animals. The oral LD50 for rats is 630 mg kg<sup>-1</sup>. Organophosphate pesticide poisoning has been a major cause of concern around the world due to its severe effects on the nervous and reproductive systems of living beings [9]. For agricultural and domestic application, several organophosphorus pesticide formulations are available. Every year, our laboratory receives reports of these insecticides being misused in a number of poisoning instances, including suicide and homicide. Because of the extensive usage of these insecticides, a simple and specific method of detection is required [10]. The detection of human beneficial substances, contaminants as well as pollutants from environmental samples is very necessary and many researchers have reported their work in these regards [11-13]. Previously, a method that





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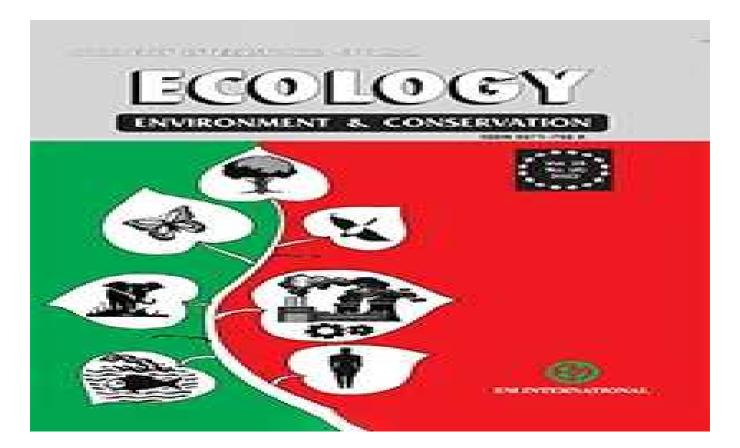
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# Detection of Azoxystrobin in Environmental Samples by using Ftir Spectroscopic Method

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#### ABSTRACT

A new UV-Visible spectrophotometric method for determination of fungicide azoxystobin was developed. The method is based on the bromination of azoxystrobin to form dibromoazoxystrobin which react with Potassium iodide, Potassium iodate mixture in the presence of leucomalachite green (LMG) to form a bluish green colored complex. Characterization was done for the synthesis of bluish green colored complex by using UV-Vis spectrophotometer and FTIR methods. As a result, the UV-Visible absorption spectrum was observed at 615 nm. The limits of detection and limits of quantification were observed at 0.0019 µg ml<sup>1</sup> and 0.0059 µg ml<sup>-1</sup> respectively. We have also studied the conformational and functional group (such as most characteristic band of O-H stretching frequency observed at 3346.49 cm<sup>-1</sup>, Bonding N-H symmetrical is 1645.50 cm<sup>-1</sup>, C=C bending is 691.07 cm<sup>-1</sup>, Symmetrical stretching C-N is 1493.13 cm<sup>-3</sup> and 1404.70 cm<sup>-1</sup>, C-C stretching and other vibrational is 1059.74 cm<sup>-1</sup>). Involved in the complexation between azoxystrobin and bromination by FTIR method. This developed method has been successfully applied for the detection of azoxystrobin in various environmental samples. Beer's law obeyed over the concentration range of 0.5-13 µg mL<sup>-1</sup> in final solution volume of 10 ml. The reproducibility assessed by carrying out seven days replicate analysis of a solution containing 5 µg ml<sup>-1</sup> of azoxystrobin in a final solution of 10 mL. The molar absorptivity of the colour system is 1.936×10<sup>4</sup> L mol<sup>-1</sup> cm<sup>-1</sup> and Sandell's sensitivity is 0.800 ×10<sup>4</sup> µg cm<sup>-2</sup>. The relative standard deviation (RSD) for the absorbance value was found to be 1.9%. The suggested method is free from the interference of other toxicant agents. The analytical parameters were optimized and the method was applied to the determination of azoxystrobin in water, soil and food samples.

Key words : UV-Visible Spectrophotometer, FTIR, Azoxystrobin, Bromination and Leucomalachite green (LMG).

#### Introduction

Pesticides are the major basis with signicant role in ensuring safety from the destruction caused by many pests. At present time, the viable food production can't achieved without the vital role of pesticides. Pesticides are applied directly on the plants which are able to determine for long time in vegetables. When pesticides are use in the field, it is assessed that only about 1% of the pesticide is able to

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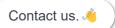
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### SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF QUIZALOFOP-P-ETHYL HERBICIDE IN AGRICULTURAL SAMPLE USING CHARGE TRANSFER COMPLEX

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Abstract- In order to improve crop quality and yield storage life, a wide range of pesticides have been utilized in agriculture. However, due to the expanding population and fast urbanization, pesticide use has increased now more than ever before. The constant usage of these pesticides has led to environmental contamination and health risks for people. A simple and sensitive spectrophotometric method was developed for determination of quizalofop-p-ethyl herbicide in food samples. quizalofop-p-ethyl (QPE) is a post-emergence herbicide that effectively controls grass weeds and is often detected in the environment. However, the biochemical and molecular mechanisms of QPE degradation in the environment remains unclear. quizalofop-p-ethyl (QPE), a unitary R configuration aromatic oxyphenoxypropionic acid ester(AOPP) herbicide, was widely used and had led to detrimental environmental effects The method is based on acid hydrolysis of quizalofop-p-ethyl, quizalofop-p-ethyl get dissociated then the chlorinated part of the dissociated product was reacted with Fe (II) to form vellow color complex. Its  $\lambda$ max was found to be 420nm. The influences of various experimental parameters on the absorbance of the charge transfer complex of quizalofop-p-ethyl with Fe (II) are studied. The absorbance of complex was measured at 420 nm. The charge transfer complex of herbicide with Fe (II) shows molar absorptivity 1.5x10<sup>7</sup>Lmol<sup>-</sup> <sup>1</sup>cm<sup>-1</sup> and Sandell's sensitivity 1.0x10<sup>-5</sup>. Analytical parameters were optimized and successfully applied to the determination of quizalofop-p-ethyl in various samples. The method shows a linear range from 2-18  $\mu g m L^{-1}$ . The percent recovery for determination of quizalofop-p-ethyl in commercial formulations was found to be 89.35-106.57 %. The limit of detection and quantification was found to be 0.188  $\mu$ g mL<sup>-1</sup> and  $0.571 \mu g \ mL^{-1}$  respectively.

*Key Words: Pesticides, Quizalofop-p-ethyl herbicide, Vegetables, UV–Vis spectrophotometer, charge transfer complex.* 

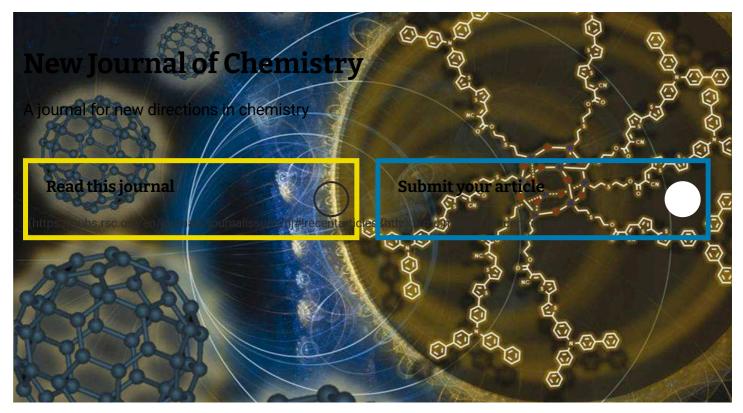


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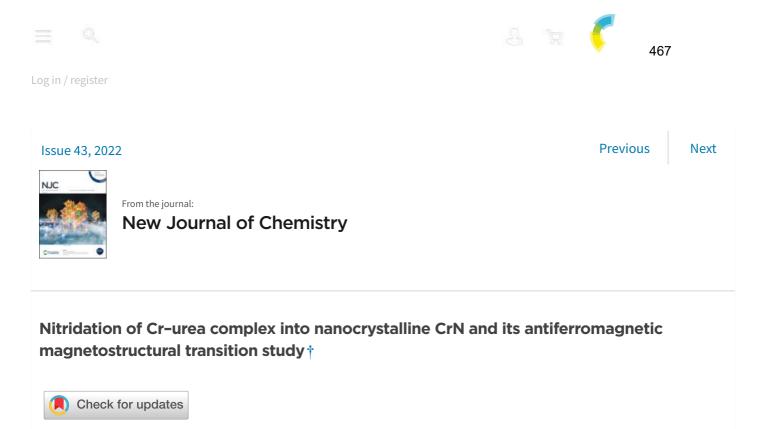
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Dadan Singh, 1 a Saumya Tamrakar, 1 a Kamlesh Shrivas and Khemchand Dewangan 1 \*\*

Author affiliations

# Abstract

An antiferromagnetic nanocrystalline CrN interstitial compound was prepared using  $Cr(NO_3)_3 \cdot 9H_2O$  and urea as starting materials. Initially, a Cr–urea complex was obtained from the solid-state reactions between starting chemicals. Then, the resulting complex was thermally heated to partially decompose into a compound containing Cr–N/Cr–O–N bonds, followed by a nitridation process under the flow of NH<sub>3</sub> gas that replaced all the oxygen with nitrogen from the precursor and produced CrN nanoparticles. The powder X-ray diffraction (XRD) pattern of the nitridated product confirmed the phase-pure formation of cubic rock-salt CrN with the space group  $Fm_3^3m$ . Electron microscopy studies revealed that the CrN nanoparticles agglomerated and the average mean diameter of the nanoparticles was calculated to be 22.92 nm. The high-resolution X-ray photoelectron spectroscopy (XPS) spectra of Cr (2p) and N (1s) confirmed the existence of the (+III) oxidation state of Cr in the sample. The antiferromagnetic characteristics of the prepared agglomerated CrN nanoparticles are discussed in comparison to the literature data available of the bulk counterparts. The zero-field cooled (ZFC) and field cooled (FC) temperature-dependent magnetization studies showed that the CrN nanoparticles experience an antiferromagnetic transition at a Néel temperature of 265.44 K. At this temperature, the CrN nanocrystals undergo a magnetostructural transition, *viz.* a paramagnetic cubic lattice transforms Contents lists available at ScienceDirect

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# Smartphone-integrated printed-paper sensor designed for on-site determination of dimethoate pesticide in food samples

Sanyukta Patel<sup>a</sup>, Kamlesh Shrivas<sup>b,\*</sup>, Deepak Sinha<sup>a,\*</sup>, Monisha<sup>b</sup>, Tarun Kumar Patle<sup>b</sup>, Sanjay Yadav<sup>b</sup>, Santosh Singh Thakur<sup>c</sup>, Manas Kanti Deb<sup>b</sup>, Shamsh Pervez<sup>b</sup>

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<sup>c</sup> Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Koni Bilaspur 495009, Chhattisgarh, India

#### ARTICLE INFO

Keywords: Cu@Ag NPs Smartphone Paper sensor Colorimetry Dimethoate Foods

#### ABSTRACT

Herein, a user-friendly and portable smartphone-integrated printed-paper sensor was designed with Cu@Ag nanoparticles (NPs) for on-site monitoring of dimethoate pesticide in food samples, and the results obtained are compared with those obtained by UV-vis spectrophotometry. The working principle for identification of dimethoate pesticide is the change of yellow color NPs to reddish-yellow with associated bathochromic shift of absorption peak when pesticide introduced onto the fabricated paper or glass vial containing the NPs. A smartphone-color detector App and colorimetry were used for quantitative analysis of dimethoate in food samples. Linearity range for analysis of dimethoate using paper sensor and colorimetry were 100–2000  $\mu g L^{-1}$  and 50–2500  $\mu g L^{-1}$  with detection limit of 30 and 16  $\mu g L^{-1}$ , respectively. The advantages of using smartphone-integrated paper devices are rapid, instrument-free detection and economic in terms of consumption of lower amounts of NPs solution compared to other NPs-based colorimetric methods.

#### 1. Introduction

Pesticides are extensively used in agriculture that increase the yield of the crop as required to meet the needs of the world population. Pesticides are exploited in agricultural land to prevent the growth of bacteria, fungi, weeds, nematodes, rodents, etc. Among different pesticides, organophosphorus pesticides (OPPs) are being globally used because of high insecticidal activity and low diligence (Pan, Sun, Li, Zhan, Xu, & Zhu, 2018; Kim et al., 2017). Dimethoate is one of the important phosphorus based OPPs employed to destroy the growth of the insects on leaves, flowers, fruits, vegetables, etc. The intake of this pesticide through food, water and air results in harmful consequences on human health. The acceptable value for daily intake of dimethoate is 0.002 mg  $kg^{-1}$  body weight day<sup>-1</sup> (FAO/WHO, 1994). The residues of dimethoate in food possess severe health problems such as depression, anxiety, irritability as well as its high exposure can lead to anemia and cancer (Hung, Lee, Hu, & Chiu, 2018; Liu et al., 2013). Hence, the analysis of dimethoate in food and water is a very key issue to avoid the exposure of toxicants that influence human health and other environmental systems.

Gas chromatography (GC) (Ramadan, Lahmek, Jlelati, & Mandil,

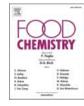
2013), high performance liquid chromatography-mass spectrometry (HPLC-MS) (Montesano, Olsson, Kuklenyik, Needham, Bradman, & Barr, 2007), fluorescence spectrometry (Hung et al., 2018; Hsu et al., 2017), gas chromatography-mass spectrometry (GC-MS) (Xiong, Zhang, Zhang, Zhang, Chen, & Zhang, 2012), capillary electrophoresis-mass spectrometry (CE-MS) (Yang, Xu, Shen, Wang, Xu, Chen, & Fu, 2009), and colorimetry (Mitic, Zivanovic, Miletic, Grahovac, & Pecev, 2012; Das et al., 1994) are commonly employed for separation and identification of pesticides in food and other environmental samples. Although these techniques are sophisticated, sensitive and accurate for the determination of dimethoate at low levels though they require more maintenance cost. Moreover, these instruments are difficult to apply at on-site analysis. On the contrary, colorimetry is a facile, rapid and costeffective method for the analysis of dimethoate. The main limitation of colorimetric assays is making use of chromophoric organic compounds or dyes which are hazardous in nature as well occasionally not found specific to a particular chemical substance in a variety of samples (Mitic et al., 2012; Das et al., 1994). Therefore, another apparent method is needed which should be exempted from the use of chromophoric reagents or dyes.

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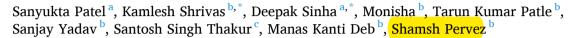
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### Smartphone-integrated printed-paper sensor designed for on-site determination of dimethoate pesticide in food samples



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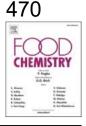
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# Smartphone-integrated printed-paper sensor designed for on-site determination of dimethoate pesticide in food samples



Sanyukta Patel<sup>a</sup>, Kamlesh Shrivas<sup>b,\*</sup>, Deepak Sinha<sup>a,\*</sup>, Monisha<sup>b</sup>, Tarun Kumar Patle<sup>b</sup>, Sanjay Yadav<sup>b</sup>, Santosh Singh Thakur<sup>c</sup>, Manas Kanti Deb<sup>b</sup>, Shamsh Pervez<sup>b</sup>

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ARTICLEINFO	A B S T R A C T
Keywords: Cu@Ag NPs Smartphone Paper sensor Colorimetry Dimethoate Foods	Herein, a user-friendly and portable smartphone-integrated printed-paper sensor was designed with Cu@Ag nanoparticles (NPs) for on-site monitoring of dimethoate pesticide in food samples, and the results obtained are compared with those obtained by UV–vis spectrophotometry. The working principle for identification of dimethoate pesticide is the change of yellow color NPs to reddish-yellow with associated bathochromic shift of absorption peak when pesticide introduced onto the fabricated paper or glass vial containing the NPs. A smartphone-color detector App and colorimetry were used for quantitative analysis of dimethoate in food samples. Linearity range for analysis of dimethoate using paper sensor and colorimetry were 100–2000 $\mu$ gL <sup>-1</sup> and 50–2500 $\mu$ gL <sup>-1</sup> with detection limit of 30 and 16 $\mu$ gL <sup>-1</sup> , respectively. The advantages of using smartphone-integrated paper devices are rapid, instrument-free detection and economic in terms of consumption of lower amounts of NPs solution compared to other NPs-based colorimetric methods.

#### 1. Introduction

Pesticides are extensively used in agriculture that increase the yield of the crop as required to meet the needs of the world population. Pesticides are exploited in agricultural land to prevent the growth of bacteria, fungi, weeds, nematodes, rodents, etc. Among different pesticides, organophosphorus pesticides (OPPs) are being globally used because of high insecticidal activity and low diligence (Pan, Sun, Li, Zhan, Xu, & Zhu, 2018; Kim et al., 2017). Dimethoate is one of the important phosphorus based OPPs employed to destroy the growth of the insects on leaves, flowers, fruits, vegetables, etc. The intake of this pesticide through food, water and air results in harmful consequences on human health. The acceptable value for daily intake of dimethoate is 0.002 mg  $kg^{-1}$  body weight day<sup>-1</sup> (FAO/WHO, 1994). The residues of dimethoate in food possess severe health problems such as depression, anxiety, irritability as well as its high exposure can lead to anemia and cancer (Hung, Lee, Hu, & Chiu, 2018; Liu et al., 2013). Hence, the analysis of dimethoate in food and water is a very key issue to avoid the exposure of toxicants that influence human health and other environmental systems.

Gas chromatography (GC) (Ramadan, Lahmek, Jlelati, & Mandil,

2013), high performance liquid chromatography-mass spectrometry (HPLC-MS) (Montesano, Olsson, Kuklenyik, Needham, Bradman, & Barr, 2007), fluorescence spectrometry (Hung et al., 2018; Hsu et al., 2017), gas chromatography-mass spectrometry (GC-MS) (Xiong, Zhang, Zhang, Zhang, Chen, & Zhang, 2012), capillary electrophoresis-mass spectrometry (CE-MS) (Yang, Xu, Shen, Wang, Xu, Chen, & Fu, 2009), and colorimetry (Mitic, Zivanovic, Miletic, Grahovac, & Pecev, 2012; Das et al., 1994) are commonly employed for separation and identification of pesticides in food and other environmental samples. Although these techniques are sophisticated, sensitive and accurate for the determination of dimethoate at low levels though they require more maintenance cost. Moreover, these instruments are difficult to apply at on-site analysis. On the contrary, colorimetry is a facile, rapid and costeffective method for the analysis of dimethoate. The main limitation of colorimetric assays is making use of chromophoric organic compounds or dyes which are hazardous in nature as well occasionally not found specific to a particular chemical substance in a variety of samples (Mitic et al., 2012; Das et al., 1994). Therefore, another apparent method is needed which should be exempted from the use of chromophoric reagents or dyes.

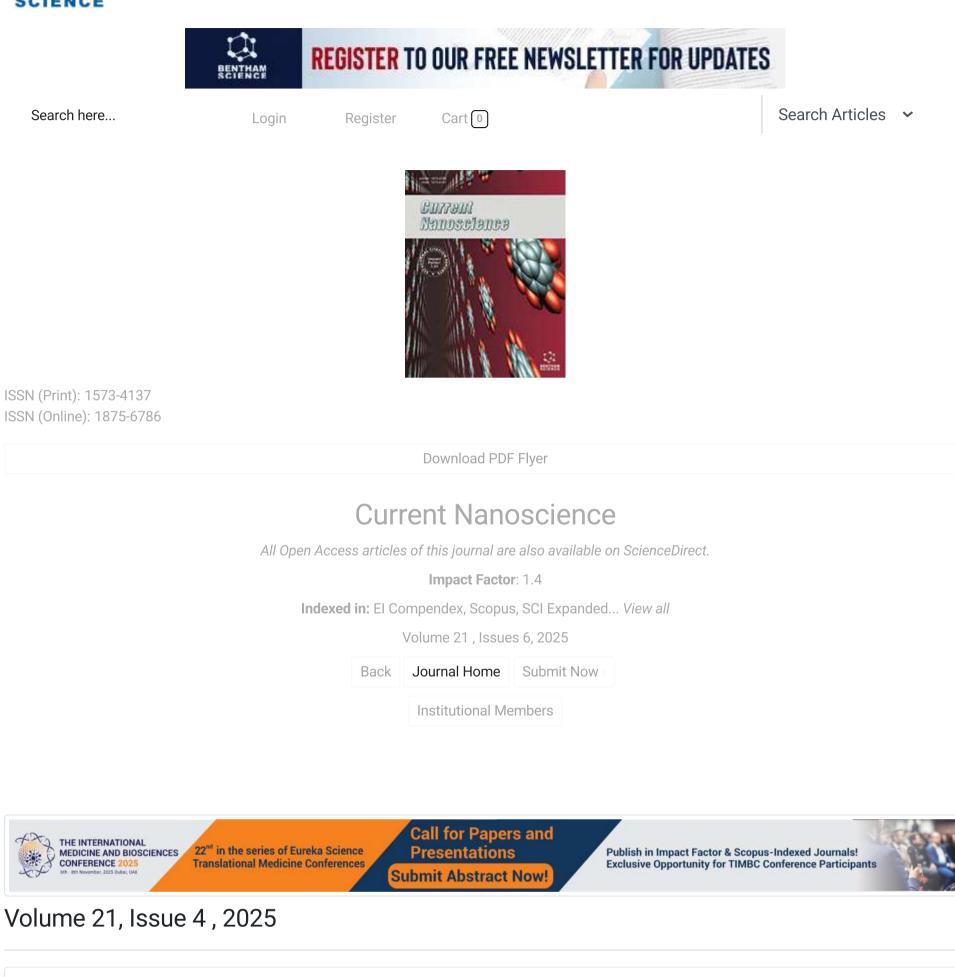
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(Review Article)

Recent Advances in Water-Soluble Polymer and Polymeric Nanoparticles for Pharmaceutical Application

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Author(s): Harish Bhardwaj, Sulekha Khute, Ram Kumar Sahu and Rajendra Kumar Jangde\* DOI: <u>10.2174/0115734137294889240314032718</u>

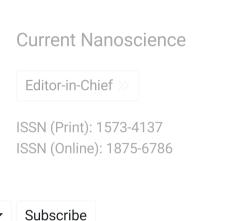
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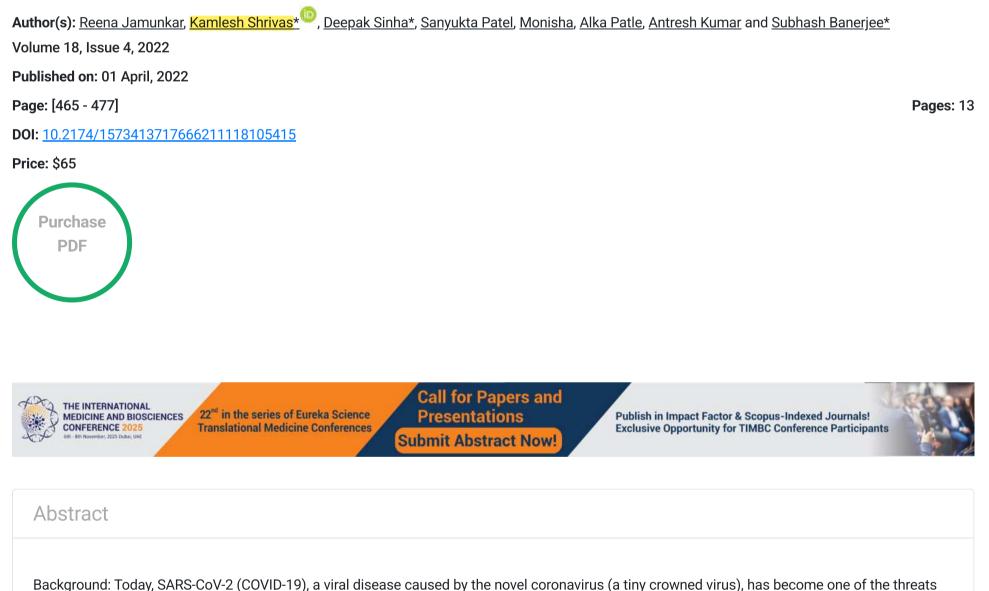


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# Application of Silver Nanoparticles as a New Alternative Antiviral Agent for SARS-CoV-2: A Review



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people in several countries; however, due to their propensity to create new strains, it appears that curing all corona strains will be challenging. So, it is necessary to identify the structure of the virus, mechanism of action, and its antiviral activities against drugs and other functional materials.

for human beings all over the world and caused the death of millions of people worldwide. Many vaccines have been developed and administered to

Methods: AgNPs have unique physicochemical and antimicrobial properties. This review describes the structure and nature of the virus and the mechanism of action of an antiviral drug such as silver nanoparticles (AgNPs) with the virus. In addition, different methods for synthesis of AgNPs, application of AgNPs as an antiviral agent against influenza virus, human immuno deficiency virus (HIV), herpes simplex virus type 1 (HSV-1), hepatitis B virus (HBV), polio virus, respiratory syncytial virus (RSV), are discussed. Also, the most probable applications and properties of AgNPs that can help prepare it as an antiviral agent are discussed.

Results: The use of AgNPs against various viruses, including the coronavirus family, is found to be effective; therefore, it can be considered for the development of antiviral agents, disinfectants, antiviral coated mask, and their therapeutic use against the treatment of novel coronavirus with minimum side effect and great efficiency.

Conclusion: AgNPs were successfully used for the treatment of various viral diseases of the coronavirus family such as H1N1, H3N2, influenza, even for SARS and MERS coronaviruses. AgNPs coated masks, disinfectants, fabrics, wipes, and inhalation systems are effective for the inhibition of SARS-CoV-2 infection. Since sanitizers have a temporary effect, the development of some other potential alternatives having low toxicity, ease of use, long lasting efficiency, health cautiousness, minimum side effect, sustainable fabrics is required.

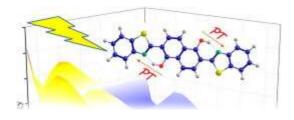


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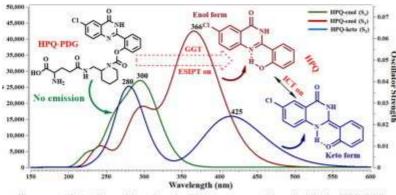
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### A portable smartphone-assisted digital image fluorimetry for analysis of methiocarb pesticide in vegetables: Nitrogen-doped carbon quantum dots as a sensing probe

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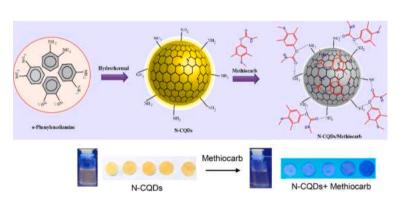
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#### HIGHLIGHTS

#### G R A P H I C A L A B S T R A C T

- Nitrogen-doped carbon quantum dot (N-CQDs) designed for detection of methiocarb.
- Fluorescent-paper sensor with smartphone is exploited for analysis of methiocarb.
- Detection of methiocarb is based on quenching of fluorescence intensity of N-CQDs.
- Fluorescent-paper sensor is instrument free, portable, user-friendly and rapid.



#### ARTICLE INFO

Keywords: Nitrogen-doped carbon quantum dot Sensing probe Paper sensor Fluorimetry Methiocarb Vegetables

#### ABSTRACT

The increasing use of pesticides in the agriculture fields strengthen the crop production to meet the needs of increasing population. The residues in water and food materials cause several health hazards. Herein, nitrogendoped carbon quantum dot (N-CQDs) is designed for determination of methiocarb pesticide in vegetables by fluorescent paper sensor and compared the results with fluorimetry. The fluorescent paper-based detection is performed by recording the change in fluorescence of N-CQDs with introduction of methiocarb using smartphone and ImageJ software. Good linear range was acquired for analysis of methiocarb from 10 to 1000  $\mu$ gL<sup>-1</sup> with a low detection limit (LOD) of 3.5  $\mu$ gL<sup>-1</sup> in fluorimetry; and 700–10,000  $\mu$ gL<sup>-1</sup> with a LOD of 500  $\mu$ gL<sup>-1</sup> in fluorescent paper sensor. A better recovery from 92.0 to 95.4% illustrating the selectivity of both methods for analysis of methiocarb in vegetables. Thus, the advantage of using N-CQDs as a fluorescent sensor for analysis of methiocarb in vegetables is instrument free, portable and user-friendly.

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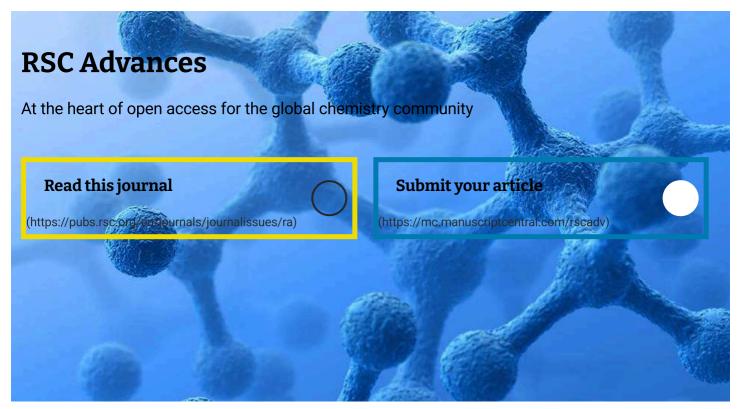


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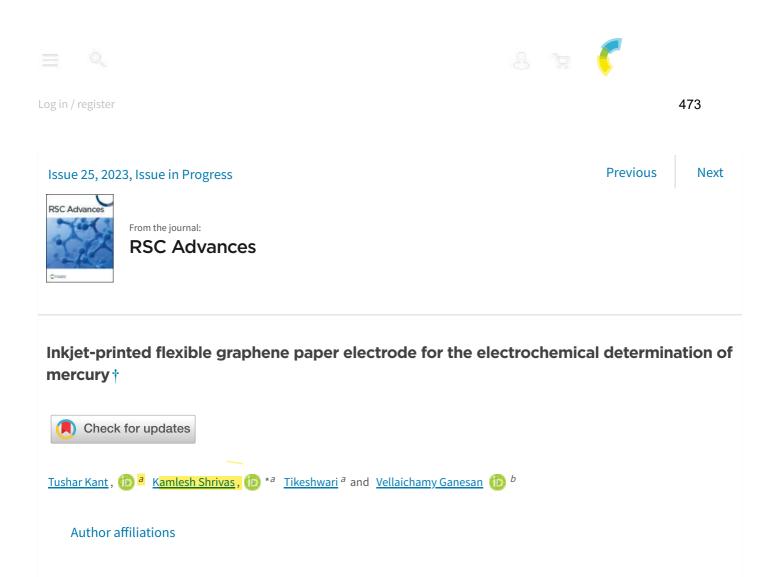
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### Abstract

Here, we report an inkjet-printed graphene paper electrode (IP-GPE) for the electrochemical analysis of mercuric ions (Hg(II)) in industrial wastewater samples. Graphene (Gr) fabricated on a paper substrate was prepared by a facile solution-phase exfoliation method in which ethyl cellulose (EC) behaves as a stabilizing agent. Scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were utilized to determine the shape and multiple layers of Gr. The crystalline structure and ordered lattice carbon of Gr were confirmed by X-ray diffraction (XRD) and Raman spectroscopy. The nano-ink of Gr-EC was fabricated on the paper substance *via* an inkjet printer (HP-1112) and IP-GPE was exploited as a working electrode in linear sweep voltammetry (LSV) and cyclic voltammetry (CV) for the electrochemical detection of Hg(II). The electrochemical detection is found to be diffusion-controlled illustrated by obtaining a correlation coefficient of 0.95 in CV. The present method exhibits a better linear range of 2–100  $\mu$ M with a limit of detection (LOD) of 0.862  $\mu$ M for the determination of Hg(II). The application of IP-GPE in electrochemical analysis shows a user-friendly, facile, and economical method for the quantitative determination of Hg(II) in municipal wastewater samples.

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# SPECTROCHIMIC

# A portable smartphone-assisted digital image fluorimetry for analysis of methiocarb pesticide in vegetables: Nitrogen-doped carbon quantum dots as a sensing probe



#### Sanyukta Patel<sup>a</sup>, Kamlesh Shrivas<sup>b,\*</sup>, Deepak Sinha<sup>a,\*</sup>, Indrapal Karbhal<sup>b</sup>, Tarun Kumar Patle<sup>c</sup>, Monisha<sup>b</sup>, Tikeshwari<sup>b</sup>

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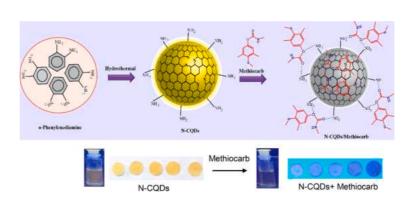
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#### HIGHLIGHTS

#### GRAPHICAL ABSTRACT

- Nitrogen-doped carbon quantum dot (N-CODs) designed for detection of methiocarb.
- Fluorescent-paper sensor with smartphone is exploited for analysis of methiocarb.
- · Detection of methiocarb is based on quenching of fluorescence intensity of N-CQDs.
- Fluorescent-paper sensor is instrument free, portable, user-friendly and rapid.



#### ARTICLE INFO

Keywords: Nitrogen-doped carbon quantum dot Sensing probe Paper sensor Fluorimetry Methiocarb Vegetables

#### ABSTRACT

The increasing use of pesticides in the agriculture fields strengthen the crop production to meet the needs of increasing population. The residues in water and food materials cause several health hazards. Herein, nitrogendoped carbon quantum dot (N-CQDs) is designed for determination of methiocarb pesticide in vegetables by fluorescent paper sensor and compared the results with fluorimetry. The fluorescent paper-based detection is performed by recording the change in fluorescence of N-CQDs with introduction of methiocarb using smartphone and ImageJ software. Good linear range was acquired for analysis of methiocarb from 10 to 1000  $\mu\text{gL}^{-1}$  with a low detection limit (LOD) of 3.5  $\mu$ gL<sup>-1</sup> in fluorimetry; and 700–10,000  $\mu$ gL<sup>-1</sup> with a LOD of 500  $\mu$ gL<sup>-1</sup> in fluorescent paper sensor. A better recovery from 92.0 to 95.4% illustrating the selectivity of both methods for analysis of methiocarb in vegetables. Thus, the advantage of using N-CQDs as a fluorescent sensor for analysis of methiocarb in vegetables is instrument free, portable and user-friendly.

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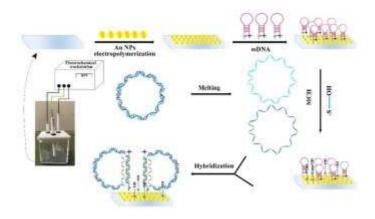
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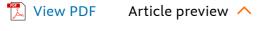
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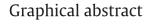


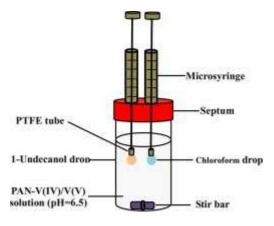
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# *N*-doped, silver, and cerium co-doped carbon quantum dots based sensor for detection of $Hg^{2+}$ and captopril

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#### ARTICLE INFO

Keywords: N-CQDs N/Ag-CQDs N/Ce-CQDs Fluorescence quenching Fluorescence recovery

#### ABSTRACT

A stable carbon quantum dots doped with nitrogen (*N*-CQDs), co-doped with silver (N/Ag-CQDs), and co-doped with cerium N/Ce-CQDs were synthesized using hydrothermal method. As-synthesized N/Ag-CQDs and N/Ce-CQDs showed high quantum yield compared to *N*-CQDs. These carbon quantum dots were used as a probe for the detection of mercury and captopril. The fluorescence quenching (turn-off) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs was occured with the addition of  $Hg^{2+}$  ion. On the other hand, captopril showed fluorescence recovery (turn-on) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs which are quenched by  $Hg^{2+}$  ion. The fluorescence recovery of CQDs is due to the high affinity of thiol group of captopril towards  $Hg^{2+}$  ion to form Hg-S bonds. On the basis of fluorescence quenching (turn-off),  $Hg^{2+}$  was determined with low limit of detection of 1.43 nM, 0.93 nM and 1.38 nM using *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs respectively as fluorescence nanoprobes. The fluorescence turn-on of the CQDs has been applied for the detection of captopril with low limit of detection of 1.65  $\mu$ M, 0.46  $\mu$ M and 1.22  $\mu$ M using *N*-CQDs, N/Ag-CQDs, and N/Ce-CQDs respectively. The developed sensing probe showed good sensitivity and high fluorescence efficiencies.

#### 1. Introduction

In recent years, carbon quantum dots (CQDs) luminescence efficiency was evaluated in a useful way like heteroatom doping [1-3]. Compared with undoped CQDs, non-metallic atom like nitrogen doping on CQDs decreases some surface defects, increases their optical properties and quantum yields. CQDs doped with non-metallic atom (N) in combination with either co-doping with metal (Ag<sup>+</sup>) and rare earth element ( $Ce^{3+}$ ) could provide very bright fluorescence with good surface passivation, resistance to photobleaching and ultra-high photoluminescence quantum yields because of excitation energy traps [4–7]. The photoluminescence mechanism of heteroatom CQDs or co-doped CQDs depends on energy traps and conjugated electronic structure. The co-dopant silver (Ag<sup>+</sup>) is used as biocompatible element with nitrogen passivated surface of CQDs, which enables the participation of lone pair electron of nitrogen for effectively enhancement of quantum yields [6,8–9]. On the other hand silver act as a strong lewis acid which has high affinity for nitrogen donor atom, that could result in formation of a stable complex between Ag-N by electron transfer mechanism and the outcome was successfully synthesized N/Ag-CQDs. In the N/Ce-CQDs, carboxyl group of CQDs can coordinate with  $Ce^{3+}$  in the interstitial state and provide more electrons for the CQDs. Cerium shows high stability in  $Ce^{3+}$  state, which protects the 4f energy level from the crystalline field and external chemical environment, and is used as an antioxidant for biomedical applications [10–14]. The applications of single heteroatom doped and co-doped CQDs have been reported for detection of drugs like daunorubicin [15], methimazole [16], gemcitabine [17], levodopa [18], cisplatin [19], and heavy metal ions like iron [20], arsenic [21], mercury [22], lead [23], organic pollutants [24], peroxides [25] and copper [26].

Mercury  $(Hg^{2+})$  is a toxic heavy metal pollutant and has become a serious problem worldwide because of its endanger impact on human health [27]. For the sake of human health, it causes serious damage to kidney, brain, endocrine system and central nervous system even at very low concentration. [28–29] Numerous analytical techniques such as colorimetric [30], fluoremetric [31], electrochemical [32] and surface

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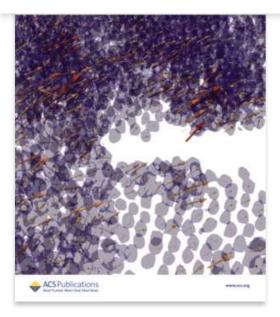
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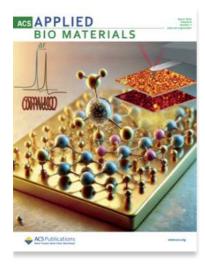
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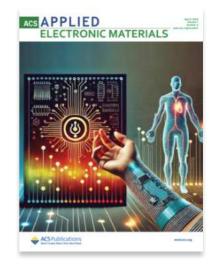
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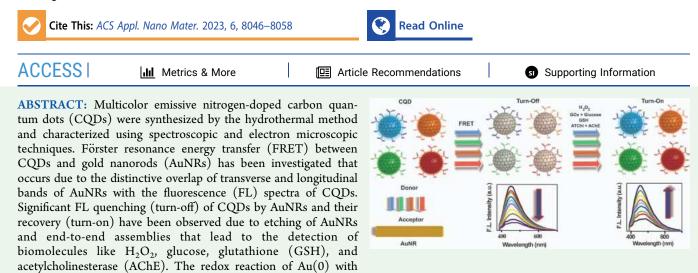
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### Förster Resonance Energy Transfer between Multicolor Emissive N-Doped Carbon Quantum Dots and Gold Nanorods for the Detection of H<sub>2</sub>O<sub>2</sub>, Glucose, Glutathione, and Acetylcholinesterase

Yogyata Chawre, <mark>Manmohan L. Satnami</mark>,\* Ankita B. Kujur, Kallol K. Ghosh, Rekha Nagwanshi, Indrapal Karbhal, Shamsh Pervez, and Manas K. Deb



 $H_2O_2$  results in the decomposition of AuNRs to give Au(I) ions, thereby inducing the fluorescence recovery of CQDs (turn-on). The interruption of the FRET phenomenon by the production of  $H_2O_2$  from the reaction of glucose oxidase in the presence of glucose and a thiol-containing compound from the reaction of acetylthiocholine and the AChE enzyme causes the FL recovery of CQDs, respectively. Moreover, the assembly of AuNRs leads to the FRET disruption, and FL turn-on signals were found to be measures of GSH. In comparison to the UV–visible approach, the FL measurements through the FRET process are found to be more sensitive under the same reaction conditions. The practical applicability of the proposed sensing system has been verified using human plasma samples.

**KEYWORDS:** multicolor emissive carbon quantum dots, fluorescence resonance energy transfer, gold nanorods, hydrogen peroxide, glucose, glutathione, acetylcholinesterase, sensing

#### **1. INTRODUCTION**

Carbon quantum dots (CQDs) have attracted immense attention worldwide due to their spellbinding photoluminescence (PL) and electrochemical properties.<sup>1-5</sup> They have been used in a variety of applications ranging from optoelectronic devices to biomedical fields like bioimaging and biomolecule sensing.<sup>2-4</sup> Doping of CQDs primarily with nitrogen has demonstrated to be effective in enhancing their emission properties, quantum yields (QYs), and stabilizing excitons due to surface passivation.<sup>3</sup> CQDs appear to be a rising star in the field of luminescence material because of their unique optical and electronic behavior, photostability, environment friendliness, low toxicity, and high chemical stability and are found to be an alternative potential material against semiconductor quantum dots and organic dyes.<sup>6-8</sup> To improve the PL efficiency, different strategies and raw materials have been used to synthesize CQDs with high QYs.9,10 However, there are certain areas that require in-depth findings such as uncertainty about PL mechanisms and the limiting application of blueemitting CQDs in the biological field. For an in-depth investigation of the PL mechanism, synthesis, characterization, and PL behavior of multicolor emissive CQDs are imperious.<sup>11,12</sup> Consequently, the synthesis of mild, facile, novel multicolor CQDs with a good QY, a tunable optical band, and a large molar extinction coefficient remains highly desirable. The PL spectra are shifted to a slightly longer wavelength as a function of size and materials. Tuned CQD color and PL can be achieved by controlling the temperature and time during their synthesis process.<sup>13</sup>

The most fascinating properties of CQDs are the PL emission due to the surface state and core-related emission.

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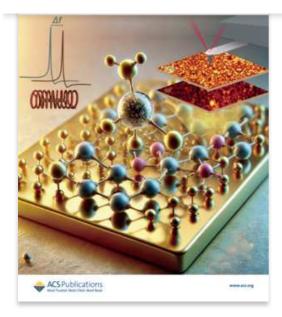
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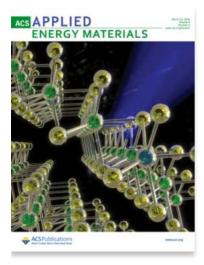
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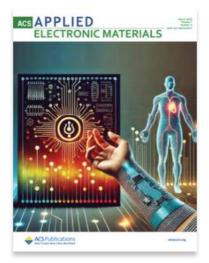
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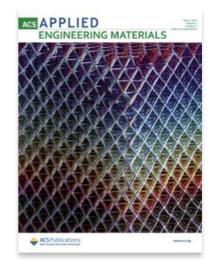


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#### Article

# $\beta$ -Cyclodextrin Stabilized Nanoceria for Hydrolytic Cleavage of Paraoxon in Aqueous and Cationic Micellar Media

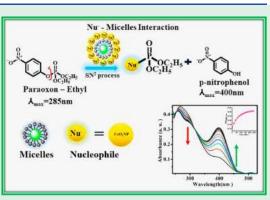
Pinki Miri, Indrapal Karbhal, Manmohan L. Satnami,\* Vinod K. Jena, and Sanjay Ghosh\*

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particles ( $\beta$ -CD@Ce route. The electro	$O_2$ NPs) were synthesizonic properties, surface	bilized cerium oxide nano- zed through a hydrothermal functional group, surface		Nu - Micelles Interaction

route. The electronic properties, surface functional group, surface composition, size, and morphologies of the as-synthesized  $\beta$ -CD@CeO<sub>2</sub> NPs were characterized using UV-visible spectroscopy, FTIR analysis, high resolution X-ray photoelectron spectroscopy (HRXPS), high resolution transmission electron microscopy (HRTEM), and field emission scanning electron microscopy (FESEM). The pH-dependent variation of the  $\zeta$ -potential of  $\beta$ -CD@CeO<sub>2</sub> NPs and the catalytic activity of the NPs for the hydrolysis of paraoxon were investigated. The observed pseudo-first-order rate constant ( $k_{obs}$ ) for the hydrolysis of paraoxon is increased with increasing pH and the  $\zeta$ -potential of  $\beta$ -CD@CeO<sub>2</sub> NPs. The kinetics and mechanism of hydrolysis of paraoxon in the aqueous and cationic micellar media have been discussed.



**KEYWORDS:** organophosphorus pesticides, paraoxon, nanoceria, hydrolytic cleavage, pH-dependent reactions, cationic surfactant, micellar catalysis

#### 1. INTRODUCTION

Neurotransmission activator enzyme acetylcholinesterase (AChE), which influences the metabolism of acetylcholine (ACh), is an important regulator in the brain for the continuous function of the body.<sup>1</sup> Organophosphorus (OPs) compounds are the most popular nerve agents.<sup>2,3</sup> They inhibit AChE activity through phosphorylation. The accumulation of acetylcholine on the neuromuscular junctions and synaptic space cause cholinergic crisis and dysfunction of the muscles needed for breathing and stopping the heartbeat. Therefore, it is essential to dispose of the organophosphorus compounds safely. In agriculture, some of the notable OP pesticides such as chlorpyriphos, dichlorvos, phosmet, ethyl paraoxon, methyl parathion, and malathion are widely used for "pest" destruction.<sup>4</sup> Previously, different types of enzymes<sup>5</sup> and organic nucleophile<sup>6</sup> have been used for degradation of these toxic OP compounds. A metal-based nanoparticle alternative of nanozymes has contributed immensely to this field of research due to its characteristic properties such as a nano size range  $\sim$ 1–100 nm, specific surface properties, easy availability, and cost effectiveness as compared to the organophosphatase enzymes and organic nucleophiles.

Lanthanide series elements, especially cerium ion, which is a hard acid in nature, have a high affinity to interact with oppositively charged groups such as phosphate. In comparison to metal oxides<sup>7</sup> and metal–organic frameworks,<sup>8,9</sup> the oxide form of cerium (CeO<sub>2</sub>) is a more attractive agent due to its

applications in photocatalysis, water splitting, and catalytic conversion.<sup>10-12</sup> Cerium oxide (CeO<sub>2</sub>) in the nanoscale range is applicable in many areas such as in the agriculture field for crop improvement and crop stress tolerance,<sup>13</sup> and in the biomedical field as a theragnostic agent for cancer treatment,<sup>14</sup> as a bioscaffold,<sup>15</sup> and for drug and gene delivery.<sup>16</sup> The occurrence of two ionic valencies  $(Ce^{3+}/Ce^{4+})$  on the active sites of nanoceria is responsible for the oxygen vacancy generation on the surface, which facilitates the phosphohydrolase activity of CeO2 NPs.<sup>17-20</sup> Because of their ionic valency state, they behave as radical scavengers.<sup>21</sup> Nanoceria exhibit pH-dependent variation of surface charges (negative, positive, or neutral) and other specific properties<sup>22</sup> like homogenization, dispersion, and stabilization in aqueous solutions, which help in its application as oxidase,<sup>23</sup> catalase,<sup>24</sup> biomolecule adsorbent,<sup>25</sup> sensors,<sup>26,27</sup> etc. Recent advancements in research have proven the enzyme mimetic like activity and catalytic phosphorylation activity<sup>28</sup> of CeO<sub>2</sub> NPs with several biomolecules such as DNA, RNA, nucleic acid, and peptides.<sup>29-31</sup>

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### ACS APPLIED BIO MATERIALS

#### Article

# $\beta$ -Cyclodextrin Stabilized Nanoceria for Hydrolytic Cleavage of Paraoxon in Aqueous and Cationic Micellar Media

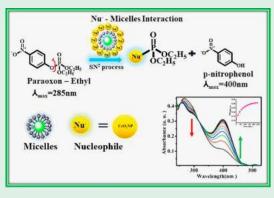
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**ABSTRACT:** Beta-cyclodextrin ( $\beta$ -CD) stabilized cerium oxide nanoparticles ( $\beta$ -CD@CeO<sub>2</sub> NPs) were synthesized through a hydrothermal route. The electronic properties, surface functional group, surface composition, size, and morphologies of the as-synthesized  $\beta$ -CD@CeO<sub>2</sub> NPs were characterized using UV-visible spectroscopy, FTIR analysis, high resolution X-ray photoelectron spectroscopy (HRXPS), high resolution transmission electron microscopy (HRTEM), and field emission scanning electron microscopy (FESEM). The pH-dependent variation of the  $\zeta$ potential of  $\beta$ -CD@CeO<sub>2</sub> NPs and the catalytic activity of the NPs for the hydrolysis of paraoxon were investigated. The observed pseudo-first-order rate constant ( $k_{obs}$ ) for the hydrolysis of paraoxon is increased with increasing pH and the  $\zeta$ -potential of  $\beta$ -CD@CeO<sub>2</sub> NPs. The kinetics and mechanism of hydrolysis of paraoxon in the aqueous and cationic micellar media have been discussed.



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# *N*-doped, silver, and cerium co-doped carbon quantum dots based sensor for detection of $Hg^{2+}$ and captopril



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#### ARTICLE INFO

Keywords: N-CQDs N/Ag-CQDs N/Ce-CQDs Fluorescence quenching Fluorescence recovery

#### ABSTRACT

A stable carbon quantum dots doped with nitrogen (*N*-CQDs), co-doped with silver (N/Ag-CQDs), and co-doped with cerium N/Ce-CQDs were synthesized using hydrothermal method. As-synthesized N/Ag-CQDs and N/Ce-CQDs showed high quantum yield compared to *N*-CQDs. These carbon quantum dots were used as a probe for the detection of mercury and captopril. The fluorescence quenching (turn-off) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs was occured with the addition of  $Hg^{2+}$  ion. On the other hand, captopril showed fluorescence recovery (turn-on) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs which are quenched by  $Hg^{2+}$  ion. The fluorescence recovery of CQDs is due to the high affinity of thiol group of captopril towards  $Hg^{2+}$  ion to form Hg-S bonds. On the basis of fluorescence quenching (turn-off),  $Hg^{2+}$  was determined with low limit of detection of 1.43 nM, 0.93 nM and 1.38 nM using *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs, respectively as fluorescence nanoprobes. The fluorescence turn-on of the CQDs has been applied for the detection of captopril with low limit of detection of 1.65  $\mu$ M, 0.46  $\mu$ M and 1.22  $\mu$ M using *N*-CQDs, N/Ag-CQDs, and N/Ce-CQDs respectively. The developed sensing probe showed good sensitivity and high fluorescence efficiencies.

#### 1. Introduction

In recent years, carbon quantum dots (CQDs) luminescence efficiency was evaluated in a useful way like heteroatom doping [1-3]. Compared with undoped CQDs, non-metallic atom like nitrogen doping on CQDs decreases some surface defects, increases their optical properties and quantum yields. CQDs doped with non-metallic atom (N) in combination with either co-doping with metal (Ag<sup>+</sup>) and rare earth element (Ce<sup>3+</sup>) could provide very bright fluorescence with good surface passivation, resistance to photobleaching and ultra-high photoluminescence quantum yields because of excitation energy traps [4-7]. The photoluminescence mechanism of heteroatom CQDs or co-doped CQDs depends on energy traps and conjugated electronic structure. The co-dopant silver (Ag<sup>+</sup>) is used as biocompatible element with nitrogen passivated surface of CODs, which enables the participation of lone pair electron of nitrogen for effectively enhancement of quantum yields [6,8–9]. On the other hand silver act as a strong lewis acid which has high affinity for nitrogen donor atom, that could result in formation

of a stable complex between Ag-N by electron transfer mechanism and the outcome was successfully synthesized N/Ag-CQDs. In the N/Ce-CQDs, carboxyl group of CQDs can coordinate with Ce<sup>3+</sup> in the interstitial state and provide more electrons for the CQDs. Cerium shows high stability in Ce<sup>3+</sup> state, which protects the 4f energy level from the crystalline field and external chemical environment, and is used as an antioxidant for biomedical applications [10–14]. The applications of single heteroatom doped and co-doped CQDs have been reported for detection of drugs like daunorubicin [15], methimazole [16], gemcitabine [17], levodopa [18], cisplatin [19], and heavy metal ions like iron [20], arsenic [21], mercury [22], lead [23], organic pollutants [24], peroxides [25] and copper [26].

Mercury (Hg<sup>2+</sup>) is a toxic heavy metal pollutant and has become a serious problem worldwide because of its endanger impact on human health [27]. For the sake of human health, it causes serious damage to kidney, brain, endocrine system and central nervous system even at very low concentration. [28–29] Numerous analytical techniques such as colorimetric [30], fluoremetric [31], electrochemical [32] and surface

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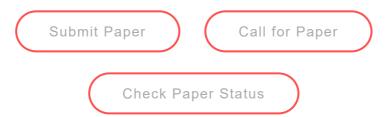
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Paper Submission Till: 29th of this Current Month



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# Gold Nanoparticle: Fastest Tool for Onsite Monitoring of Pesticides

Anand Besekar<sup>\*1, 2</sup>, Rasleen Kaur<sup>1</sup>, Priya Katiyar<sup>1</sup>, Anita Bhoi<sup>1</sup>, Lakshita Dewangan<sup>2</sup>, Manmohan L Satnami<sup>2</sup> and S Keshavkant<sup>1</sup>

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### Abstract

Chemical pesticides are the large heterogeneous compounds which are employed in the modern agriculture. Paraoxon belongs to the class of organophosphate pesticides which has been used extensively in the agricultural fields. The overuse of pesticides results in the harmful impact over the ecological system and human health. Paraoxon is a non-degradable pesticide but can be transformed in the environment by hydrolysis/ photolysis thereby producing severely harmful chemicals. The paraoxon is noticeably recognized to inactivate the catalytic activity of the enzyme acetylcholinesterase. Nanoparticles (NPs) of various metals are largely reported to be loaded with enormous typical properties and a good stability. In line, gold NPs (AuNPs) are one of the most stable NPs that can been prepared following various techniques in different shapes and structures. These have been displayed best applicability in various aspects owing to their simple preparation, stability, smooth functionalization and remarkable color modifications. The red color of the well-dispersed AuNPs changes into blue coloration upon aggregation. Based on this, AuNPs have been effectively utilized for the detection of many pollutants present in the environment. In the present study, a change in the color of the AuNPs from red to slight black have been observed in presence of paraoxon, and was triggered by the addition of sodium chloride. The technique evolved is quite simple and does not require any expensive chemicals or instruments. The change in color was very rapid and was observed by the bare eye. Thus, this colorimetric technique may probably be utilized for onsite monitoring of pesticides.

### **Graphical abstract**

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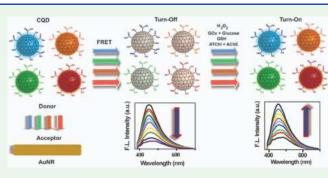
#### Article

### Förster Resonance Energy Transfer between Multicolor Emissive N-Doped Carbon Quantum Dots and Gold Nanorods for the Detection of H<sub>2</sub>O<sub>2</sub>, Glucose, Glutathione, and Acetylcholinesterase

Yogyata Chawre, Manmohan L. Satnami,\* Ankita B. Kujur, <mark>Kallol K. Ghosh,</mark> Rekha Nagwanshi, Indrapal Karbhal, Shamsh Pervez, and Manas K. Deb

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ABSTRACT: Mu	llticolor emissive nitrogen-do	ped carbon q	uan-	Turn-Off H <sub>3</sub> O <sub>3</sub>	Turn-On

tum dots (CQDs) were synthesized by the hydrothermal method and characterized using spectroscopic and electron microscopic techniques. Förster resonance energy transfer (FRET) between CQDs and gold nanorods (AuNRs) has been investigated that occurs due to the distinctive overlap of transverse and longitudinal bands of AuNRs with the fluorescence (FL) spectra of CQDs. Significant FL quenching (turn-off) of CQDs by AuNRs and their recovery (turn-on) have been observed due to etching of AuNRs and end-to-end assemblies that lead to the detection of biomolecules like  $H_2O_2$ , glucose, glutathione (GSH), and acetylcholinesterase (AChE). The redox reaction of Au(0) with



 $H_2O_2$  results in the decomposition of AuNRs to give Au(I) ions, thereby inducing the fluorescence recovery of CQDs (turn-on). The interruption of the FRET phenomenon by the production of  $H_2O_2$  from the reaction of glucose oxidase in the presence of glucose and a thiol-containing compound from the reaction of acetylthiocholine and the AChE enzyme causes the FL recovery of CQDs, respectively. Moreover, the assembly of AuNRs leads to the FRET disruption, and FL turn-on signals were found to be measures of GSH. In comparison to the UV–visible approach, the FL measurements through the FRET process are found to be more sensitive under the same reaction conditions. The practical applicability of the proposed sensing system has been verified using human plasma samples.

**KEYWORDS:** multicolor emissive carbon quantum dots, fluorescence resonance energy transfer, gold nanorods, hydrogen peroxide, glucose, glutathione, acetylcholinesterase, sensing

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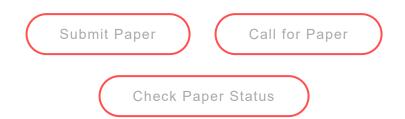
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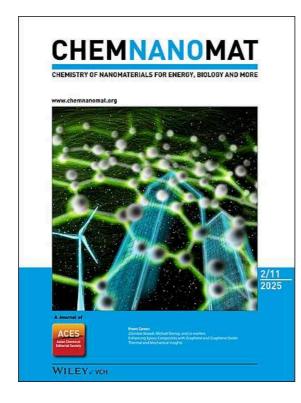
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# On the Cover



The main objective of study is a comprehensive investigation of the mechanical properties of **epoxy polymer nanocomposites** infused with graphenebased nanoflakes, ranging from neat epoxy production to the characterization of nanoflakes and subsequent mechanical testing. However, besides the thermal and mechanical aspects, the improvement of the stability of the suspension during cross-linking with the graphene oxide is studied. More information can be found in the Research Article by Zdzisław Nowak, Michael Giersig, and co-workers.

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### Honeycomb Boron Carbon Nitride as High-Performance Anode Material for Li-Ion Batteries

Indrapal Karbhal,<sup>[a, b]</sup> Vikash Chaturvedi,<sup>[a, b]</sup> Apurva Patrike,<sup>[a, b]</sup> Poonam Yadav,<sup>[a, b]</sup> and Manjusha V. Shelke<sup>\*[a, b]</sup>

**Abstract:** 3D Porous carbon-based materials are well known for their excellent mechanical and electrochemical properties for various energy storage applications including Li-ion Battery (LIB) anodes. However, their commercial application is limited due to their low theoretical specific capacity. Heteroatom doping in carbonaceous networks proved an efficient way to modify the surface properties, which considerably improves the Li intake capacity and Li diffusion in porous carbon materials. In this work, we have synthesized 3D honeycomb boron carbon nitride (HBCN) from boric acid, glucose, and cyanamide. Silica nanoparticles (SiO<sub>2</sub> NPs) are

#### Introduction

The rechargeable Li-ion Battery (LIB) is the most extensively used energy storage system for consumer electronics applications due to its compact size, high energy density, and sufficiently long cycle life.<sup>[1]</sup> LIBs hold the potential to replace petroleum as a primary fuel in the automotive sector and are considered the most promising energy storage system for the next-generation hybrid electric vehicles (HEVs). The increased demands of high energy density, high capacity, low weight, low cost, and longer lifespan are achieved by the vital selection of electrode materials.<sup>[2]</sup> Graphite, being the state-of-the-art anode material for LIB, still faces problems to satisfy the everincreasing energy/power density requirements due to its limited theoretical capacity (372 mAhg<sup>-1</sup>). Hence, to achieve high energy demands, significant efforts have been employed for the development of alternate carbon-based anode chemistries, due to their robust architectural stability and superior electrochemical behavior.<sup>[3]</sup> Properties, such as unique structural morphology, large pore volume, excellent mechanical and thermal stability, less expensive with easier availability, etc. makes these carbon materials an obvious choice for designing electrode for LIBs and several other applications.<sup>[4-8]</sup> Moreover, systematic doping of heteroatoms like Boron (B), Nitrogen (N),

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used as structure-directing agents to replicate well-organized honeycomb structures. HBCN possesses a high specific surface area (SSA) of ~597 m<sup>2</sup>g<sup>-1</sup>, with a uniform porosity distribution, low charge transfer resistance, and steady Li flux. When analyzed as an anode material for LIB, HBCN demonstrated an excellent specific capacity of ~652 mAhg<sup>-1</sup> and 408 mAhg<sup>-1</sup> at an input current density of 100 mAg<sup>-1</sup> and 1 Ag<sup>-1</sup> respectively and an energy density of 227 Whkg<sup>-1</sup> at 1 C rate in a full cell LIB. These results indicate that the doping of B and N hetero atoms is significantly advantageous for LIBs application.

Phosphorous (P), Sulfur (S), and Fluorine (F) in the carbon matrix can potentially tune the surface, electronic, and diffusion properties of carbon materials to enhance the theoretical limits on specific capacity.<sup>[9-12]</sup> N doping in the carbonaceous framework has been most comprehensively studied and resulted in a significant enhancement in the electrochemical behavior of graphitic and porous carbon. N atoms generally bond with carbon atoms with three common bonding configurations named pyridinic N, pyrrolic N, and graphitic N in the carbon matrix replacing carbon.<sup>[13,14]</sup> Similarly, Boron is an equally important dopant that is known to induce the complementary electronic properties to those of Nitrogen leading to specific application purposes.<sup>[15]</sup> Combined doping of N and B is also helpful in achieving high doping efficiency in a synergetic manner.<sup>[16,17]</sup> Boron carbon nitride (BCN) is an intermediate of semi-metallic graphene and insulating boron nitride (BN). BCN has found a place in several applications such as neutron absorbers, catalysts, and energy storage devices. BCN-based porous carbon materials are frequently reported as excellent supercapacitor electrodes due to the presence of both electrophilic and nucleophilic centers.<sup>[18,19]</sup> The presence of these active centers plays a key role to enhance the specific functionalities of these materials according to desired applications. Combined effects of heteroatom doping, porous carbon architecture, excellent charge transfer and ion diffusion properties of the doped surface, and higher defect density are expected to boost the electrochemical behavior of B, N doped carbon. BCN has been synthesized in various structural forms right from zerodimensional (0 D),<sup>[20,21]</sup> 1 D,<sup>[22-24]</sup> and 2 D<sup>[25]</sup> in various literature for a range of applications. Interestingly, 3D BCN with porous morphology and controlled carbonaceous architecture has been reported scarcely in the literature.

Although it is a great challenge to design a 3D porous morphology with a ternary B



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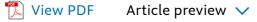
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### Nitrogen and Sulphur co-doped Graphene: A Robust Material for Methylene Blue Removal

Shubhra Sinha<sup>a</sup>, Indrapal Karbhal<sup>a,\*</sup>, Manas Kanti Deb<sup>a,\*</sup>, Anushree Saha<sup>a</sup>, Rajiv Nayan<sup>a</sup>, Ramsingh Kurrey<sup>a</sup>, Shamsh Pervez<sup>a</sup>, Kallol K. Ghosh<sup>a</sup>, Santosh Singh Thakur<sup>b</sup>, Manish K. Rai<sup>a</sup>, Manmohan L. Satnami<sup>a</sup>, Kamlesh Shrivas<sup>a</sup>

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#### ARTICLE INFO

Keywords: Graphene Adsorption Doping Methylene blue and removal

#### ABSTRACT

N, S co-doped graphene (NSG) has been synthesized by using graphene oxide, cyanamide and sodium sulphide as a source of C, N and S respectively. Due to its excellent electronic properties and stability, NSG has been used as an adsorbent for methylene blue (MB) removal from aqueous solution. Adsorption efficiencies of Graphene, N-doped graphene, S-doped graphene and NSG were compared during the study and it was found that NSG was the most efficient material for the adsorption of MB. The study was carried out in the UV-visible region by observing the changes in absorbance. NSG has excellent properties to adsorb the MB dye with a removal efficiency of 93.76±0.2%. Additionally, desorption studies were also carried out using 0.1 M cetylpyridinium chloride as cationic surfactant and the desorption% was found to be 50.28±0.1%, signifying its reusability as an adsorbent. This indicates that NSG opens a new window for the design of heteroatom-doped carbon material as well as its application in the adsorption studies. Accordingly, the synthesized material will be employed for wastewater treatment as a reusable adsorbent of MB in the near future with high efficiency and appreciable stability. In addition, the material has several other future applications such as electrode material for supercapacitor battery, sensor, adsorbent for metal ions and biomolecules, etc.

#### 1. Introduction

In the recent past, heteroatom (N, P, B and S) doping on graphene and its budding application opportunities have attained great attention. It is noteworthy that chemical doping helps to modify the properties of graphene and unlocks various potential features that have widespread applications like water purification, energy storage, biomarker, catalyst and many more. It is seen that in the case of undoped graphene, the antibonding  $(\pi^*)$  and bonding  $(\pi)$  orbitals (which make up its conduction and valence bands respectively) are degenerate. Furthermore, it is remarkable that supreme, undoped graphene is chemically inert in nature. This is because, its delocalized  $\pi$  system tightly binds and passivates its unpaired electrons, which hinder its certain properties like reactivity and absorptivity. Providentially, doping on graphene with heteroatoms can confer it with plentiful active sites. In addition, its adaptable nature allows it to be used as a part of composite materials since chemical modifications facilitate favourable adjustment of its surface properties [1–3]. The dopant atoms exert local chemical changes in the conventional structure of graphene, thereby, improving its electrical and thermal conductivities and also its charge carrier densities. These chemical treatments eventually cause various structural defects and the formation of new functional groups on graphene. Hence, doping on graphene with heteroatoms has eventually opened up new opportunities in the field of dye removal and various other fields [4–6].

However, it is worth mentioning that if pure catalysts are employed for the decomposition of such stubborn dyes, then it would require a longer reaction time and larger reactor volume to achieve an acceptable amount of adsorption. Therefore, doping can be employed as an efficient alternative approach to enhance the catalytic property of catalysts and modulate their optical and other properties [7,8]. Among various heteroatoms, nitrogen and sulphur are two of the most commonly used dopants in the case of graphene and its derived materials due the presence of active lone pair of electrons in nitrogen and sulphur [9].

Methylene blue (MB), which is also known as methylthioninium chloride, is a synthetic basic dye. It is an organic chloride salt that has 3,7-bis(dimethylamino)phenothiazine-5-ium as the counter ion (Fig. 1).

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Article

### Förster Resonance Energy Transfer between Multicolor Emissive N-Doped Carbon Quantum Dots and Gold Nanorods for the Detection of H<sub>2</sub>O<sub>2</sub>, Glucose, Glutathione, and Acetylcholinesterase

Yogyata Chawre, Manmohan L. Satnami,\* Ankita B. Kujur, Kallol K. Ghosh, Rekha Nagwanshi, Indrapal Karbhal, Shamsh Pervez, and Manas K. Deb

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ACCESS III Metrics & More Article Recommendations SI Supporting Information ABSTRACT: Multicolor emissive nitrogen-doped carbon quantum dots (CQDs) were synthesized by the hydrothermal method and characterized using spectroscopic and electron microscopic techniques. Förster resonance energy transfer (FRET) between CQDs and gold nanorods (AuNRs) has been investigated that occurs due to the distinctive overlap of transverse and longitudinal bands of AuNRs with the fluorescence (FL) spectra of CQDs. Significant FL quenching (turn-off) of CQDs by AuNRs and their recovery (turn-on) have been observed due to etching of AuNRs and end-to-end assemblies that lead to the detection of biomolecules like  $H_2O_2$ , glucose, glutathione (GSH), and acetylcholinesterase (AChE). The redox reaction of Au(0) with

 $H_2O_2$  results in the decomposition of AuNRs to give Au(I) ions, thereby inducing the fluorescence recovery of CQDs (turn-on). The interruption of the FRET phenomenon by the production of  $H_2O_2$  from the reaction of glucose oxidase in the presence of glucose and a thiol-containing compound from the reaction of acetylthiocholine and the AChE enzyme causes the FL recovery of CQDs, respectively. Moreover, the assembly of AuNRs leads to the FRET disruption, and FL turn-on signals were found to be measures of GSH. In comparison to the UV–visible approach, the FL measurements through the FRET process are found to be more sensitive under the same reaction conditions. The practical applicability of the proposed sensing system has been verified using human plasma samples.

**KEYWORDS:** multicolor emissive carbon quantum dots, fluorescence resonance energy transfer, gold nanorods, hydrogen peroxide, glucose, glutathione, acetylcholinesterase, sensing

#### 1. INTRODUCTION

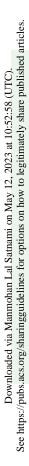
Carbon quantum dots (CQDs) have attracted immense attention worldwide due to their spellbinding photoluminescence (PL) and electrochemical properties.<sup>1-5</sup> They have been used in a variety of applications ranging from optoelectronic devices to biomedical fields like bioimaging and biomolecule sensing.<sup>2-4</sup> Doping of CQDs primarily with nitrogen has demonstrated to be effective in enhancing their emission properties, quantum yields (QYs), and stabilizing excitons due to surface passivation.<sup>5</sup> CQDs appear to be a rising star in the field of luminescence material because of their unique optical and electronic behavior, photostability, environment friendliness, low toxicity, and high chemical stability and are found to be an alternative potential material against semiconductor quantum dots and organic dyes.<sup>6-8</sup> To improve the PL efficiency, different strategies and raw materials have been used to synthesize CQDs with high QYs.9,10 However, there are certain areas that require in-depth findings such as uncertainty about PL mechanisms and the limiting application of blueemitting CQDs in the biological field. For an in-depth investigation of the PL mechanism, synthesis, characterization, and PL behavior of multicolor emissive CQDs are imperious.<sup>11,12</sup> Consequently, the synthesis of mild, facile, novel multicolor CQDs with a good QY, a tunable optical band, and a large molar extinction coefficient remains highly desirable. The PL spectra are shifted to a slightly longer wavelength as a function of size and materials. Tuned CQD color and PL can be achieved by controlling the temperature and time during their synthesis process.<sup>13</sup>

The most fascinating properties of CQDs are the PL emission due to the surface state and core-related emission.

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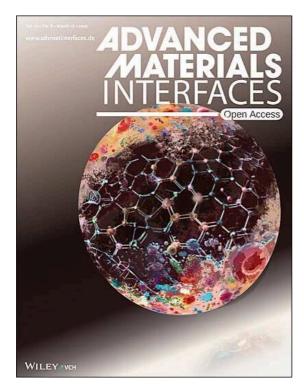
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# **On the Cover**



#### **Bio-Nano Interface**

In article 2400560, Giulio Caracciolo and co-workers explore the dynamic interplay between proteins and DNA at the surface of graphene oxide nanosheets, capturing a pivotal shift in the composition of the protein corona. It highlights how DNA modulates structural stability and drives biological activation, shedding light on nanoscale mechanisms that are essential for advancing the frontiers of biomedical nanotechnology.

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## Template Directed Synthesis of Boron Carbon Nitride Nanotubes (BCN-NTs) and Their Evaluation for Energy Storage Properties

Indrapal Karbhal, Vikash Chaturvedi, Poonam Yadav, Apurva Patrike, and Manjusha V. Shelke\*

A unique approach has been applied for the synthesis of 1D boron carbon nitride nanotubes (BCN-NTs) using  $MnO_2$  nanowires as templates. BCN-NTs have been evaluated in Na-ion batteries, Li-ion batteries, and supercapacitors as electrode material and exhibited excellent and stable electrochemical performance. BCN-NTs as an anode for Na-ion battery has been shown to be highly stable up to 3000 cycles with capacity retention of 95 mAh g<sup>-1</sup>, at a high current density of 1 A g<sup>-1</sup>. In the case of the Li-ion battery, these BCN-NTs show a specific capacity of 563 mAh g<sup>-1</sup> at a current density of 50 mA g<sup>-1</sup>. Finally, when used as an electrode for a supercapacitor, BCN-NTs display a specific capacity of 221 F g<sup>-1</sup> at a current density of 3 A g<sup>-1</sup> and 168 F g<sup>-1</sup> even at a very high current density of 30 A g<sup>-1</sup> exemplifying the excellent rate performance. The multifunctionality and stable performance of BCN-NTs among various electrochemical energy storage systems highlight the robustness of the material and make it an excellent candidate for scalable production and commercialization.

#### **1. Introduction**

A surge in demand for clean and sustainable energy storage devices has presented the need for the development of low-cost, ubiquitous, and marvellously engineered electrode materials. Carbons, metals, metal oxides, chalcogenides, and conducting polymers are some of the materials that are frequently used as an electrode for electrochemical charge storage.<sup>[1,2–4]</sup> Metal oxides and chalcogenides have very high theoretical specific capacity but they lose their capacity gradually during cycling

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due to their excessive volume expansion and pulverization in addition to low conductivity.<sup>[5]</sup> Alloying-type metal electrodes also face the issues of agglomeration and capacity fading with cycling.<sup>[6]</sup>

Carbon-based nanomaterials such as graphite, carbon nanotubes (CNT), Graphene, and porous carbon are widely accepted as durable electrode materials in electrochemical devices due to excellent chemical stability, good electrical conductivity, widespread availability, and electrochemical stability under harsh conditions.<sup>[7–12]</sup> They usually possess high surface area but the specific capacities of these materials are often not very high due to inherent inferior theoretical capacity values. Interestingly, heteroatomdoped carbons like Nitrogen-, Sulphur, Fluorine-, Boron- doped carbons can have

additional functionalities and invariably lift the limits on charge storage capacities.<sup>[11,13]</sup> Few-layered boron carbon nitride (BCN) nanosheets, as analogues of graphene, have shown superior Li<sup>+</sup> storage capacities because of the polarity of B–N bonds.<sup>[14]</sup> The high density of >B–N< and  $\equiv$ C–N< groups ensures a high concentration of redox centres for reaction with Li<sup>+</sup> ions, thus ensuring higher charge storage capacity.<sup>[15]</sup> Additionally, dimensionality control is a very important way to engineer carbon-based materials. 1D, 2D, and 3D carbon materials possess an unusual set of properties that are required for the development of electrode materials used in different applications. Especially, 1D nanomaterials are of great interest because of their high L/D ratio (aspect ratio) and mechanical robustness which shortens the diffusion path length and provides good stress tolerance.<sup>[16]</sup>

The nanotube morphology is advantageous because Na<sup>+</sup>/Li<sup>+</sup> ions can diffuse into sites either on the outer or the inner surface of hollow boron carbon nitride nanotubes (BCN-NTs). Also, Na<sup>+</sup>/Li<sup>+</sup> ions can be inserted within the BCN layers of BCN-NTs.<sup>[14,17]</sup> These properties such as high conductivity, doping, and dimensionality tuning make 1D-doped CNTs one of the most interesting electrode materials for energy storage applications.

BCN has been synthesized by various methods as discussed in previous reports.<sup>[18,19,20]</sup> In brief, Shelimov and Mokovits reported the first synthesis of arrays of C/BN/C using acetylene and trichlorobenzene over an anodic alumina template via pyrolysis. BCN-NTs grown by bias-assisted hot-filament method from  $B_2H_6$ ,

#### Carbon Trends 10 (2023) 100248

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### Carbon Trends

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### Nitrogen and Sulphur co-doped Graphene: A Robust Material for Methylene Blue Removal



Shubhra Sinha<sup>a</sup>, Indrapal Karbhal<sup>a,\*</sup>, Manas Kanti Deb<sup>a,\*</sup>, Anushree Saha<sup>a</sup>, Rajiv Nayan<sup>a</sup>, Ramsingh Kurrey<sup>a</sup>, Shamsh Pervez<sup>a</sup>, Kallol K. Ghosh<sup>a</sup>, Santosh Singh Thakur<sup>b</sup>, Manish K. Rai<sup>a</sup>, Manmohan L. Satnami<sup>a</sup>, Kamlesh Shrivas<sup>a</sup>

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#### ARTICLE INFO

Keywords: Graphene Adsorption Doping Methylene blue and removal

#### ABSTRACT

N, S co-doped graphene (NSG) has been synthesized by using graphene oxide, cyanamide and sodium sulphide as a source of C, N and S respectively. Due to its excellent electronic properties and stability, NSG has been used as an adsorbent for methylene blue (MB) removal from aqueous solution. Adsorption efficiencies of Graphene, N-doped graphene, S-doped graphene and NSG were compared during the study and it was found that NSG was the most efficient material for the adsorption of MB. The study was carried out in the UV-visible region by observing the changes in absorbance. NSG has excellent properties to adsorb the MB dye with a removal efficiency of  $93.76\pm0.2\%$ . Additionally, desorption studies were also carried out using 0.1 M cetylpyridinium chloride as cationic surfactant and the desorption% was found to be  $50.28\pm0.1\%$ , signifying its reusability as an adsorbent. This indicates that NSG opens a new window for the design of heteroatom-doped carbon material as well as its application in the adsorbent of MB in the near future with high efficiency and appreciable stability. In addition, the material has several other future applications such as electrode material for supercapacitor battery, sensor, adsorbent for metal ions and biomolecules, etc.

#### 1. Introduction

In the recent past, heteroatom (N, P, B and S) doping on graphene and its budding application opportunities have attained great attention. It is noteworthy that chemical doping helps to modify the properties of graphene and unlocks various potential features that have widespread applications like water purification, energy storage, biomarker, catalyst and many more. It is seen that in the case of undoped graphene, the antibonding  $(\pi^*)$  and bonding  $(\pi)$  orbitals (which make up its conduction and valence bands respectively) are degenerate. Furthermore, it is remarkable that supreme, undoped graphene is chemically inert in nature. This is because, its delocalized  $\pi$  system tightly binds and passivates its unpaired electrons, which hinder its certain properties like reactivity and absorptivity. Providentially, doping on graphene with heteroatoms can confer it with plentiful active sites. In addition, its adaptable nature allows it to be used as a part of composite materials since chemical modifications facilitate favourable adjustment of its surface properties [1-3]. The dopant atoms exert local chemical changes in the conventional structure of graphene, thereby, improving its electrical and thermal conductivities and also its charge carrier densities. These chemical treatments eventually cause various structural defects and the formation of new functional groups on graphene. Hence, doping on graphene with heteroatoms has eventually opened up new opportunities in the field of dye removal and various other fields [4–6].

However, it is worth mentioning that if pure catalysts are employed for the decomposition of such stubborn dyes, then it would require a longer reaction time and larger reactor volume to achieve an acceptable amount of adsorption. Therefore, doping can be employed as an efficient alternative approach to enhance the catalytic property of catalysts and modulate their optical and other properties [7,8]. Among various heteroatoms, nitrogen and sulphur are two of the most commonly used dopants in the case of graphene and its derived materials due the presence of active lone pair of electrons in nitrogen and sulphur [9].

Methylene blue (MB), which is also known as methylthioninium chloride, is a synthetic basic dye. It is an organic chloride salt that has 3,7-bis(dimethylamino)phenothiazine-5-ium as the counter ion (Fig. 1).

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### ACS APPLIED NANO MATERIALS

#### Article

### Förster Resonance Energy Transfer between Multicolor Emissive N-Doped Carbon Quantum Dots and Gold Nanorods for the Detection of H<sub>2</sub>O<sub>2</sub>, Glucose, Glutathione, and Acetylcholinesterase

Yogyata Chawre, Manmohan L. Satnami,\* Ankita B. Kujur, Kallol K. Ghosh, Rekha Nagwanshi, Indrapal Karbhal, Shamsh Pervez, and Manas K. Deb

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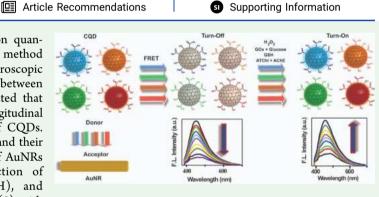
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III Metrics & More



**ABSTRACT:** Multicolor emissive nitrogen-doped carbon quantum dots (CQDs) were synthesized by the hydrothermal method and characterized using spectroscopic and electron microscopic techniques. Förster resonance energy transfer (FRET) between CQDs and gold nanorods (AuNRs) has been investigated that occurs due to the distinctive overlap of transverse and longitudinal bands of AuNRs with the fluorescence (FL) spectra of CQDs. Significant FL quenching (turn-off) of CQDs by AuNRs and their recovery (turn-on) have been observed due to etching of AuNRs and end-to-end assemblies that lead to the detection of biomolecules like  $H_2O_2$ , glucose, glutathione (GSH), and acetylcholinesterase (AChE). The redox reaction of Au(0) with



 $H_2O_2$  results in the decomposition of AuNRs to give Au(I) ions, thereby inducing the fluorescence recovery of CQDs (turn-on). The interruption of the FRET phenomenon by the production of  $H_2O_2$  from the reaction of glucose oxidase in the presence of glucose and a thiol-containing compound from the reaction of acetylthiocholine and the AChE enzyme causes the FL recovery of CQDs, respectively. Moreover, the assembly of AuNRs leads to the FRET disruption, and FL turn-on signals were found to be measures of GSH. In comparison to the UV–visible approach, the FL measurements through the FRET process are found to be more sensitive under the same reaction conditions. The practical applicability of the proposed sensing system has been verified using human plasma samples.

**KEYWORDS:** multicolor emissive carbon quantum dots, fluorescence resonance energy transfer, gold nanorods, hydrogen peroxide, glucose, glutathione, acetylcholinesterase, sensing

#### 1. INTRODUCTION

Carbon quantum dots (CQDs) have attracted immense attention worldwide due to their spellbinding photoluminescence (PL) and electrochemical properties. <sup>1-5</sup> They have been used in a variety of applications ranging from optoelectronic devices to biomedical fields like bioimaging and biomolecule sensing.<sup>2-4</sup> Doping of CQDs primarily with nitrogen has demonstrated to be effective in enhancing their emission properties, quantum yields (QYs), and stabilizing excitons due to surface passivation.<sup>5</sup> CQDs appear to be a rising star in the field of luminescence material because of their unique optical and electronic behavior, photostability, environment friendliness, low toxicity, and high chemical stability and are found to be an alternative potential material against semiconductor quantum dots and organic dyes.<sup>6-8</sup> To improve the PL efficiency, different strategies and raw materials have been used to synthesize CQDs with high QYs.<sup>9,10</sup> However, there are certain areas that require in-depth findings such as uncertainty

emitting CQDs in the biological field. For an in-depth investigation of the PL mechanism, synthesis, characterization, and PL behavior of multicolor emissive CQDs are imperious.<sup>11,12</sup> Consequently, the synthesis of mild, facile, novel multicolor CQDs with a good QY, a tunable optical band, and a large molar extinction coefficient remains highly desirable. The PL spectra are shifted to a slightly longer wavelength as a function of size and materials. Tuned CQD color and PL can be achieved by controlling the temperature and time during their synthesis process.<sup>13</sup>

The most fascinating properties of CQDs are the PL emission due to the surface state and core-related emission.

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### Nitrogen and Sulphur co-doped Graphene: A Robust Material for Methylene Blue Removal

Shubhra Sinha<sup>a</sup>, Indrapal Karbhal<sup>a,\*</sup>, Manas Kanti Deb<sup>a,\*</sup>, Anushree Saha<sup>a</sup>, Rajiv Nayan<sup>a</sup>, Ramsingh Kurrey<sup>a</sup>, Shamsh Pervez<sup>a</sup>, Kallol K. Ghosh<sup>a</sup>, Santosh Singh Thakur<sup>b</sup>, Manish K. Rai<sup>a</sup>, Manmohan L. Satnami<sup>a</sup>, Kamlesh Shrivas<sup>a</sup>

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#### ARTICLE INFO

Keywords: Graphene Adsorption Doping Methylene blue and removal

#### ABSTRACT

N, S co-doped graphene (NSG) has been synthesized by using graphene oxide, cyanamide and sodium sulphide as a source of C, N and S respectively. Due to its excellent electronic properties and stability, NSG has been used as an adsorbent for methylene blue (MB) removal from aqueous solution. Adsorption efficiencies of Graphene, N-doped graphene, S-doped graphene and NSG were compared during the study and it was found that NSG was the most efficient material for the adsorption of MB. The study was carried out in the UV-visible region by observing the changes in absorbance. NSG has excellent properties to adsorb the MB dye with a removal efficiency of 93.76+0.2%. Additionally, desorption studies were also carried out using 0.1 M cetylpyridinium chloride as cationic surfactant and the desorption% was found to be 50.28±0.1%, signifying its reusability as an adsorbent. This indicates that NSG opens a new window for the design of heteroatom-doped carbon material as well as its application in the adsorption studies. Accordingly, the synthesized material will be employed for wastewater treatment as a reusable adsorbent of MB in the near future with high efficiency and appreciable stability. In addition, the material has several other future applications such as electrode material for supercapacitor battery, sensor, adsorbent for metal ions and biomolecules, etc.

#### 1. Introduction

In the recent past, heteroatom (N, P, B and S) doping on graphene and its budding application opportunities have attained great attention. It is noteworthy that chemical doping helps to modify the properties of graphene and unlocks various potential features that have widespread applications like water purification, energy storage, biomarker, catalyst and many more. It is seen that in the case of undoped graphene, the antibonding  $(\pi^*)$  and bonding  $(\pi)$  orbitals (which make up its conduction and valence bands respectively) are degenerate. Furthermore, it is remarkable that supreme, undoped graphene is chemically inert in nature. This is because, its delocalized  $\pi$  system tightly binds and passivates its unpaired electrons, which hinder its certain properties like reactivity and absorptivity. Providentially, doping on graphene with heteroatoms can confer it with plentiful active sites. In addition, its adaptable nature allows it to be used as a part of composite materials since chemical modifications facilitate favourable adjustment of its surface properties [1-3]. The dopant atoms exert local chemical changes in the conven-

tional structure of graphene, thereby, improving its electrical and thermal conductivities and also its charge carrier densities. These chemical treatments eventually cause various structural defects and the formation of new functional groups on graphene. Hence, doping on graphene with heteroatoms has eventually opened up new opportunities in the field of dye removal and various other fields [4-6].

However, it is worth mentioning that if pure catalysts are employed for the decomposition of such stubborn dyes, then it would require a longer reaction time and larger reactor volume to achieve an acceptable amount of adsorption. Therefore, doping can be employed as an efficient alternative approach to enhance the catalytic property of catalysts and modulate their optical and other properties [7,8]. Among various heteroatoms, nitrogen and sulphur are two of the most commonly used dopants in the case of graphene and its derived materials due the presence of active lone pair of electrons in nitrogen and sulphur [9].

Methylene blue (MB), which is also known as methylthioninium chloride, is a synthetic basic dye. It is an organic chloride salt that has 3,7-bis(dimethylamino)phenothiazine-5-ium as the counter ion (Fig. 1).

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# *N*-doped, silver, and cerium co-doped carbon quantum dots based sensor for detection of $Hg^{2+}$ and captopril

Lakshita Dewangan<sup>a</sup>, Yogyata Chawre<sup>a</sup>, Jyoti Korram<sup>a</sup>, Indrapal Karbhal<sup>a</sup>, Rekha Nagwanshi<sup>b</sup>, Vishal Jain<sup>c</sup>, Manmohan L. Satnami<sup>a,\*</sup>

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#### ARTICLE INFO

Keywords: N-CQDs N/Ag-CQDs N/Ce-CQDs Fluorescence quenching Fluorescence recovery

#### ABSTRACT

A stable carbon quantum dots doped with nitrogen (*N*-CQDs), co-doped with silver (N/Ag-CQDs), and co-doped with cerium N/Ce-CQDs were synthesized using hydrothermal method. As-synthesized N/Ag-CQDs and N/Ce-CQDs showed high quantum yield compared to *N*-CQDs. These carbon quantum dots were used as a probe for the detection of mercury and captopril. The fluorescence quenching (turn-off) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs was occured with the addition of  $Hg^{2+}$  ion. On the other hand, captopril showed fluorescence recovery (turn-on) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs which are quenched by  $Hg^{2+}$  ion. The fluorescence recovery of CQDs is due to the high affinity of thiol group of captopril towards  $Hg^{2+}$  ion to form Hg-S bonds. On the basis of fluorescence quenching (turn-off),  $Hg^{2+}$  was determined with low limit of detection of 1.43 nM, 0.93 nM and 1.38 nM using *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs respectively as fluorescence nanoprobes. The fluorescence turn-on of the CQDs has been applied for the detection of captopril with low limit of detection of 1.65  $\mu$ M, 0.46  $\mu$ M and 1.22  $\mu$ M using *N*-CQDs, N/Ag-CQDs, and N/Ce-CQDs respectively. The developed sensing probe showed good sensitivity and high fluorescence efficiencies.

#### 1. Introduction

In recent years, carbon quantum dots (CQDs) luminescence efficiency was evaluated in a useful way like heteroatom doping [1-3]. Compared with undoped CQDs, non-metallic atom like nitrogen doping on CQDs decreases some surface defects, increases their optical properties and quantum yields. CQDs doped with non-metallic atom (N) in combination with either co-doping with metal (Ag<sup>+</sup>) and rare earth element (Ce<sup>3+</sup>) could provide very bright fluorescence with good surface passivation, resistance to photobleaching and ultra-high photoluminescence quantum yields because of excitation energy traps [4–7]. The photoluminescence mechanism of heteroatom CQDs or co-doped CQDs depends on energy traps and conjugated electronic structure. The co-dopant silver (Ag<sup>+</sup>) is used as biocompatible element with nitrogen passivated surface of CQDs, which enables the participation of lone pair electron of nitrogen for effectively enhancement of quantum yields [6,8–9]. On the other hand silver act as a strong lewis acid which has high affinity for nitrogen donor atom, that could result in formation of a stable complex between Ag-N by electron transfer mechanism and the outcome was successfully synthesized N/Ag-CQDs. In the N/Ce-CQDs, carboxyl group of CQDs can coordinate with  $Ce^{3+}$  in the interstitial state and provide more electrons for the CQDs. Cerium shows high stability in  $Ce^{3+}$  state, which protects the 4f energy level from the crystalline field and external chemical environment, and is used as an antioxidant for biomedical applications [10–14]. The applications of single heteroatom doped and co-doped CQDs have been reported for detection of drugs like daunorubicin [15], methimazole [16], gemcitabine [17], levodopa [18], cisplatin [19], and heavy metal ions like iron [20], arsenic [21], mercury [22], lead [23], organic pollutants [24], peroxides [25] and copper [26].

Mercury  $(Hg^{2+})$  is a toxic heavy metal pollutant and has become a serious problem worldwide because of its endanger impact on human health [27]. For the sake of human health, it causes serious damage to kidney, brain, endocrine system and central nervous system even at very low concentration. [28–29] Numerous analytical techniques such as colorimetric [30], fluoremetric [31], electrochemical [32] and surface

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### Talanta

Volume 259, 1 July 2023, 124526

# Recognition of malathion pesticides in agricultural samples by using α-CD functionalized gold nanoparticles as a colorimetric sensor

Bhuneshwari Sahu, Ramsingh Kurrey, <mark>Manas Kanti Deb</mark> 옷 쩓, Beeta Rani Khalkho, Suryakant Manikpuri

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### Highlights

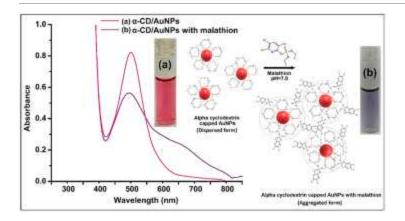
- AuNPs/α-CD based colorimetric method for detection of malathion pesticides.
- Mechanism is based on the non-covalent and H-bonding interaction of malathion with AuNPs/α-CD.
- Applications to the determination of malathion in vegetable samples.
- Advantages of present method are simple, sensitive, selective and excellent recovery %.

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### Abstract

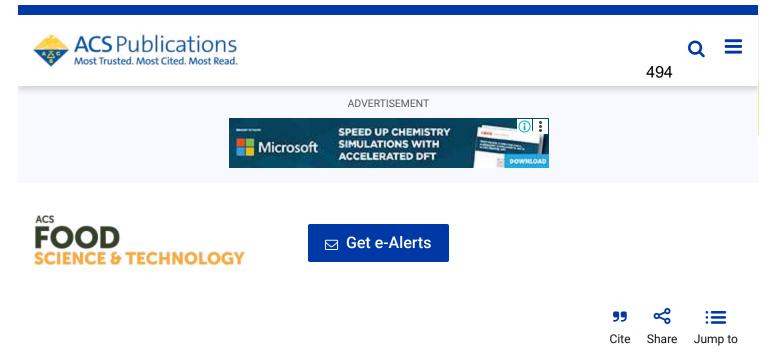
Herein, a rapid, precise alpha-cyclodextrin ( $\alpha$ -CD) based gold nanoparticles (AuNPs) for selective detection of malathion pesticides has been reported. These are organophosphorus pesticides (OPPs), that can cause a neurological disease by inhibiting the activity of acetylcholinesterase (AChE). It is important to exploit a quick and sensitive approach for monitoring OPPs. Hence in the present work, a colorimetric assay for the detection of malathion has been developed as a model of OPPs from the environmental sample matrices. The physical and chemical properties of synthesized alpha-cyclodextrin stabilized gold <u>nanoparticles</u> (AuNPs/ $\alpha$ -CD) were studied with various characterization techniques, including UV-visible spectroscopy, TEM, DLS and FTIR. The designed sensing system displayed linearity in the broad range of malathion concentrations, 10–600 ngmL<sup>-1</sup> with a limit of detection and the limit of quantification values 4.03 ngmL<sup>-1</sup> and 12.96 ngmL<sup>-1</sup>, respectively. The application of the designed chemical sensor was extended to the malathion pesticide determination in real samples such as vegetables, which resulted in almost 100% recovery rates in all the spiked samples. Thus, due to these advantages, the present study established a selective, facile and sensitive colorimetric platform for the direct detection of malathion within a very short time (5min) with a low detection limit. The practicality of the constructed platform was further executed by the detection of the pesticide in vegetable samples.

### Graphical abstract



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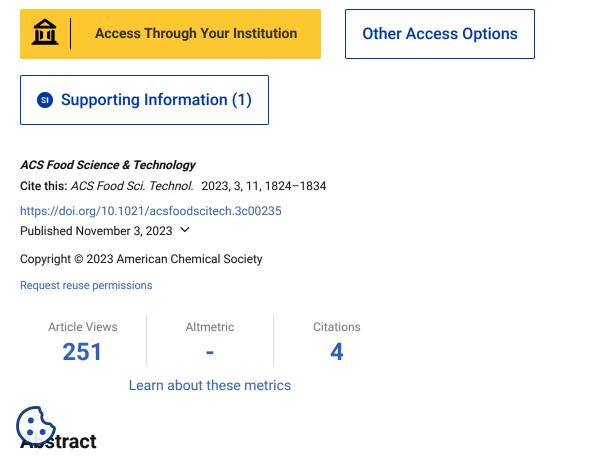
### Introduction



ARTICLE | November 3, 2023

## Dual-Mode Plasmonic and Paper-Based Colorimetric Assays for the Determination of Riboflavin in Green Leafy Vegetables and Whole Grains

Tikeshwari, <mark>Kamlesh Shrivas</mark>\*, Sanyukta Patel, Monisha, Tushar Kant, Santosh Singh Thakur, Shamsh Pervez, Manas Kanti Deb, and Kallol K. Ghosh





We developed plasmonic and paper-based colorimetric assays using poly(vinyl alcohol)-capped silver nanoparticles (AgNPs) to detect vitamin  $B_2$  in food samples. Plasmonic colorimetry shifts the plasmonic band from 405 to 445 nm in the presence of  $B_2$ , while the paper-based method changes the color of AgNPs from yellow to reddish yellow.  $B_2$  levels were quantified with a smartphone-assisted RGB color detector app. Experimental and density functional theory investigations validated the selective riboflavin–AgNP interaction. The plasmonic assay detected  $B_2$  in the range of  $0.01-1.0 \ \mu g \ m L^{-1}$  with a detection limit of  $0.008 \ \mu g \ m L^{-1}$ , while the paper-based assay detected in the range of  $0.2-2.0 \ \mu g \ m L^{-1}$  with a detection limit of  $0.09 \ \mu g \ m L^{-1}$ . Both methods had low relative standard deviations of 3.5% (plasmonic) and 4.7% (paper-based). The cost-effective, user-friendly, paper-based assay is particularly suitable for resource-limited settings, validated against high-performance liquid chromatography and Student's *t*-test for accuracy.

Subjects 🛈 Colorimetry Metal Nanoparticles Nutrition Organic Compounds Plasmonics Keywords 🛈 AgNPs/PVA Plasmonic Colorimetry Paper-Based Colorimetry Vitamin B<sub>2</sub> Leafy Vegetables Grains **Read this Article** To access this article, please review the available access options below. Recommended 

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## Materials Chemistry and Physics

Volume 307, 1 October 2023, 128161

# Graphene-silver nano-ink for inkjet printing of paper electrode for electrochemical sensing of 4-nitrophenol

Monisha ª, Tushar Kant ª, Tikeshwari ª, <mark>Kamlesh Shrivas</mark> ª 은 쩓, Antresh Kumar <sup>b</sup>, Khemchand Dewangan <sup>c</sup> 은 쩓

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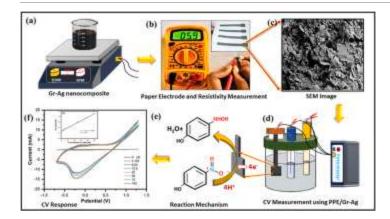
### Highlights

- Printed paper electrode (PPE) with graphene (Gr)-silver (Ag) was used as electrochemical sensing for 4-nitrophenol (4-NP).
- Inkjet printer was employed to print formulated Gr-Ag NI on photo paper and sintered at 200°C for 30min to make electrode.
- Gr-Ag/PPE was used as a <u>working electrode</u> in <u>cyclic voltammetry</u> for 4-NP determination.
- Gr-Ag/PPE provides a low cost, decomposable, and user-friendly sensor for monitoring of 4-NP in environmental water sample.

### Abstract

Here, an inkjet printed paper electrode (PPE) decorated with graphene (Gr)-silver (Ag) nanocomposite was exploited as an electrochemical sensing probe for analysis of 4nitrophenol (4-NP) in environmental water samples. In this work, 4% Gr-Ag nanocomposite ink (NI) was prepared in ethanol, <u>ethylene glycol</u>, and glycerol in the ratio of 50:45:5, which possess surface tension and viscosity of 36mNm<sup>-1</sup> and 11 mPas, respectively. The office inkjet printer was employed to print formulated Gr-Ag NI on digital photo paper, followed by sintered at 200°C for 30min to make effective conducting tracks for the sensing of 4-NP. Gr-Ag NI-based PPE was used as a <u>working electrode</u> in <u>cyclic voltammetry</u>. The working principle of detection is based on the electrocatalytic reduction process of 4-NP on the electrode surface. A good linearity range of 3.125–100µM was observed, achieving a detection limit of 2.7µM to measure 4-NP. Thus, the developed PPE holds considerable potential and offers an economical, biodegradable, and user-friendly sensor for future applications in the monitoring of 4-NP in environmental water samples.

### Graphical abstract



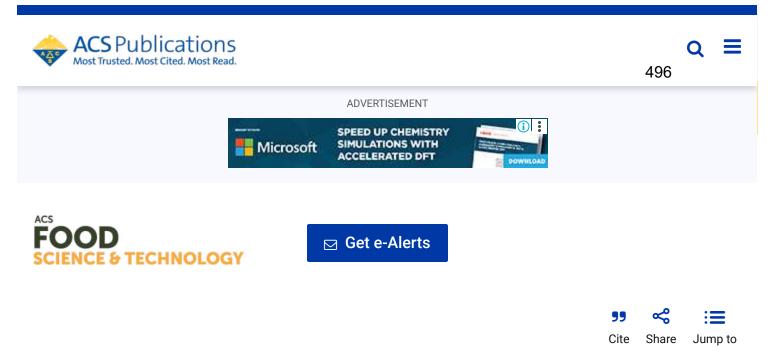
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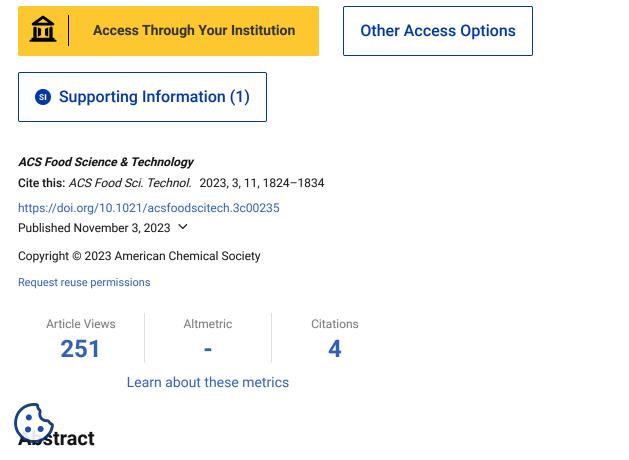
## Section snippets



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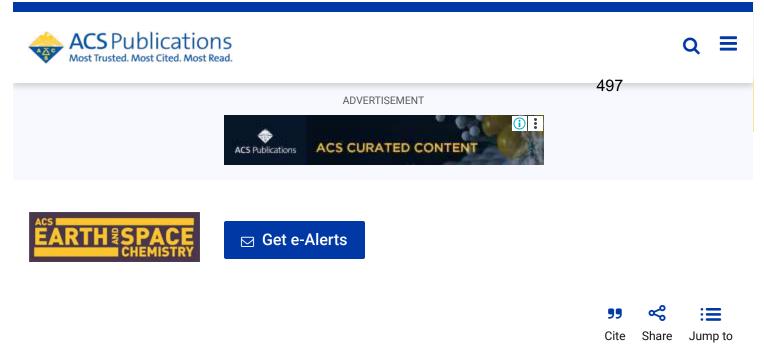


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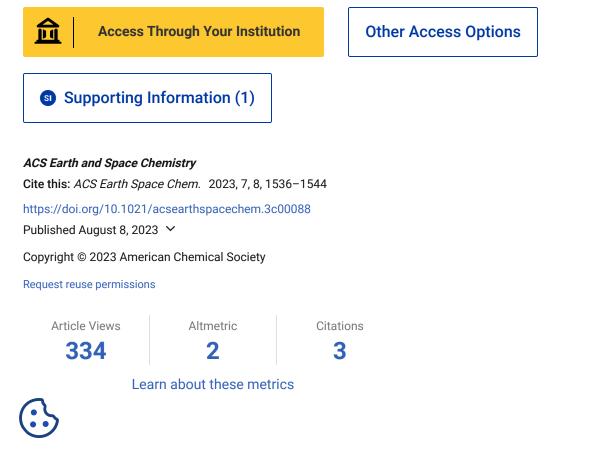
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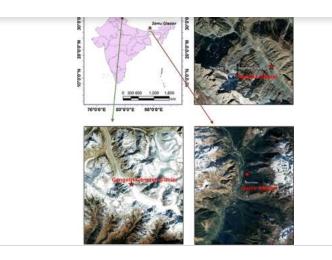
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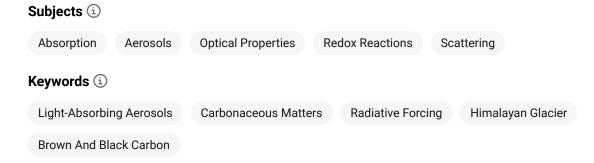


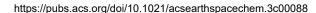
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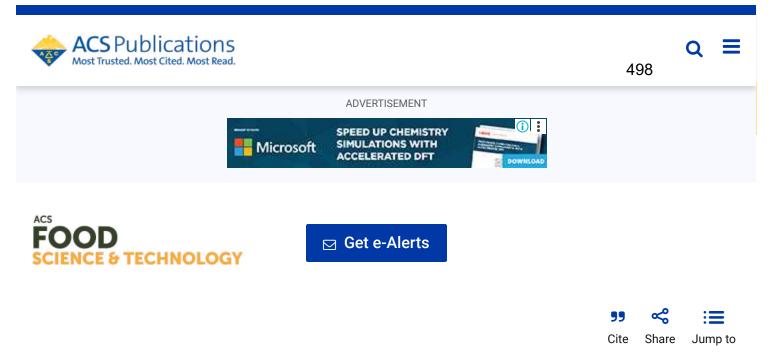
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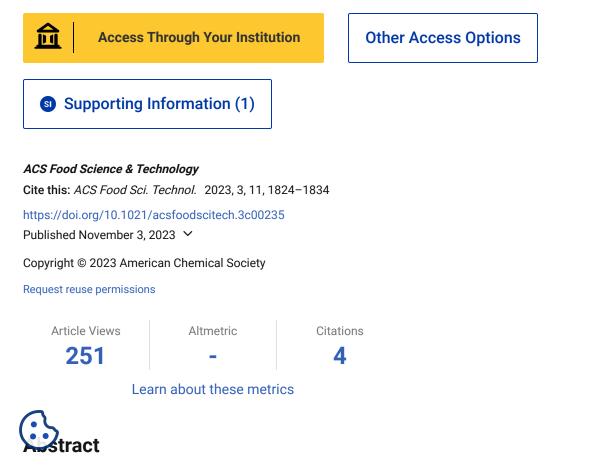
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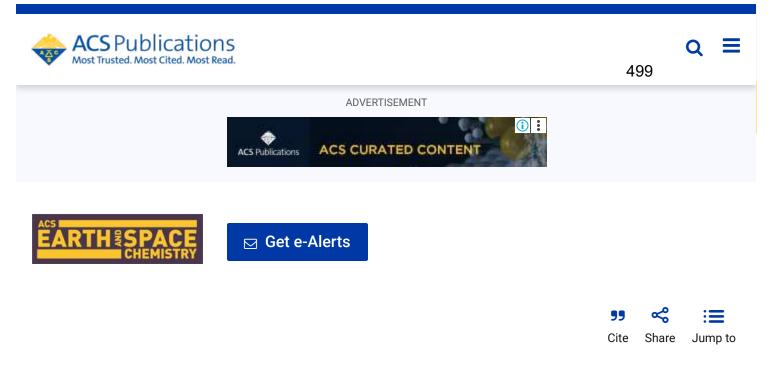


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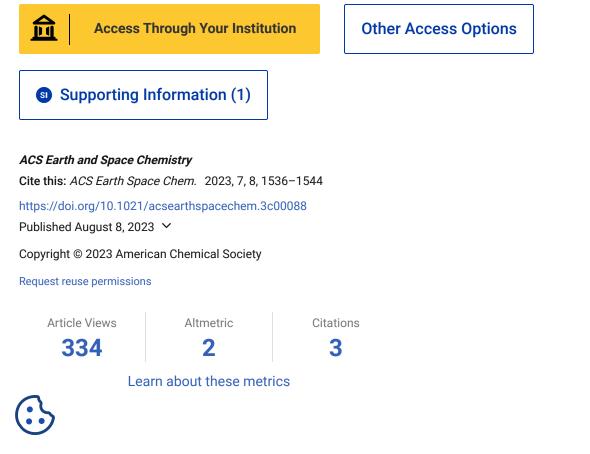
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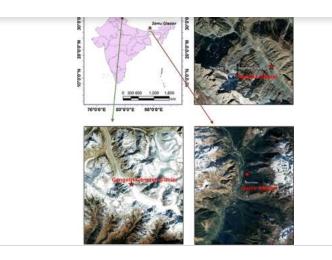
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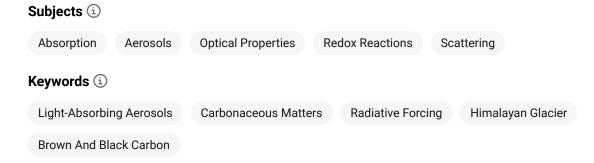


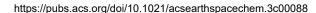
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Ghosh), Manas Kanti Deb (search.aspx?key=Manas Kanti Deb), Shamsh Pervez (search.aspx?key=Shamsh Pervez), Indrapal Karbhal (search.aspx?key=Indrapal Karbhal)

Email(s): ikarbhal@gmail.com (mailto:ikarbhal@gmail.com)

Address: School of Studies in Chemistry, Pt. Ravishankar Shukla University Raipur (C.G.) \*Corresponding Author: ikarbhal@gmail.com

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# Ravishankar

A novel composite electrode material has been synthesized using in-situ chemical characterization of aniline over the surface of rice straw-derived carbon (RSC). The detailed structural characterization validates the effective incorporation of granular polyaniline (PANI) over the RSC surface. The supercapacitor performance of the RSC@PANI electrode was systematically investigated and achieved as high as specific capacitance of 408 Fg-1 at a current density of 1 Ag-1. Moreover, RSC@PANI shows 93% capacitance retention after 1000 cycles at a current density 10 Ag-1. Apart from its outstanding electrochemical performance, the resulting RSC@PANI electrode exhibits exceptional characteristics such as scalability and lightweight properties. This study contributes valuable insights into the synthesis and characterization of RSC@PANI as a promising electrode material for supercapacitors.

Keywords: Rice Straw () Polyaniline () RSC@PANI () Supercapacitor () Scalability () Low-cost ()

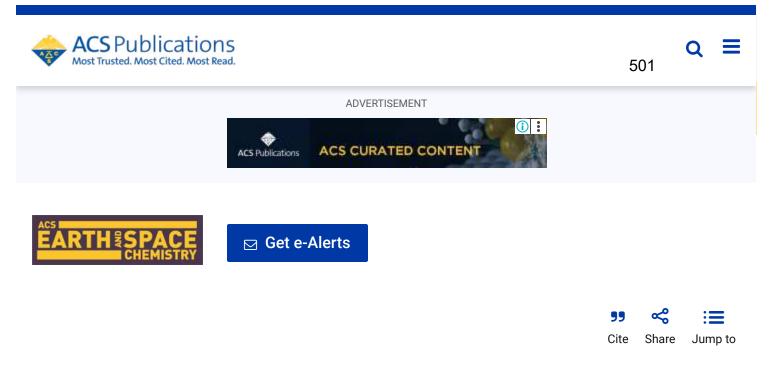
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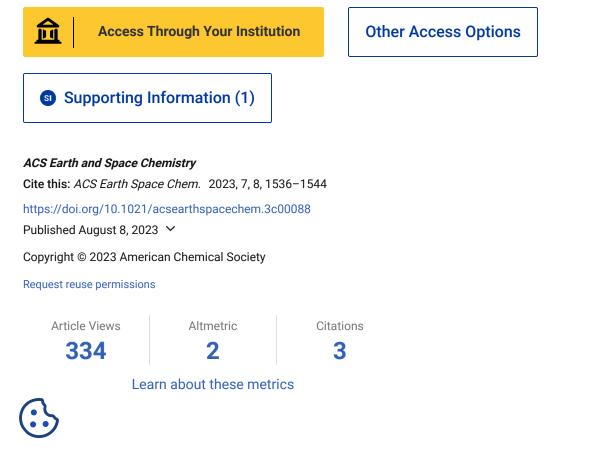
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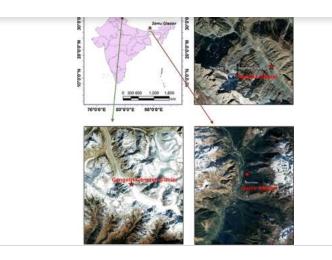
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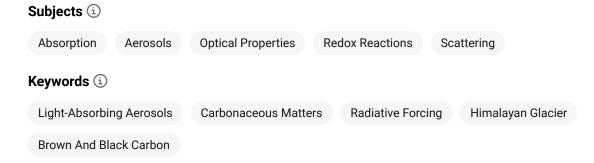


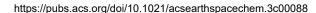
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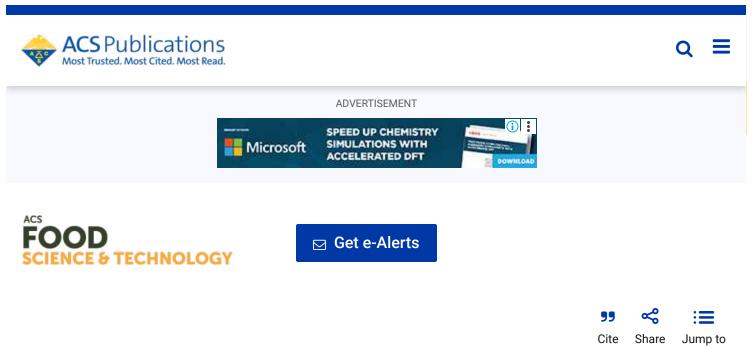
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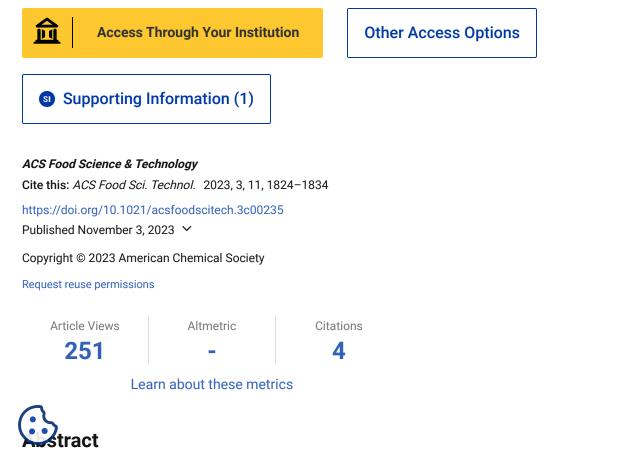
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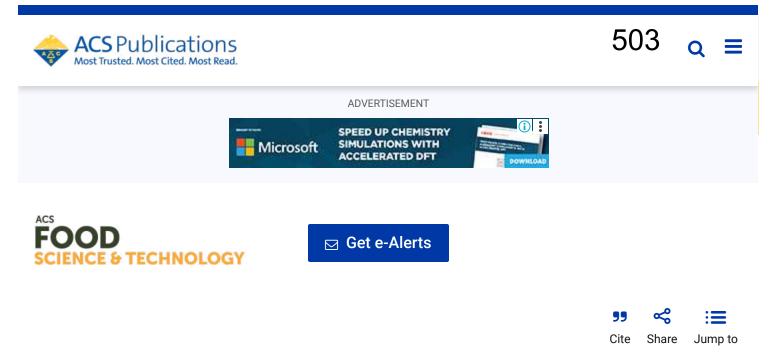


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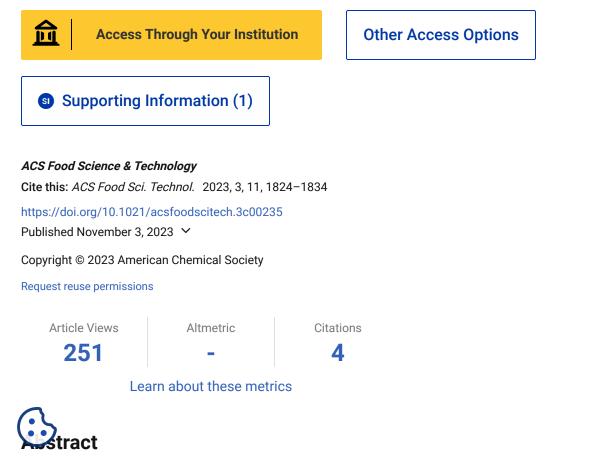
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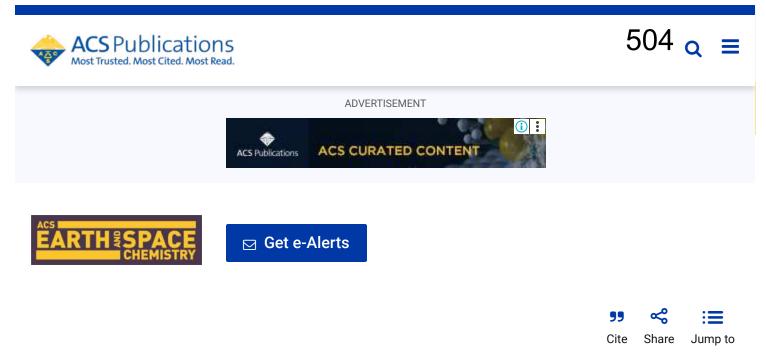


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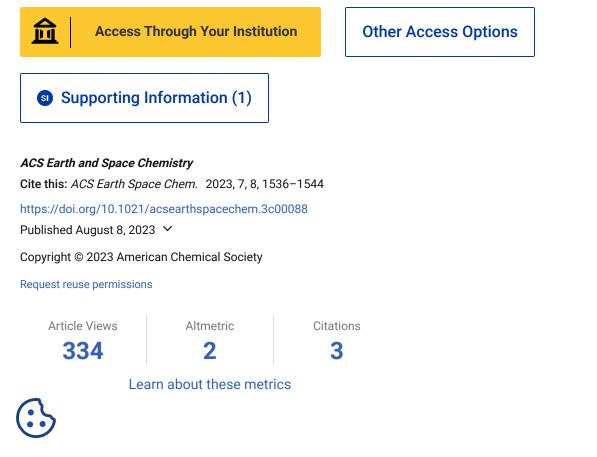
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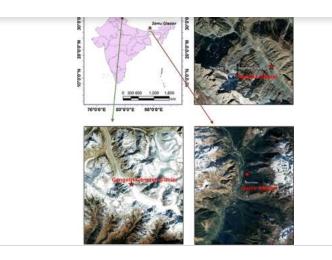
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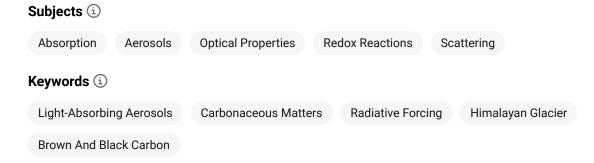


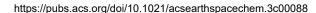
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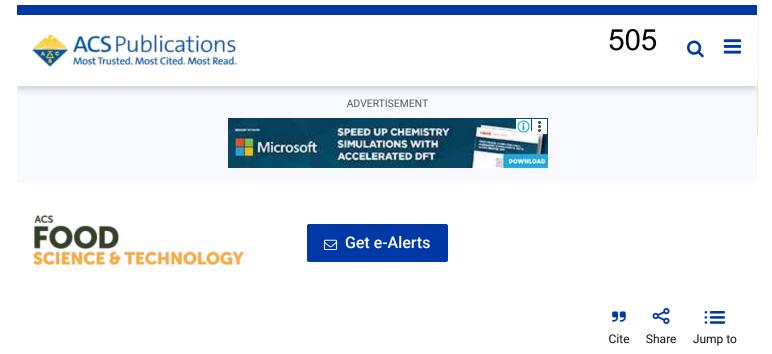
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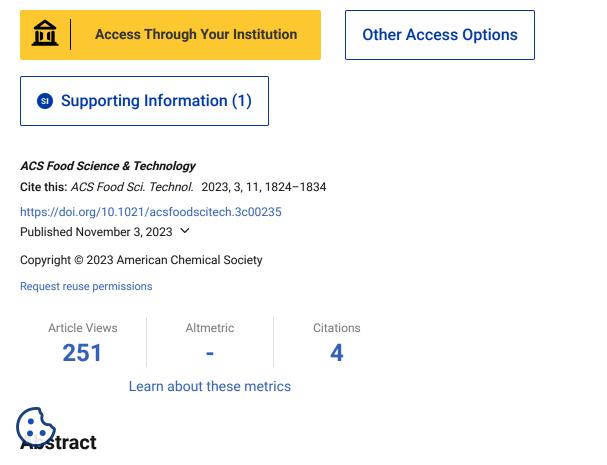
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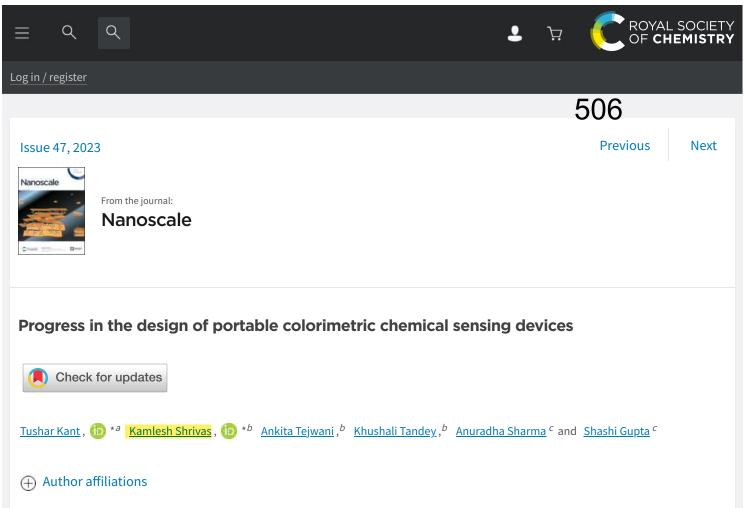


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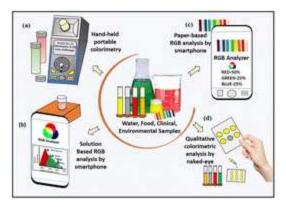
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# Abstract

The need for precise determination of heavy metals, anions, biomolecules, pesticides, drugs, and other substances is vital across clinical, environmental, and food safety domains. Recent years have seen significant progress in portable colorimetric chemical sensing devices, revolutionizing on-the-spot analysis. This review offers a comprehensive overview of these advancements, covering handheld colorimetry, RGB-based colorimetry, paper-based colorimetry, and wearable colorimetry devices. It explores the underlying principles, functional materials (chromophoric reagents/dyes and nanoparticles), detection mechanisms, and their applications in environmental monitoring, clinical care, and food safety. Noble metal nanoparticles (NPs) have arisen as promising substitutes in the realm of sensing materials. They display notable advantages, including heightened sensitivity, the ability to fine-tune their plasmonic characteristics for improved selectivity, and the capacity to induce visible color changes, and simplifying detection. Integration of NPs fabricated paper device with smartphones and wearables facilitates reagent-free, cost-effective, and portable colorimetric sensing, enabling real-time analysis and remote monitoring.



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# 1. Introduction

The determination of heavy metals, biomolecules, pesticides, volatile organic compounds (VOCs), drugs, and several other materials plays a vital role in clinical, environmental, and food safety applications. In clinical backgrounds, the exact exposure of biomolecules, such as proteins and genetic markers, is vital for diagnosing diseases, monitoring treatment efficacy, and ensuring optimal patient care. Environmental monitoring relies on the analysis of heavy metals and VOCs to assess pollution levels, identify sources of contamination, and protect ecosystems and human health. Pesticide analysis is essential in agricultural practices to ensure safe and sustainable food production while minimizing environmental impact. Additionally, in food safety, the identification of contaminants and nutrients is critical for ensuring the quality and safety of food products and safeguarding consumers' well-being. Overall, precise determination of these substances in different contexts is indispensable for public health protection, environmental preservation, and maintaining high food safety standards.<sup>1–5</sup>

Numerous analytical methods are utilized in diverse applications for identification and examination of metals, biomolecules, toxicants, and various other substances. For metal detection, methods such as atomic absorption spectroscopy (AAS),<sup>6</sup> inductively coupled plasma-atomic emission spectroscopy (ICP-AES),<sup>7</sup> ICP-mass spectrometry (MS),<sup>8</sup> fluorimetry,<sup>9</sup> and electroanalytical methods <sup>10</sup> are commonly utilized. In the analysis of biomolecules, pesticides, drugs, and volatile organic compounds (VOCs) from environmental, clinical, food, and industrial samples, techniques like fluorimetry, <sup>11</sup> electroanalytical methods, <sup>12</sup> high-performance liquid chromatography (HPLC), <sup>13</sup> gas chromatography (GC), <sup>14</sup> liquid chromatography-mass spectrometry (LC-MS), <sup>15</sup> and gas chromatography-mass spectrometry (GC-MS) <sup>16</sup> are widely used. The selection of specific methods depends on the nature of the substances being

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Page 1



# Studies on the Interaction of Imidazolium Ionic Liquids with Human Serum Albumin

Lavkesh Kumar Singh Tanwar<sup>1</sup>, Kallol K Ghosh<sup>2\*</sup>

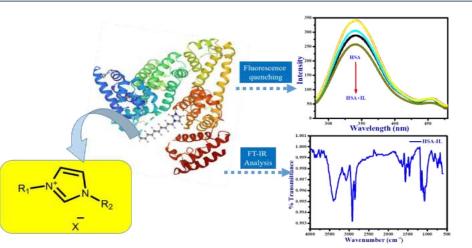
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# Abstract

Imidazolium-based ionic liquids have emerged as promising bio-compatible solvents for biomolecules. The interaction of two imidazolium-based ionic liquids, namely 1-decyl-3-methylimidazolium tetrafluoroborate [Dmim][BF<sub>4</sub>] and 1-butyl-3-methylimidazolium octylsulfate [Bmim][OS], with human serum albumin (HSA) have been investigated using UV-visible, fluorescence and fourier transform infrared spectroscopy. Stern-Volmer quenching constant (K<sub>sv</sub>) and the binding affinity (K<sub>a</sub>) value have been also calculated to reveals the molecular interactions between HSA and the imidazolium-based ILs. Additionally, we explored the thermodynamic feasibility of these interactions by calculating the Gibbs free energy ( $\Delta$ G), entropy ( $\Delta$ S), and enthalpy ( $\Delta$ H). Hydrophobic interactions have been identified as exerting a more significant influence than hydrogen bonding in the interactions between proteins and ionic liquids. This implies that the hydrophobic characteristics of the ionic liquids play a pivotal role in the denaturation of proteins. Consequently, we conclude that the hydrophobic nature of the ionic liquids is essential for inducing interactions with proteins and potentially contributing to protein structure denaturation.

Keywords: Ionic liquid, Imidazolium ionic liquids, Serum albumin, Fluorescence, FTIR.



# Graphical abstract

# **1. Introduction**

Serum albumin, the predominant protein in the circulatory system, plays a crucial role in various physiological processes, including the transportation and binding of compounds like fatty acids, drugs, and hormones (Sindhu et al., 2022; Rawat and Bohidar, 2012; Egorova et al., 2017). The interaction of serum albumin with different molecules and solvents significantly



# A Review on Extraction, Identification and Application of

Pesticidal Active Phytoderived Metabolites

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# Abstract

Bioactive compounds obtained from plants, microorganisms and minerals show some specific properties like insecticidal, herbicidal, repellent, antifeedant and toxicant activities called bio pesticide. They have specific modes of action against different pests. Due to their environmental eco-friendly nature, low cost, economic effectiveness, less pollution, and target specific quality they are in high demand in agriculture compared to chemical or synthetic pesticides. Extraction, purification, identification and characterization of these compounds from the plants materials are found always challenging. There are various types of traditional and non-traditional methods of extraction have been proposed such as maceration, distillation, ultrasonic-assisted extraction, soxhlet extraction, enzyme assisted extraction, microwave assisted extraction, accelerated solvent extraction, etc. have been reported for extraction of bioactive ingredients from plants complex matrix samples. The chromatographic separation techniques like thin layer chromatography(TLC), high performance thin layer chromatography (HPTLC), high performance liquid chromatography (HPLC) and gas chromatographic (GC) are used for their separation followed by the identification in order to determine their structure with the help of UV-Vis, fluorescence, NMR spectrometry, Fourier transforms infra-red spectrometry (FTIR) and mass spectrometry (MS). This review summarized the extraction procedure, formulation of biopesticide, structural identification and their application in agriculture.

**Key words:** Biopesticides, Synthetic Pesticide, Extraction, Identification, Formulation, Pesticidal Active Components.

# 1. Introduction

Pesticide is a chemical compound used to control harmful pests present in the soil and plants. Based on sources pesticides are categorized into chemical or synthetic pesticides and Biopesticides. Chemical pesticides contain various chemicals and polymers that act as carriers (Rakhimol et al., 2020). These carriers are specific for different pests. They are used to control weeds as herbicides, algae as algaecides, rodents as rodenticides, insects as insecticides, nematodes as nematicides, molluscs as molluscicides, termites as termiticides, mites as miticides, ticks as acaricides, fungi as fungicides, bacteria as bactericides etc. (Farooq et al., 2019). Synthetic pesticides are also classified based on active components present in them such as dichlorvos, organochlorines, diazinons, chlorpyrifos, diamides, carbamates etc. (Decool et al., 2024). Herbicides are used to control weeds to facilitate crop management by

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#### RESEARCH



# Antibacterial Activity of CdTe/ZnS Quantum Dot-β Lactum Antibiotic Conjugates

Sandeep K. Vaishanav<sup>2</sup> • Jyoti Korram<sup>1</sup> • Tikendra K. Verma<sup>5</sup> • S. K. Jadhav<sup>3</sup> • Rekha Nagwanshi<sup>4</sup> • Manmohan L. Satnami<sup>1</sup>

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#### Abstract

β-Lactum antibiotics are broad class of antibiotics which kills bacteria by inhibiting the formation of peptidoglycan that constitutes the bacterial cell wall. The resistance that develops in bacteria for antibiotics led the scientific world to think about the future aspects for modifying the way through which antibiotics are acted on the bacteria and become lethal for them. In this consequence, the potential of latest marketed antibiotics e.g. Amoxiciline (I), ceftazidim (II) have been evaluated after being conjugated with quantum dots. The surface of quantum dots has been conjugated with antibiotics by carbodiimide coupling with the help of 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (EDC) and N-hydroxysuccinimide (NHS) as conjugating agent between antibiotic and functionalized quantum dots. The antibacterial properties of QD-conjugated antibiotics have been determined by disc diffusion assay. The potency of QD-conjugated antibiotics has been estimated by determining their MIC<sub>50</sub> for the selected strain of Gram-negative (*Escherichia coli*) and Gram-positive (*Staphylococcus aureus*) bacteria. Minimum inhibitory concentration study, minimum bactericidal concentration and growth pattern analysis revealed that QDantibiotic conjugates showed slightly more prospective than pure native antibiotics against both Gram-negative (*Escherichia coli*) and Gram-positive (*Staphylococcus aureus*) bacteria.

Keywords  $\beta$ -Lactum antibiotics · QD-antibiotics conjugates · MIC<sub>50</sub> · Antibacterial Activity

#### Introduction

Since the invention of penicillin,  $\beta$ -lactam antibiotics have developed as the most essential spectrum of antibacterial agents [1, 2]. However, the experimental treatment and wide utilization of these agents have made the bacteria to

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generate various types of  $\beta$ -lactamases ( $\beta$ -Lases), which could prompt the spread of bacterial resistance [3-6]. Thus clinical viability of  $\beta$ -lactam antibiotics was negotiated. β-lactam antibiotics resistance has turned out to be a serious issue that encounters the human health [7-10]. Thus, progressively more demand has been put on pharmaceutical investigators and medical researchers to develop new antibiotics [11]. Some strategies have been accounted for disabling the bacterial resistance. One was to change the structure of  $\beta$ -lactam to reduce its sensitivity to the hydrolysis by  $\beta$ -Lases [12]. Another technique was to utilize double activity cephems; if bacteria have resistance to one of them, the other antibacterial agent would destroy them in another way [13–16]. Vergauwe and coworkers utilized reagents, for example, 3 clavulanic acid to inactivate the  $\beta$ -Lases [17]. In all these techniques, reagents added to conquer the bacterial resistance were organic compounds. Inorganic components were occasionally utilized as a part of the antimicrobial industry. Though, it is notable that inorganic nanomaterials are great antimicrobial agents. Currently, there were some research work reported, which

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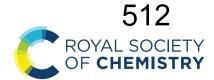
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# Prominent Perspective on Existing Biological Hallmarks of Alzheimer's Disease

Namrata Singh <sup>1</sup> <sup>2</sup>, Srishti Sharma <sup>3</sup>, Kallol K Ghosh <sup>3</sup>, Bhanushree Gupta <sup>4</sup>, Kamil Kuca <sup>2</sup> <sup>5</sup>

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### Abstract

Biomarkers are the most significant diagnosis tools tending towards unique approaches and solutions for the prevention and cure of Alzheimer's Disease (AD). The current report provides a clear perception of the concept of various biomarkers and their prominent features through analysis to provide a possible solution for the inhibition of events in AD. Scientists around the world truly believe that crucial hallmarks can serve as critical tools in the early diagnosis, cure, and prevention, as well as the future of medicine. The awareness and understanding of such biomarkers would provide solutions to the puzzled mechanism of this neuronal disorder. Some of the argued biomarkers in the present article are still in an experimental phase as they need to undergo specific clinical trials before they can be considered for treatment.

**Keywords:** Alzheimer's disease; biomarkers; diagnosis.; neurodegenerative diseases; tau protein; βamyloid peptide.

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#### RESEARCH



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### Abstract

Biomarkers are the most significant diagnosis tools tending towards unique approaches and solutions for the prevention and cure of Alzheimer's Disease (AD). The current report provides a clear perception of the concept of various biomarkers and their prominent features through analysis to provide a possible solution for the inhibition of events in AD. Scientists around the world truly believe that crucial hallmarks can serve as critical tools in the early diagnosis, cure, and prevention, as well as the future of medicine. The awareness and understanding of such biomarkers would provide solutions to the puzzled mechanism of this neuronal disorder. Some of the argued biomarkers in the present article are still in an experimental phase as they need to undergo specific clinical trials before they can be considered for treatment.

**Keywords:** Alzheimer's disease; biomarkers; diagnosis.; neurodegenerative diseases; tau protein; βamyloid peptide.

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# Basic and Advanced Logical Concept Derived from Surface Enhanced Infrared Spectroscopy (SEIRS) as Sensing Probe for Analysis of Chemical Species: A Brief Review

Shubhra Sinha<mark>, Manas Kanti Deb</mark>\*, Indrapal Karbhal, Suryakant Manikpuri, Rajiv Nayan, Babita Markande

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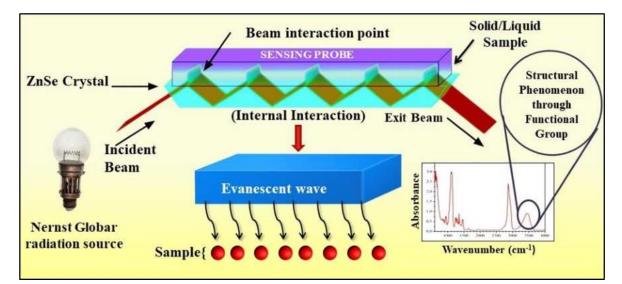
# \*Corresponding Author: <u>debmanas@yahoo.com</u> (M. K. Deb)

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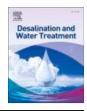
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# Graphical Abstract





Desalination and Water Treatment



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# Applications of different adsorbent materials for the removal of organic and inorganic contaminants from water and wastewater – A review



Dharini Sahu<sup>a</sup>, Shamsh Pervez<sup>a,\*</sup>, Indrapal Karbhal<sup>a</sup>, Aishwaryashri Tamrakar<sup>a</sup>, Archi Mishra<sup>a</sup>, Sushant Ranjan Verma<sup>a</sup>, Manas Kanti Deb<sup>a</sup>, Kallol K. Ghosh<sup>a</sup>, Yasmeen Fatima Pervez<sup>b</sup>, Kamlesh Shrivas<sup>a</sup>, Manmohan L. Satnami<sup>a</sup>

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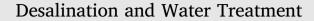
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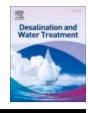
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**Desalination and Water Treatment** 

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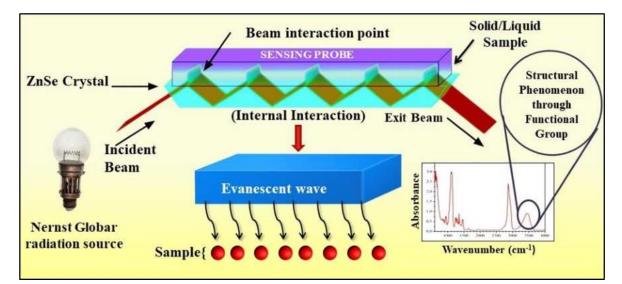
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# **Graphical** Abstract



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Volume 514, 1 September 2024, 215919

Review

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Khushali Tandey <sup>a</sup>, Kamlesh Shrivas <sup>a</sup>  $\stackrel{\frown}{\sim}$   $\stackrel{\boxtimes}{\simeq}$ , Anuradha Sharma <sup>b</sup>, Tushar Kant <sup>c</sup>, Ankita Tejwani <sup>a</sup>, Tikeshwari <sup>a</sup>, Manas Kanti Deb <sup>a</sup>, Shamsh Pervez <sup>a</sup>, Kallol K. Ghosh <sup>a</sup>

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## Highlights

- This review advances in the development of colorimetric and fluorometric paper-based devices (PADs)
- PADs with <u>metal nanoparticles</u> and <u>quantum dots</u> employed as sensing probes in the point-of-care diagnosis.
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- This innovative paper-based detection platforms for diverse diagnostic scenarios and their utility in resource-limited settings.

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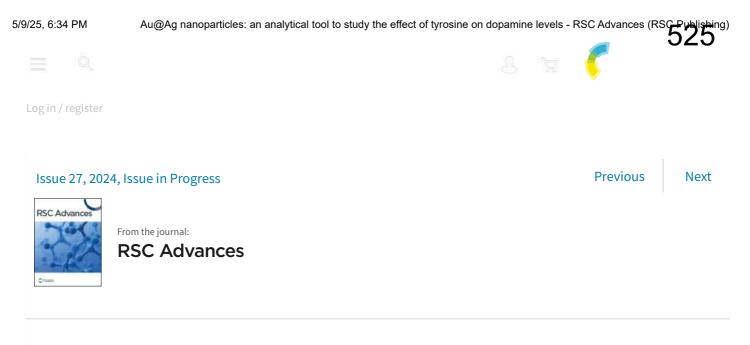
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## Highlights

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- PADs with <u>metal nanoparticles</u> and <u>quantum dots</u> employed as sensing probes in the point-of-care diagnosis.
- PADs are integrated with desktop scanners and smartphones measure the grey scale/RGB values for <u>quantitative measurement</u>.
- This innovative paper-based detection platforms for diverse diagnostic scenarios and their utility in resource-limited settings.

Abstract



Au@Ag nanoparticles: an analytical tool to study the effect of tyrosine on dopamine levels



Angel Minj, <sup>a</sup> Sushama Sahu, <sup>b</sup> Lavkesh Kumar Singh Tanwar <sup>a</sup> and Kallol K. Ghosh (1) \*<sup>a</sup>

Author affiliations

## Abstract

The neurotransmitter dopamine (DA) plays important roles in the human body, including regulatory functions, movement, memory and motivational control. The direct intake of DA is cannot cross the blood–brain barrier (BBB) efficiently. Notably, L-tyrosine works as a precursor or prime the human brain. Herein, we report an analytical method that strongly supports the hypothesis that the intake of tyrosine (Tyr)-rich food enhances DA levels. For this analysis, citrate–coated gold–core silver–shell nanoparticles (Au@Ag NPs) were synthesized. The interaction of DA with the Au@Ag NPs was investigated using multiple spectroscopic techniques, and different thermodynamic parameters were evaluated to assign the binding mechanism. Real sample analysis with Tyr-rich food was also conducted to study the effect of Tyr on DA levels. Analytical studies were performed to verify the outcomes of the present work. The limit of detection of the Au@Ag NPs–DA system for Tyr was found to be 1.64 mM. This study can contribute to development in the fields of medicine and pharmaceuticals, particularly in regard to neuromedicine. One of the major advantages of this investigation is that it will fuel research interest in the supplementation of neurotransmitters and help categorize Tyr as a dietary precursor of dopamine.

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Cite this: RSC Adv., 2024, 14, 20093

## Inner-filter effect of nitrogen-doped carbon quantum dots-MnO<sub>2</sub> nanotubes for smartphoneintegrated dual-mode sensing of glutathione and captopril<sup>†</sup>

Ankita B. Kujur,<sup>a</sup> Manmohan L. Satnami, <sup>b</sup>\*<sup>a</sup> Yogyata Chawre,<sup>a</sup> Pinki Miri,<sup>b</sup> Akash Sinha,<sup>ab</sup> Rekha Nagwanshi,<sup>c</sup> Indrapal Karbhal,<sup>a</sup> Kallol K. Ghosh, <sup>b</sup>a Shamsh Pervez <sup>a</sup> and Manas Kanti Deb <sup>a</sup>

Nitrogen-doped carbon quantum dots (N-CQDs) exhibit unique fluorescence properties and are considered one of the best candidates for the development of fluorescence-based sensors for the detection of many analytes. In this work, a smartphone-assisted fluorescent sensor has been developed using N-CQDs and MnO<sub>2</sub> nanotubes (MnO<sub>2</sub> NTs) for the detection of glutathione (GSH) and captopril (CAP). N-CQDs were facilely synthesized *via* the solvothermal method, where *o*-phenylenediamine (*o*-PD) and urea were used as nitrogen precursors. Likewise, MnO<sub>2</sub> NTs were synthesized using the hydrothermal method. Relying on the excellent fluorescence quenching ability of MnO<sub>2</sub> NTs, a nanocomposite of N-CQDs and MnO<sub>2</sub> NTs is prepared, wherein the fluorescence intensity of N-CQDs was effectively quenched in the presence of MnO<sub>2</sub> NTs *via* the inner-filter effect (IFE). The addition of thiolated compounds (GSH and CAP) helped in the recovery of the fluorescence of N-CQDs by triggering the redox reaction and decomposing the MnO<sub>2</sub> NTs. An investigation of fluorescence along with smartphone-based studies by evaluating the gray measurement using Image J software showed a great response towards GSH and CAP providing LODs of 4.70  $\mu$ M and 5.22  $\mu$ M (fluorometrically) and 5.76  $\mu$ M and 2.81  $\mu$ M (smartphone-based), respectively. The practical applicability of the sensing system has been verified using human blood plasma samples.

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### 1 Introduction

After their discovery, carbon quantum dots (CQDs) have massively gained attention and been studied by researchers. In contrast to conventional semiconductor quantum dots, they are easy to synthesize using low-cost precursors. Their synthesis also includes some green and environmental friendly approaches.<sup>1,2</sup> In addition to this, they possess many properties like good photostability,<sup>3</sup> high quantum yield,<sup>4</sup> water solubility,<sup>5</sup> low toxicity,<sup>6</sup> good biocompatibility.<sup>7</sup> Enhancement of the photoluminescence of the CQDs is assisted by nitrogen doping. The decision to choose nitrogen as a dopant over other heteroatoms (phosphorus, sulphur, nitrogen-phosphorus codoped, nitrogen-sulphur co-doped)<sup>8-11</sup> in the core of the carbon quantum dot is that it offers a suitable atomic size for doping into the carbon framework and the electronegativity assists in the favourable interaction with carbon atoms and the accessible lone pair of electrons of the nitrogen atom enhances the electronic properties.12 Functional groups such as the amino group act as reactive sites for controlled nucleation and growth of carbon dots.13 Nitrogen atoms participating in the cyclic core of carbon dots also influence their PL properties. For instance, the pyrrolic N can alone participate in protonation and enhance the fluorescence.14 Moreover, pyridinic N leads to an increase in the cyclic imines which enhance the conjugated system and improve the PL intensity.15 It is the only N atom capable of transferring protons to the conjugated system because its lone pair electrons can pair with protons. This proton transfer benefits radiative recombination.16 The graphitic N alters the electronic energy level which corresponds to optical transitions.<sup>17</sup> It aids in surface functionalization as well as in improving quantum yield.18 Many electrophotochemical applications of CQDs such as light-driven

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<sup>&</sup>lt;sup>†</sup> Electronic supplementary information (ESI) available: Normalized excitation and emission spectra of N-CQDs, deconvoluted XPS spectra of N-CQDs, Stern-Volmer plot for MnO<sub>2</sub> NTs quenching N-CQDs and comparison tables of GSH and CAP with previously reported work. See DOI: https://doi.org/10.1039/d4ra03287j

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**Research papers** 

# PANI-grafted boron, nitrogen co-doped carbon fiber: An outstanding, highperformance supercapacitor electrode

Rajiv Nayan<sup>a</sup>, Shubhra Sinha<sup>a</sup>, Vaibhav Dixit<sup>a</sup>, Manmohan L. Satnami<sup>a</sup>, Kallol K. Ghosh<sup>a</sup>, Shamsh Pervez<sup>a</sup>, Manas Kanti Deb<sup>a</sup>, Kamlesh Shrivas<sup>a</sup>, Manish K. Rai<sup>a</sup>, Sandeep G. Yenchalwar<sup>b</sup>, Kundan Wasnik<sup>c</sup>, Sandesh R. Jadkar<sup>b</sup>, Indrapal Karbhal<sup>a</sup>  $\stackrel{\wedge}{\sim}$  🖾

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Highlights

- A novel composite of PANI grafted B, N *co*-doped cotton derived carbon fiber (BNCF) has been synthesized.
- The <u>supercapacitor performance</u> of the BNCF-PANI electrode was investigated as electrode material for supercapacitor.
- The capacitance was achieved as high as 370 F g<sup>-1</sup> at a current density of 1 A g<sup>-1</sup>.
- BNCF-PANI based electrode showing the <u>energy density</u> of 12.8 Wh kg<sup>-1</sup> at current density of 1 Ag<sup>-1</sup>.
- Power density was found to be 2500 W kg<sup>-1</sup>at current density of 10 A g<sup>-1</sup>.

## Abstract

The rapid development of wearable electronic devices demands light-weight, flexible, high performance and eco-friendly <u>supercapacitors</u>. However, an efficacious design and fabrication of a steady structure for the same is still a challenge. Herein, a novel composite of <u>polyaniline</u> (PANI) grafted Boron, Nitrogen *co*-doped cotton derived carbon fiber (BNCF) has been synthesized via in-situ chemical polymerization. The detailed structural characterization confirms the successful incorporation of granular PANI over the BNCF surface. The <u>supercapacitor performance</u> of the as-synthesized BNCF-PANI electrode was investigated as electrode material for supercapacitor and the capacitance was achieved as high as  $370Fg^{-1}$  at a current density of 1 A g<sup>-1</sup>. Moreover, BNCF-PANI based electrode exhibited the <u>energy density</u> of 12.8Whkg<sup>-1</sup> at current density of 1 A g<sup>-1</sup>.

## Graphical abstract



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## THROUGHPUT ANALYSIS OF SINGLE HOP MODEL OF LAYERED ARCHITECTURAL BASED WSN ON VARIOUS MOBILITY MODEL: NS3

Monika Bhardwaj<sup>\*1</sup>, Sunjay Kumar<sup>\*2</sup>, V.K Patle<sup>\*3</sup>

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Raipur, Chhattisgarh, India.

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#### ABSTRACT

Nowadays layered based WSN is an interesting area of research. Wireless Sensor Networks are selfconfigurable, self-healing networks consisting of a larger number of small size sensor nodes. Sensor Nodes composed of processor, memory, battery, sensor devices and transceiver. WSN sensed the environment data (temperature, humidity etc.) and transferring it to the computational center via the sink node. In this work we use various Mobility Models to evaluate the throughput of Single Hop Model of layered based Wireless Sensor Network by NS-3.

Keywords: Wireless Sensor Network, Mobility Models, Performance Metrics.

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In a layered based model have a single powerful base station, and the layers of sensor nodes around it correspond to the nodes that have the same hop-count to the BS. The objective is to determine the throughput of Layered based Wireless Sensor Network with Non-realistic Mobility Model. To evaluate the result we use NS3 simulator, which is used to evaluate performance of network and mobility models.NS3 consist of a flow monitor module that measure all flow on the simulation and give output in terminal.

#### II. LITERATURE REVIEW

We have studies many literatures in the field of WSN. Most of the related work is highlighted the existing mobility models as well as different performance metric. Apart from this we also collected the researcher's point of views and their directions in the future work.

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1सहायक प्राध्यापक, अर्थषास्त्र अध्ययनषाला, पं. रविषंकर शुक्ल विष्वविद्यालय रायपुर.

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#### **ABSTRACT:**

Social भारत सरकार की कृषि नीति कैसी होनी चाहिए, यह इस बात पर निर्भर करता है कि कृषि विकास के किस टूर्फ़ी के क्रै सरकार को कृषि के आधुनिक साधनांें की आपूर्ति पर बल देना चाहिए। नई कृषि विधेयक सकारात्मक थे किस्मून्क अपनी उपज कहीं भी बेंच सकेंगे अभी राज्य के कानून पर निर्भर है। इन बिलों के आने से राज्य अपना कमीषन और मंडी शुल्क खो देंगे। लेकिन किसानों को डर था कि इससे सरकार द्धारा गाारंटीयुक्त न्यूनतम समर्थन मूल्य समाप्त हो जायेगा, जिससे उन्हें अपनी फसलों के लिए प्राप्त होने वाली कीमतें कम हो जायेगी। जिससे किसानों ने इन अधिनियमों के खिलाफ प्रदर्षन किया। भारत के सर्वोच्च न्यायालय ने जनवरी 2021 में कृषि कानूनों के कार्यान्वयन पर रोक लगा दी।

Keywords: कृषि नीति () न्यूनतम समर्थन मूल्य () प्रति हेक्टे अर आय। ()

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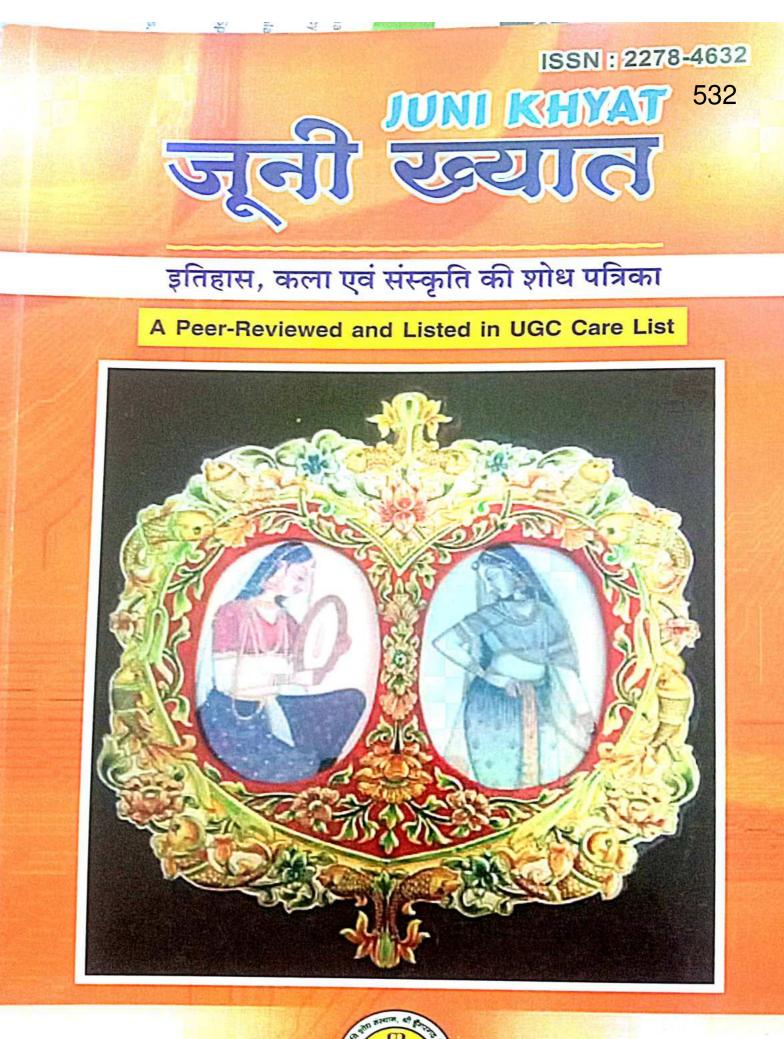
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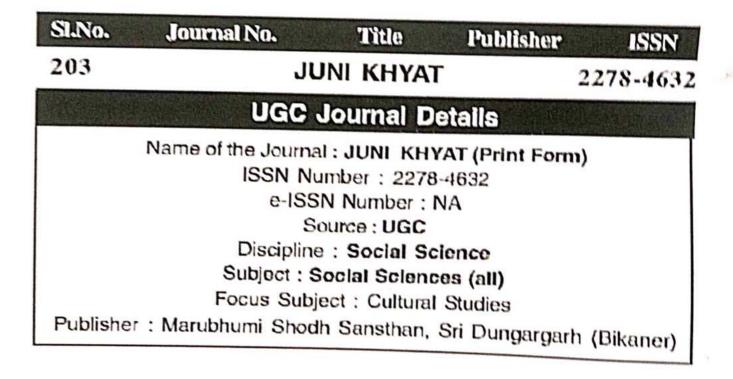
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श्याम महर्षि संचिवः मरुभूमि शोध संस्थान (राष्ट्रभाषा हिन्दी प्रचार समिति) श्रीडूँगरगढ् 331803 (बीकानेर) राज.

आलेख सीडी में या निम्न पर ईमेल किया जा सकता है।

सम्पादकीय कार्यालय : डॉ. बी.एल. भादानी रांगड़ी चौक, बीकानेर 334001(राज.)

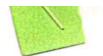
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Juni Khyat (UGC Care Group I Listed Journal)



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# "छत्तीसगढ़ के असंगठित क्षेत्र में कार्यरत महिला उद्यमियों की रोजगार एवं आय का अध्ययन" (दुर्ग जिला के धमधा एवं दुर्ग जनपद पंचायत के विषेष संदर्भ में)

शंकर लाल पटेल शोधछात्र पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.) डॉ.अर्चना सेठी सहायक प्राध्यापक पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

सारांश :--अंसगठित क्षेत्र में कार्यरत महिला उद्यमियों के सर्वेक्षित क्षेत्र में कुल न्यादर्ष 80 लिया गया है जिसमें ग्रामीण क्षेत्र हो 20 तथा शहरी क्षेत्र से 60 है जिसके अध्ययन से यह सारांप प्राप्त होता है कि दुर्ग जिला के धमधा तथा दुर्ग विकास खण् मैदानी क्षेत्र तथा उद्यम के लिए अनुकुल वातावरण, षिक्षा के स्तर आर्थिक संपन्नता होने से उद्यम के क्षेत्र बहुत अधिक विकास किया है। असंगठित क्षेत्र में उद्यम प्रारंभ कर अपना ही नहीं बल्कि अपने साथ अन्य लोंगों को भी उद्यम में सर्वाधिक 0-2 व्यक्तियों को रोजगार देने वाली महिला उद्यमियों का प्रतिषत 76.25 है। आय प्राप्त कर वह स्वयं तो संपन्न हो रही है साथ ही साथ अन्य लोगों को भी संपन्न बना रही है। उद्यम में सर्वाधिक आय 1000–3000 रूपय मासिक प्राप्त करने वले का प्रतिषत 68.57 है। हालाकिं यह असंगठित क्षेत्र में उद्यम चलाने में शहरी क्षेत्र की महिला उद्यमी ग्रामीण क्षेत्र की महिल उद्यमियों से आगे है शहर की महिलाएं अधिक जागरूक, षिक्षित तथा अधिक स्वतंत्र महसुस कर रही है। ग्रामीण क्षेत्र क्षे महिलाएं रूढ़ीवादी तथा सामाजिक संबंध के कारण से कम ही या एक–दो ही महिलाएं असंगठित क्षेत्र में उद्यम का संचालन कर पा रही है, परन्तु समस्याएं कितनी भी हो असंगठित क्षेत्र में कार्य करने वाली महिला उद्यमी विकास के लक्ष्य को प्राप करने के लिए हर समस्या को पार कर आधुनिक समाज की मुख्यधारा से जुड़ती जा रही है।

संकेत शब्द :- महिला उद्यमी, उद्यम, समस्याएं, सामाजिक, आर्थिक, संतुष्ट, असंतुष्ट, कार्य, रोजगार,

प्रस्तावना :-- भारत देष 135 करोड़ की आबादी वाला दुनिया की द्वितिय बड़ा देष है जहां की 27 प्रतिषत आबादी युवा शकि है जिसे रोजगार दे पाना भारत सरकार के लिए चुनौती से कम नही है। यहां षिक्षा का स्तर 73 प्रतिषत है, जिसे अपनी जीवन यापन हेतु रोजगार की तलाष है ऐसे में हमारे देष के युवाओं को रोजगार की लिए सरकार की ओर नजर गड़ाने से अच्छा है कि वह स्वरोजगार प्रारंभ कर अपने ही नही अपने साथ अन्य लोगों को भी रोजगार प्रदान कर सके।

आधुनिक भारतीय समाज में महिलाएं पुरुषो से कम नही वह पुरुषों से कदम से कदम मिलाकर चल रही है। किसी भी क्षेत्र की बात हो वह हर एक क्षेत्र में पुरुषों से कम नहीं है चाहे वह रोजगार हो राजनीति हो, समाज या उद्यम की क्षेत्र क्यों न हो। आज असंगठित क्षेत्र में देखा जाये तो भारत की ग्रामीण तथा शहरी दोनो क्षेत्र में महिलाओं की भागीदारी बढ़ती जा रही है। वह उद्यम के हर क्षेत्र में अपनी पांव पसार रही है। असंगठित क्षेत्र के प्रमुख उद्यम जैसे फल दुकान, किराना दुकान, सब्जी दुकान, ब्युटि पार्लर, फैंसी स्टोर, दोना पत्तल, सिलाई–कढ़ाई, कपड़ा दुकान, जैविक खाद, डेयरी, मुर्गी पालन आदि व्यवसाय को महिलाएं ही संचालित कर रही है।

समय के इस चक में व्यक्तियों के दृष्टिकोण बदल रहा है। आज कल स्त्रियां उद्योग–धन्धों का तीव्रगति से विकासकर रही है। विभिन्न अध्ययनो से यह बात भी सिद्ध हो चुका है कि वर्तमान समय के आर्थिक विभाजन में महिलाओं की भूमिका तथा परिस्थिति में अत्यधिक परिर्वतन आयी है। आर्थिक विकास की इस स्वरूप में महिलाओं में सोचने, समझने तथा निर्णय करने की क्षमता में आमूल चूल परिवर्तन आया है। इसी परिवर्तन का परिणाम कहा जा सकता है कि समाज कृषि आधारित व्यवसाय से आगे आधुनिक औद्योगिक व्यवस्था की ओर अग्रसर हुआ तथा अब वह घर से बाहर भी विभिन्न प्रकार से उद्यमी कार्य कर अर्थतंत्र में अपनी महत्वपूर्ण भूमिका निभा रही है।

#### महिला उद्यमी से आषय

सामान्य रूप से यदि कहा जाये तो भी महिलायें किसी भी प्रकार की वस्तुओं और सेवाओं का उत्पादन कर रही है महिल उद्यमी कही जायेगी। इस प्रकार से वह महिला अपने उद्योग की स्थापना से लेकर वितरण व्यवस्था तक की सम्पूर्ण जवाबदारी लेती है अर्थात वह उद्योग स्थापित करती है उसमें लगने वाली पूंजी की व्यवस्था करती है। उद्योग का सुनिध्धित ढंग से संचालन करती है। उसमे लगने वाले कच्चे माल की व्यवस्था करती है। उत्पादन प्राप्त कर उसकी ब्रिकी के लिए बाजार की खोज, वितरण की व्यवस्था तथा उस उद्योग से प्राप्त होने वाले लाभ-हानि की भागीदारी होती है उन्हें महिल उद्यमी कहा जाता है। इस प्रकार हम कह सकते है कि महिला उद्यमी जनसंख्या के उस भाग से है जो कि अपने स्वयं के



# छत्तीसगढ़ में स्व-सहायता समूह के माध्यम से महिलाओं के सामाजिक एवं आर्थिक सशक्तिकरण का अध्ययन (दुर्ग एवं राजनांदगांव जिला के विशेष संदर्भ में)

<mark>डॉ अर्चना सेठी</mark>\* ओमप्रकाश वर्मा\*\*

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#### सारांश –

वर्तमान भारतीय परिप्रेक्ष्य में विशेषकर ग्रामीण क्षेत्र में महिलाओं ने अपने मेहनत और लगन के बल पर यह साबित कर दिया कि स्व सहायता समूह के साथ जुड़कर एक नया मुकाम हासिल किया जा सकता है। प्रस्तुत अध्ययन में छत्तीसगढ़ के दुर्ग एवं राजनांदगांव जिले के स्व–सहायता समूह का महिलाओं के सामाजिक एवं आर्थिक सशक्तिकरण पर प्रभाव एवं संतुष्टि का अध्ययन किया गया है। दुर्ग जिले में स्व–सहायता समूह की सदस्यता से पूर्व 37.3 प्रतिशत महिलाएं सशक्त थी एवं स्व–सहायता समूह की सदस्यता के पश्चात 41.6 प्रतिशत महिलाएं सशक्त हो गई। राजनांदगांव जिले में स्व–सहायता समूह की सदस्यता से पूर्व 38.5 प्रतिशत महिलाएं सशक्त थी एवं स्व–सहायता समूह की सदस्यता के पश्चात 46.8 प्रतिशत महिलाएं सशक्त हो गई अर्थात हमारी प्रथम शून्य परिकल्पना महिला स्व–सहायता समुह से सदस्यों के सामाजिक आर्थिक सशक्तिकरण में कोई सार्थक प्रभाव नही पडा है, अस्वीकार की जाती है। स्व–सहायता समूह की सदस्यता से कमशः दोनों जिलों में 4.3 एवं 8.3 प्रतिशत अतिरिक्त महिलाएं सशक्त हुई एवं दुर्ग जिले में महिला सशक्तिकरण सूचकांक स्व–सहायता समूह की सदस्यता से पूर्व 0.64 था जो स्व–सहायता समूह की सदस्यता के पश्चात 0.75 हो गया। राजनांदगांव जिला में महिला सशक्तिकरण सूचकांक स्व–सहायता समूह की सदस्यता से पूर्व 0.65 था जो स्व–सहायता समूह की सदस्यता के पश्चात 0.78 हो गया। संतुष्टि का अध्ययन करने हेतु काई स्कवेयर परीक्षण किया गया है। परिगणित मूल्य 7.36 तालिका मूल्य 11.00 से छोटा है। अतः शून्य परिकल्पना अस्वीकार की जाती है कि स्व–सहायता समूहों के माध्यम से महिलाओं के संतुष्टि में कोई सार्थक प्रभाव नहीं पडा है अर्थात स्व–सहायता समूहों के माध्यम से महिलाओं के संतुष्टि में सार्थक प्रभाव पड़ा है। स्व-सहायता समूह के आय को प्रभावित करने वाले तत्वों का अध्ययन करने के लिए बहुगुणी प्रतिपगमन गुणांक का प्रयोग किया गया है। स्व–सहायता समूह का कार्य, स्व–सहायता समूह का निर्माण अवधि, स्व–सहायता समूह का आकार या सदस्यों की संख्या, सदस्यों की शिक्षा, समूह द्वारा दिए गए ऋण का आकार, समूह द्वारा दिये गये ऋण का ब्याज दर, बचत आदि आय को धनात्मक रुप से प्रभावित कर रहे है।

आभारः राज्य योजना आयोग से अनुदान प्राप्त।

शब्द कूंजी: स्व–सहायता समूह, महिला सशक्तिकरण, पंचसूत्र।

#### प्रस्तावना –

भारत में कुल जनसंख्या में से आधी अबादी महिलाओं की है और यहां के अधिकांश जनसंख्या ग्रामीण प्रधान है जिसमें से लगभग 77 प्रतिशत जनसंख्या गांवो में बसती है और अर्थव्यवस्था मूल रूप से कृषि पर आधारित है। अभी भी अधिकांश महिलाएं सामाजिक व आर्थिक दृष्टिकोण से पिछड़ी हुई है। ऐसी स्थिति में महिलाओं को सशक्त सबल करने, उनके अधिकारो की रक्षा करने, स्वावलंबी बनाने तथा उसकी सामाजिक, आर्थिक व राजनीतिक दशा सुधारने में स्व सहायता समूह अपनी महत्वपूर्ण भूमिका निभा रही है। महिला स्व–सहायता समूह महिलाओं को संगठित कर उनकी सामाजिक, आर्थिक व राजनीतिक सशक्तिकरण का एक सशक्त माध्यम बन चुकी है।(थान्गमनी, एस. एवं मुठुसेलवी, एस.)

भारतीय समाज में नारी का स्थान पूज्यनीय रहा है। समाज तथा सभ्यता के विकास में महिलाओं का योगदान सर्वोपरि रही है। महिलाएं प्रत्येक समाज का एक महत्वपूर्ण अंग है जिसका संख्या लगभग पुरूषों के समान ही होती है। अतः महिलाओं का विकास करके ही सार्वभौमिक विकास की कल्पना को साकार करना सम्भव है। पं. जवाहरलाल नेहरू ने भी इसी तथ्य को पुष्ट करते हुए कहा है कि ''यदि आपको विकास करना है तो महिलाओं का उत्थान करना होगा, महिलाओं का विकास होने पर समाज का विकास स्वतः हो जाएगा।'यह विभिन्न सामाजिक आर्थिक घटकों पर महिलाओं के जीवन शैली को बेहतर बनाने का एक स्वैच्छिक संगठन है। जिसके माध्यम से महिलाओं के विकास में महिला सशक्तिकरण अपनी महत्वपूर्ण भूमिका निभा रही है। (कण्पाकोंडल)

### SYNTHESIS, CHARACTERIZATION AND ANTI-PROLIFERATIVE EVALUATION OF ISOINDOLINE-1,3-DIONE DERIVATIVES

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**ABSTRACT:** In the present study, some potential anti-proliferative compounds: isoindoline-1,3dione derivatives A1-A11 have been synthesized from various Schiff bases (aromatic amines) 1-11. The newly synthesized compounds were optimized by Thin layer chromatography and various physical parameters were as their structural assignments were based on elemental (C, H, N) and Spectral (IR, 1H-NMR, Mass) analysis. Then, these compounds were screened for the antiproliferative activity against various bacterial and fungal strains. The result of anti-proliferative screening has shown that iso-indoline-1,3-dione derivatives (A1-A11) possessed prominent antiproliferative profile. The compound A10 and A11 possessed mild against MDA-MB-231 (Human Breast Cancer Cell) and A11 and A1 showed antiproliferative activity against MCF-7 (Human Breast Cancer Cell) as compared to the other synthesized compounds showed most efficient and potent anti-proliferative activity with reference to the standard drug, Adriamycin (Doxorubicin). **KEYWORDS:** Anti-proliferative activity, isoindoline-1,3-dione, SRB assay, MCF-7, MDA-MB-468, Phthalimide, etc.

#### Introduction

The advent of multidrug resistance in different infections has increased the urgent necessity for novel medicines. Anti-cancer medications face a significant challenge in combating pathogen resistance, which calls for ongoing research to investigate new types of anti-proliferative agents.[1] Literature survey also reveals that isoindoline-1,3-dione and its derivatives were synthesized as anti-convulsant,[2] anti-inflammatory,[3] anti-microbial,[4] anti-tuberculosis,[5] anti-viral,[6] anti-proliferative,[7] anti-glycemia,[8] anti-HIV [9] etc. It has also been observed that the derivative of Schiff base [10-17] have been found to exhibit promising anti-proliferative activity. In view of these observations, it was thought worthwhile that to synthesize the newer derivatives

of isoindoline-1,3-dione starting from isobenzofuran-1,3-dione followed by combination of various Schiff base having aromaticity in single frame, which may lead to compounds with interesting Anti-proliferative activity. [18-33]

#### Chemistry

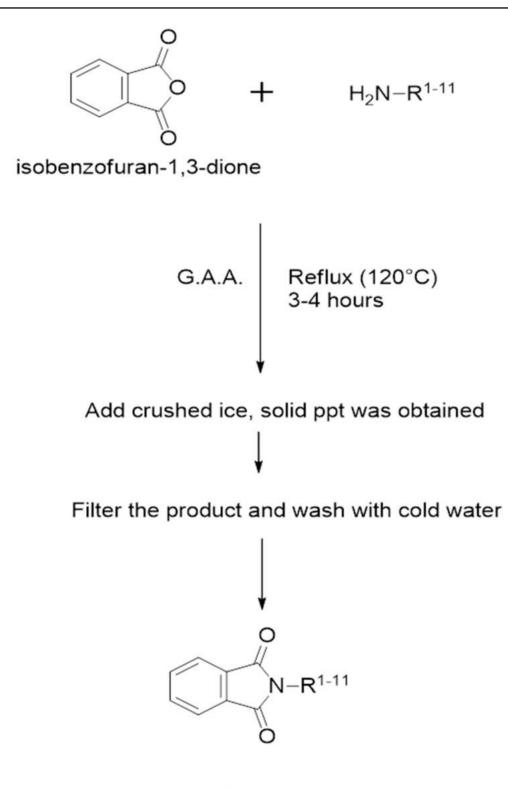
In the current study, the compounds were synthesized by condensing phthalic anhydride (0.01 mol) and a number of aromatic amines (ranging from 1 to 11) in 10 mL glacial acetic acid at reflux for 3 to 4 hours at 120°C. TLC optimised the reaction's progression. After that, bring the conical flask to room temperature before adding 30 mL of ice-cold distilled water to the reaction medium. The product was filtered and washed with ice-cold distilled water until the glacial acetic acid elimination process was completed. The product was then recrystallized using ethyl acetate and DMSO, leading to the varying yields of the further refined chemicals. Elemental (C, H, N) and spectral (IR, 1H-NMR, Mass) data were used to define the structures of novel produced compounds. The synthesis method of the aforementioned compounds is described in Scheme-1.

#### **Result and Discussion**

The anti-proliferative screening showed that all the tested compounds A1-A11 showed moderate to excellent inhibitory growth against two different cancer cell line, i.e., MCF-7 (Human Breast Cancer Cell) and MDA-MB-468 (Human Breast Cancer Cell)  $\mu$ g/ml concentration using standard method.

It has been observed from the results of antiproliferative activity against MCF-7 (Human Breast Cancer Cell) and MDA-MB-468 (Human Breast Cancer Cell), the Schiff base: N-(substituted isobenzofuran-1,3-dione) derivatives A10 and A11 possessed mild against MDA-MB-231 (Human Breast Cancer Cell) and A11 and A1 showed antiproliferative activity against MCF-7 (Human Breast Cancer Cell) as compared to the other synthesized compounds and standard drug, Adriamycin (Doxorubicin).

Compound A11 having (2-(3-chlorobenzylidene)hydrazinyl)methamine substituent at N-position exhibited most promising antiproliferative activity against both the cancer cell line with  $100\mu$ g/ml. By observing the effects of different substituting group A1-A11, it was noticed that compounds A10 and A11 bearing 4-aminobenzenesulfonamide and (2-(3-chlorobenzylidene)hydrazinyl)methamine showed excellent antiproliferative activity against MCF-7 (Human Breast Cancer Cell) and MDA-MB-468 (Human Breast Cancer Cell) as compared to other substituent in their respective groups of compounds. Substitution with amino-aromatic group at N-position in iso-indoline-1,3-dione as seen in compounds A1, A2, A6, A7 also showed substantial and prominent antiproliferative activity.



# Product 1-11

Fig.1. Synthesis Scheme

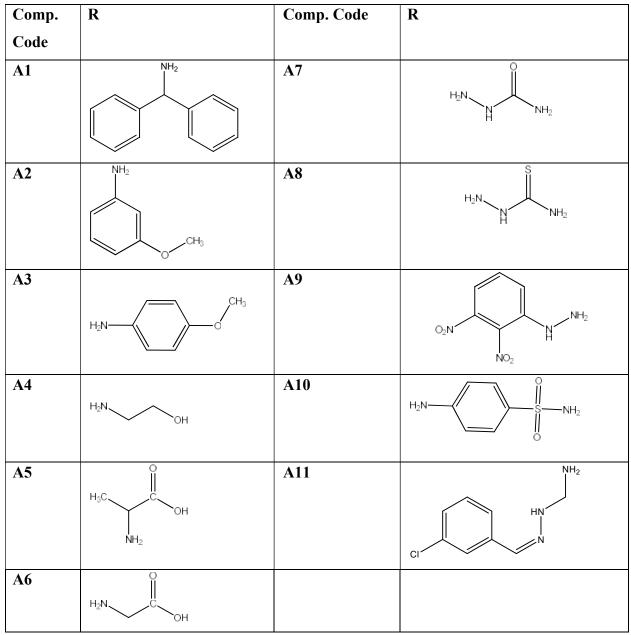


Table.1. Determine the value of R for various derivatives.

# Experimental

### Chemistry

All the reagents and solvents were generally received from commercial supplier. Reactions were done in dried glassware. Melting points were taken in open capillaries by thermonic melting point apparatus, and are uncorrected. The purity of the newly synthesized compounds was checked by thin layer chromatography (TLC) on silica gel-G coated plates by using different solvent systems. Infrared (IR) spectra were determined by Shimadzu FT-IR spectrophotometer (IR-Affinity-1) using KBr pallets and wave number was reported in cm-1. The 1H-NMR and spectra were taken on Bruker AVANCE II spectrometer in CDC13 or DMSO-d6 and chemical shifts ( $\delta$ ) are given in ppm. Tetramethylsilane (TMS) was used as internal reference standard. Mass spectra was recorded

on LCMS mass spectrophotometer (Shimadzu). The carbon, hydrogen and nitrogen analysis were performed and the results were found within the theoretical values.

General Method for Synthesis of Products A1-A11: The compounds were prepared by a condensation reaction between phthalic anhydride (0.01 mol) and selected aromatic amines (1-11) in 10 mL glacial acetic acid under reflux at 120°C for 3-4 h. The progress of the reaction was optimized by TLC. Then cool the conical flask at room temperature and added 30mL cold distilled water/crushed ice was added into the reaction media. The product was filtered and washed with cold distilled water till the removal of glacial acetic acid carried out. The product was then recrystallized with ethyl acetate and DMSO and further purified compounds lead to their variable yields.

**2-benzhydrylisoindoline-1,3-dione (A1)**: Melting point 115-117°C , yield 57.59% . IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 3098.84 (Ar-C-H); 1774.77(C=O); 1579.70 (C=C); 1282.00 (N-C); 3021.92 (C-H); 1536.48 (CH<sub>2</sub>-CH<sub>2</sub>).. <sup>1</sup>H-NMR (DMSO, d6, 500 MHz) δ 7.85-7.88 (m,4H) phthalimide; δ 7.33-7.37 (m,8H) Ar-H; δ 6.16 Ar-CH-Ar. MS: [M<sup>+</sup>]at m/z 313.25.

**2-(3-methoxyphenyl)isoindoline-1,3-dione (A2)** Melting point 120-125°C , yield 76.23% . IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 3098.65 (Ar-C-H); 1775.12(C=O); 2955.08 (CH<sub>3</sub>); 1196.15 (O-CH<sub>3</sub>); 3030.69 (C-H); 2945.75 (CH<sub>2</sub>-CH<sub>2</sub>), 1602.07 (N-H). <sup>1</sup>H-NMR (DMSO, d6, 500 MHz) δ 7.87-7.89 (m,4H) phthalimide; δ 6.83-6.85 (m,4H) ArH; δ 3.82 (3H) –OCH3. MS: [M<sup>+</sup>]at m/z 253.15.

**2-(4-methoxyphenyl)isoindoline-1,3-dione (A3)** Melting point 120-125°C , yield 59.63% . IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 3094.32 (Ar-C-H); 1768.31 (C=O); 2968.29 (CH<sub>3</sub>); 1175.08 (O-CH<sub>3</sub>); 3042.54 (C-H); 1585.69 (CH<sub>2</sub>-CH<sub>2</sub>), 1611.76 (N-H). <sup>1</sup>H-NMR (DMSO, d6, 500 MHz) δ 7.87-7.88 (m,4H) phthalimide; δ6.85-7.30 (m,4H) ArH; δ 3.82 (3H) –OCH3. MS: [M<sup>+</sup>]at m/z 253.16.

**2-(2-hydroxyethyl)isoindoline-1,3-dione (A4)** Melting point 110-113°C , yield 54.98% . IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 3091.81 (Ar-C-H); 1463.40 (C=C); 1242.73 (N-CH<sub>3</sub>); 3470.66 (O-H); 3030.76 (C-H); 720.26 (CH<sub>2</sub>-CH<sub>2</sub>), 1615.27 (N-H). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz) δ 7.85-7.87 (m, 4H) phthalimide; δ 3.96-4.33 (m,4H) ArH; δ 3.95 (s,1H)-OH. MS: [M<sup>+</sup>]at m/z 191.08.

**2-(1,3-dioxoisoindolin-2-yl)propanoic acid (A5)** Melting point 115-118°C , yield 54.32% . IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 2998.12 (-CH<sub>3</sub>); 1335.41 (C-OH); 3198.76 (Ar-C-H); 1714.45 (C=0); 1610.36 (N-H); 1216.42 (C-N). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz) δ 1.74 (s, 3H) CH<sub>3</sub>; δ 5.08 (s,1H) OH; δ 7.86-7.88 (m,4H)-ArH. MS: [M<sup>+</sup>]at m/z 219.11.

**2-(1,3-dioxoisoindolin-2-yl)acetic acid (A6)** Melting point 115-120°C , yield 58.90%. IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 2934.88 (CH<sub>2</sub>); 1773.07 (C=O); 1318.98 (C-OH); 3063.41 (Ar-C-H); 1612.82

(N-H); 1247.48 (C-N). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz) δ 7.92-7.91(m,4H) ArH; δ 4.52 (s,2H) – CH<sub>2</sub>. MS: [M<sup>+</sup>]at m/z 205.08.

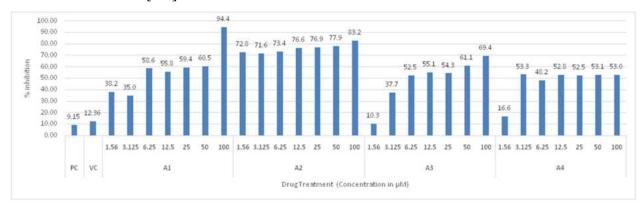
*1,3-dioxoisoindoline-2-carbohydrazide (A7)* Melting point 120-123°C , yield 62.35% . IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 3345.99 (NH<sub>2</sub>); 3267.15 (N-H); 2176.25 (2176.25); 1261.68 (C-N); 1748.36 (C=O); 3089.47 (Ar-C-H). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz) δ 1.59 (m,2H) NH<sub>2</sub>; δ 8.02-7.89 (m,4H) ArH; δ 2.24 (s, 2H) –NH<sub>2</sub>. MS: [M<sup>+</sup>]at m/z 205.16.

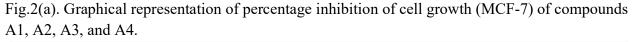
*1,3-dioxoisoindoline-2-carbothiohydrazide (A8)* Melting point 125-127°C , yield 66.45%. IR (KBr)(V<sub>max</sub> cm<sup>-1</sup>) 2548.27 (=S); 3312.57 (-NH<sub>2</sub>); 2044.82 (N-N); 3198.79 (-NH); 1283.99 (N-C); 3035.10 (Ar-C-H); 1751.79 (C=O). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz) δ 1.71 (s,1H) NH; δ 8.02-7.89 (m,4H) ArH; δ 2.93 (s, 2H) –NH<sub>2</sub>. MS: [M<sup>+</sup>]at m/z 221.18.

**2-((2,3-dinitrophenyl)amino)isoindoline-1,3-dione** (A9) Melting point 135-138°C , yield 42.13%. IR (KBr)( $V_{max}$  cm<sup>-1</sup>) 1503.49 (Ar-NO<sub>2</sub>); 1901.76 (N-N); 1744.98 (C=O); 1546.05 (-Ar); 1206.17 (C-N); 3101.25 (Ar-C-H). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz)  $\delta$  9.72 (s,1H) NH;  $\delta$  8.05-7.94 (m,4H) ArH;  $\delta$  8.34-8.32 (m, 3H) – dinitrobenzene. MS: [M<sup>+</sup>]at m/z 328.12.

**2-((4-aminophenyl)sulfonyl)isoindoline-1,3-dione (A10)** Melting point 138-140°C , yield 69.11%. IR (KBr)( $V_{max}$  cm<sup>-1</sup>) 3261.84 (O=S=O); 1747.48 (C=O); 3367.27 (Ar-NH<sub>2</sub>); 2508.67 (C-S); 1577.79 (-Ar); 3065.38 (Ar-C-H). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz)  $\delta$  7.85-7.88 (m,4H) phthalimide;  $\delta$  7.61 (m,2H)ArH, 6.61 (m, 2H)ArH;  $\delta$  6.27 Ar-NH<sub>2</sub>. MS: [M<sup>+</sup>]at m/z 302.19.

2-((2-(3-chlorobenzylidene)hydrazinyl)methyl)isoindoline-1,3-dione (A11) Melting point 157-160°C , yield 54.97%. IR (KBr)( $V_{max}$  cm<sup>-1</sup>) 703.43 (Ar-Cl); 1209.38 (C-C); 1929.69 (N=C); 3454.57 (N-H); 1281.10 (N-C); 1743.89 (C=O); 1209.38 (N-C); 3048.89 (Ar-C-H). <sup>1</sup>H-NMR (CDCl<sub>3</sub>, d6, 500 MHz)  $\delta$  8.63 (s,1H) NH;  $\delta$  8.024-8.01 (m,4H) ArH;  $\delta$  7.46-7.89 (m, 4H) Chlorobenzene. MS: [M<sup>+</sup>]at m/z 313.58.





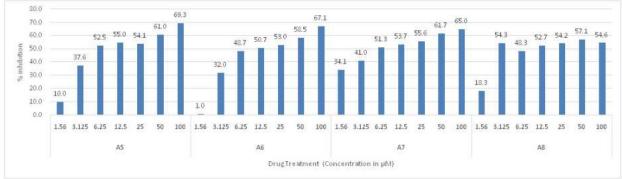


Fig.2(b). Graphical representation of percentage inhibition of cell growth (MCF-7) of compounds A5, A6, A7, and A8.

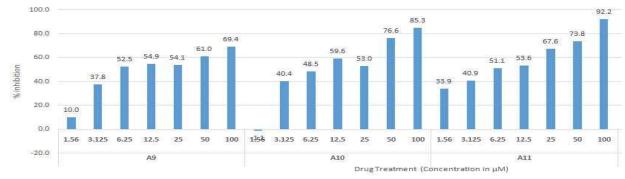


Fig.2(c). Graphical representation of percentage inhibition of cell growth (MCF-7) of compounds A09, A10, and A11.

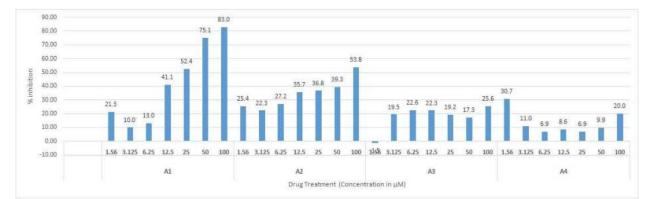


Fig.3(a). Graphical representation of percentage inhibition of cell growth (MDA-MB-468) of compounds A01, A02, A03, and A04.

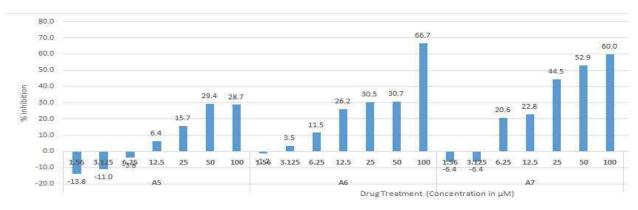


Fig.3(b). Graphical representation of percentage inhibition of cell growth (MDA-MB-468) of compounds A5, A6, A7, and A8.

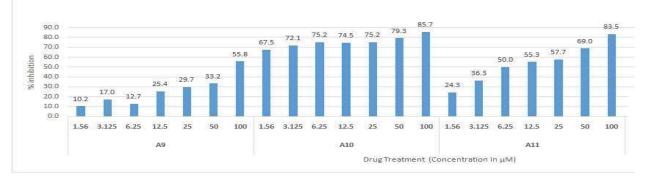


Fig.3(c). Graphical representation of percentage inhibition of cell growth (MDA-MB-468) of compounds A09, A10, andA11.

#### Pharmacology

The compounds A1-A11 and standard drug, Adriamycin (Doxorubicin), have been evaluated in vitro for anti-proliferative profile. The determination of the anti-proliferative activity of the compounds (A1-A11) was done as the percentage control growth with respect to the molar concentration of the compounds. The antiproliferative activity was conducted against two different human cancer cell line, i.e., MDA-MB-468 (Human Breast Cancer Cell) and MCF-7 (Human Breast Cancer Cell).

#### Anti-proliferative activity

All the synthesized compounds were screened for their anticancer activity by SRB method against Human Breast Cancer Cell Line (MDA-MB-468) and Human Breast Cancer Cell Line MCF-7 using Doxorubicin as standard drug (Fig.2 (a), 2(b), 2(c) and 3(a), 3(b), 3(c))

SRB assay: The cell lines were grown in RPMI 1640 medium containing 10% fetal bovine serum and 2 mM L-glutamine. For present screening experiment, cells were inoculated into 96 well microtiter plates in 90 µL at 5000 cells per well. After cell inoculation, the microtiter plates were incubated at 37°C, 5%CO2, 95% air and 100 % relative humidity for 24 h prior to addition of experimental drugs. Experimental drugs were solubilized in appropriate solvent to prepare stock

of 10-2 concentration. At the time of experiment four 10-fold serial dilutions were made using complete medium. Aliquots of 10  $\mu$ l of these different drug dilutions were added to the appropriate micro-titre wells already containing 90  $\mu$ l of medium, resulting in the required final drug concentrations.

After compound addition, plates were incubated at standard conditions for 48 hours and assay was terminated by the addition of cold TCA. Cells were fixed in situ by the gentle addition of 50  $\mu$ l of cold 30 % (w/v) TCA (final concentration, 10 % TCA) and incubated for 60 minutes at 4°C. The supernatant was discarded; the plates were washed five times with tap water and air dried. Sulfurhodamine B (SRB) solution (50  $\mu$ l) at 0.4 % (w/v) in 1 % acetic acid was added to each of the wells, and plates were incubated for 20 minutes at room temperature. After staining, unbound dye was recovered and the residual dye was removed by washing five times with 1 % acetic acid. The plates were air dried. Bound stain was subsequently eluted with 10 mM trizma base, and the absorbance was read on an Elisa plate reader at a wavelength of 540 nm with 690 nm reference wavelength.

Percent growth was calculated on a plate-by-plate basis for test wells relative to control wells. Percent Growth was expressed as the ratio of average absorbance of the test well to the average absorbance of the control wells \* 100. Using the six absorbance measurements [time zero (Tz), control growth (C), and test growth in the presence of drug at the four concentration levels (Ti)], the percentage growth was calculated at each of the drug concentration levels. The dose response parameters were calculated for each test article. Growth inhibition of 50 % (GI50) was calculated from [(Ti-Tz)/(C-Tz)] x 100 = 50, which is the drug concentration resulting in a 50% reduction in the net protein increase (as measured by SRB staining) in control cells during the drug incubation. The drug concentration resulting in total growth inhibition (TGI) was calculated from Ti = Tz. The LC50 (concentration of drug resulting in a 50% reduction in the measured protein at the end of the drug treatment as compared to that at the beginning) indicating a net loss of cells following treatment is calculated from [(Ti-Tz)/Tz] x 100 = -50.

Values were calculated for each of these three parameters if the level of activity was reached; however, if the effect was not reached or was exceeded, the values for that parameter were expressed as greater or less than the maximum or minimum concentration tested. [34,35]

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### **ABSTRACT:**

वर्तमान भारतीय परिप्रेक्ष्य में विशेषकर ग्रामीण क्षेत्र में महिलाओं ने अपने मेहनत और लगन के बल पर यह साबित कर दिया कि स्व सहायता समूह के साथ जुड़कर एक नया मुकाम हासिल किया जा सकता है। प्रस्तुत अध्ययन में छत्त्रीसुगुद्ध के दुर्ग एवं राजनांदगांव जिलें के स्व-सहायता समूह का महिलाओं के सामाजिक एवं आर्थिक सशक्तिकरण पर प्रभाव एवं संतुष्टि का अध्ययन किया गया है। दुर्ग जिले में स्व-सहायता समूह की सदस्यता से पूर्व 37.3 प्रतिशत महिलाएं सशक्त थी एवं स्व-सहायता समूह की सदस्यता के पश्चात 41.6 प्रतिशत महिलाएँ संशक्त हो गई। राजनांदगांव जिले में स्व-सहायता समूह की सदस्यता से पूर्व 38.5 प्रतिशत महिलाएं सशक्त थी एवं स्व-सहायता समूह की सदस्यता के पश्चात 46.8 प्रतिशत महिलाएं सशक्त हो गई अर्थात हमारी प्रथम शून्य परिकल्पना महिला स्व-सहायता समूह से सदस्यों के सामाजिक आर्थिक सशक्तिकरण में कोई सार्थक प्रभाव नहीं पडा है, अस्वीकार की जाती है। स्व-सहायता समूह की सदस्यता से क्रमशः दोनों जिलों में 4.3 एवं 8.3 प्रतिशत अतिरिक्त महिलाएं संशक्त हुई एवं दुर्ग जिले में महिला सशक्तिकरण सूचकांक स्व-सहायता समूह की सदस्यता से पूर्व 0.64 था जो स्व-सहायता समूह की सदस्यता के पश्चात 0.75 हो गया। राजनांदगांव जिला में महिला संशक्तिकरण सूचकांक स्व-सहायता समूह की सदस्यता से पूर्व 0.65 था जो स्व-सहायता समूह की सदस्यता के पश्चात 0.78 हो गया। संतुष्टि का अध्ययन करने हेतु काई स्कवेयर परीक्षण किया गया है। परिगणित मूल्य 7.36 तालिका मूल्य 11.00 से छोटा है। अतः शून्य परिकल्पना अस्वीकार की जाती है कि स्व-सहायता समूहों के माध्यम से महिलाओं के संतुष्टि में कोई सार्थक प्रभाव नहीं पड़ा है अर्थात स्व-सहायता समूहों के माध्यम से महिलाओं के संतुष्टि में सार्थक प्रभाव पड़ा है। स्व-सहायता समूह के आय को प्रभावित करने वाले तत्वों का अध्ययन करने के लिए बहुगुणी प्रतिपगमन गुणांक का प्रयोग किया गया है। स्व-सहायता समूह का कार्य, स्व-सहायता समूह का निर्माण अवधि, स्व-सहायता समूह का आकार या सदस्यों की संख्या, सदस्यों की शिक्षा, समूह द्वारा दिए गए ऋण का आकार, समूह द्वारा दिये गये ऋण का ब्याज दर, बचत आदि आय को धनात्मक रुप से प्रभावित कर रहे है।

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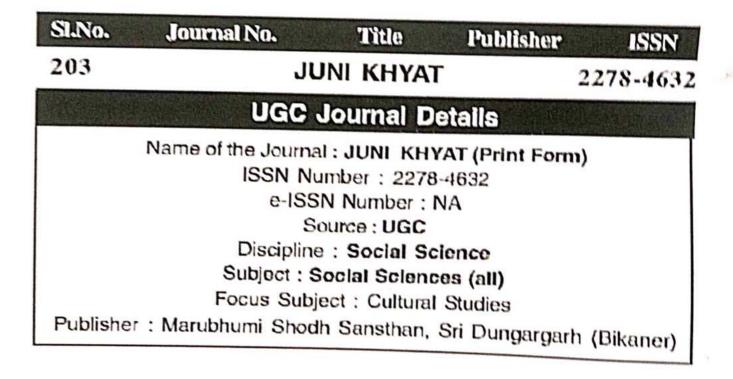
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## SHODH SAMAGAM

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महिला मजदुरों की कृषि में भुमिका एवं उनके आर्थिक जीवन पर पड़ने वाले प्रभाव का अध्ययन (विशेष : दुर्ग जिले के धमधा विकासखण्ड के संदर्भ में) शंकर लाल पटेल, शोधार्थी, अर्थशास्त्र विभाग अर्चना सेठी, (Ph.D.), अर्थशास्त्र विभाग

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### शोध सार

महिलाओं का कृषि में बहुत ही महत्वपूर्ण भुमिका हैं। यह कहा जा सकता हैं कि इस अर्थव्यवस्था रूपी गाड़ी को चलाने वाले कृषि महिला मजदूर हैं। यद्यपि महिलाओं का कृषि संबंधी स्वामित्व न होने के कारण महिलाओं के कार्य को न के बराबर समझा जाता हैं। 2011 के अनुसार कूल महिला कामगारों में से 65 प्रतिशत महिलाए कृषि कार्य करती है। देश में कुल किसानो का 118.7 करोड में से 30.3 करोड महिलाओं का हैं जिसमें महिला कृषि श्रमिकों का भागीदारी 55.21 प्रतिशत हैं। यह अध्ययन दूर्ग जिले के धमधा विकास खण्ड के संदर्भ में हैं। इस शोध का प्रमुख उद्देश्य महिला मजदूर की कृषि कार्य करने वाली परिवार का अध्ययन, आर्थिक, महिला मजदूरों की कृषि में भागीदारी तथा जीवन का रोजगार का अध्ययन किया गया है। इस अध्ययन में यह पाया गया कि महिलाए, पूरूषों की अपेक्षा अधिक योगदान दे रही हैं। अतः खिलोराकला और कन्हारपुरी और करेली के महिलाओं का योगदान अद्वितिय हैं। वहाँ महिलाए निंदाई, मिंजाई, कटाई तथा बीजरोपरण एवं सब्जी उत्पादन में बहुत महत्वपूर्ण भूमिका निभा रही हैं। इन कृषि कार्य करने वाली मजदूर महिलाओ के परिवार के आय में वृद्धि के साथ–साथ आर्थिक स्थिति में सुधार हुई हैं, जिसके कारण महिलाओं में अपने आत्मसम्मान, परिवार तथा बच्चों की शिक्षा की स्थिति में सुधार हुई हैं। इस प्रकार अध्ययन क्षेत्र मे कृषि महिला मजदुरों की आर्थिक, सामाजिक स्थिति सुदृढ़ हुई है।

#### मुख्य शब्द

महिला मजदुर, सामाजिक, आर्थिक स्थिति, कृषि, शैक्षणिक स्थिति।

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# Impact of Online purchasing upon traditional retail business on cell phone in Raipur city of Chhattisgarh

Article in ANVESHAK-International Journal of Management  $\cdot$  March 2025

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### IMPACT OF ONLINE PURCHASING UPON TRADITIONAL RETAIL BUSINESS ON CELL PHONE IN RAIPUR CITY OF CHHATTISGARH

### Sunil Kumar Kumeti

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### **Neelima Singh Thakur**

Research Scholar, School of Studies in Economics, Pt. Ravishankar Shukla University, Raipur, (C.G.) India.

### Abstract

In the outshine of globalised world with easy accessibility of network connectivity, internet and advancement of technology the online business is growing up promptly whether it is B2B, B2C, C2C, C2B, B2A or C2A. The online market is now reachable beyond their domestic territories, thus seller from online market can easily connect customer to a greater extent through various online business platforms. The emerging online market affects the local traditional retail market; they started facing lots of fluctuation in their business turnover yearly. The main objective of this research is to analyse and know the influence of online market upon biggest and largest traditional retail cell phone market of Raipur city of Chhattisgarh. The study is based on primary data collection by directly interviewing the owner of traditional cell phone stores through interview schedule. Sample size of 120 from universe has been selected by random sampling technique. The data collected has been studied and interpreted based on 16 key indicators which shows the impact on traditional cell phone market due to arisen of online market. The chi-square test has been performed in the data collected, reveals and concluded that there is significant impact of online purchasing on traditional cell phone retailers, the business pattern and profit margin has been significantly affected because of growing online market. This empirical analysis finds that many traditional stores were unable to gain super profits after deducting the expenses. The major effect of online market on traditional business is the discount offered by online stores to catch the attention of more customers. Online business also decreased the annual turnover and number of units sold of traditional businessmen. This study suggests comprehensive list of practical customer-winning ideas, tips and techniques to set business apart and to compete with online market, like traditional retailer should, analyze and understand the market forces that affect the consumer's attitude, provide additional services like product segmentation, special Offers, lower prices, better service, wider selection, good location, or convenient hours, new offers, new items, new prices, special announcements, stronger ads and better headlines.

**Key words:** Traditional retail market, online market, domestic territory, annual turnover, market forces, numbers of units sold, consumers' attitude.

### 1. Introduction

In the emerging globalized market with rapid growth of internet and technology, the competition has been continuously increasing between traditional retail stores and online stores. The reaches of online stores are beyond domestic territories which penetrate the domestic market of traditional retail stores. Online purchasing of product is emerging very fast in rapid way in last two decades. Millions of people shop online daily from various online stores. Online shopping allows consumer to directly buy goods and services according to their need anytime and anywhere in the world from online stores, due to which

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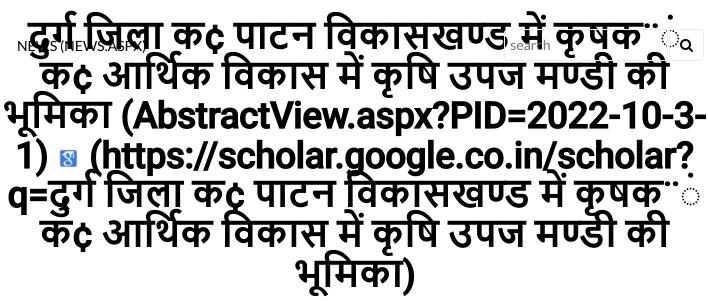
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3सहायक प्राध्यापक	अतिथि, अ	र्थषास्त विभाग	ा, शासकीय व	दू. ब. महिला र	म्नातकोत्तर म	हाविद्यालय	रायपुर (छ.ग.)
*Corresponding A	Author						

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### **ABSTRACT:**

आज कृषि जीवन व्यापन का साधन मात्र ही नहीं बल्कि कृषक<sup>...</sup> क¢ आर्थिक विकास का प्रमुख स'तश्की क्रैt क्रुमिश्रिच्छ आप्रथ्य विषय है और अधिकांष राज्य सरकारों ने पारदर्षिता और व्यापारियों के विवेकाधिकार को समाप्त करने के लिए 19980 कि बाद कृषि उपज विपणन समिति अधिनियम लागू किया। जिसके अंतर्गत कृषि उपज विपणन मण्डियों की स्थापना की गई। यह समग्र रूप से सरकारी नीतियों का विस्तार है, जो खाद्य सुरक्षा, किसानों को लाभकारी मूल्य और उपभोक्ताओं के उचित मूल्य को निर्देषित करता है। कृषि उपज विपणन मण्डी क¢ अन्तर्गत उपज<sup>...</sup> क<sup>...</sup> एकत्रित करना, उनका श्रेणीकरण व प्रमाणीकरण करना, भण्डारण, परिवहन, वितरण प्रणालियां आदि क्रियाओं क<sup>...</sup> किया जाता है। प्राचीन काल से ही कृषि उत्पाद<sup>...</sup> की क्रय-विक्रय में बिच©लिय<sup>...</sup> का ब लबाला रहा है जिससे किसानों क<sup>...</sup> उसक¢ उत्पाद<sup>...</sup> की लागत भी नहीं मिल पाती थी। आजादी क¢ पष्ट्यात् हमारे देष क¢ नीति निर्माताअ<sup>...</sup> ने कृषि एवं कृषकों क¢ महत्व क<sup>...</sup> ध्यान में रखते हुए य<sup>...</sup>जनाएं बनाई। जिससे भारत ने 19 वीं सदी क¢ छठवें दषक के उत्तरार्ध में अनाज अ©र कृषि उत्पाद<sup>...</sup> क¢ मामले में लगभग पूर्णतः आत्मनिर्भर ह<sup>...</sup> गया था। भारत सरकार क¢ कृषि मंत्रालय क¢ अंतर्गत ग्रामीण विकास विभाग की कृषि-विपणन षाखा द्वारा कृषि उपज की विपणन क¢ लिए अनेक प्रयास किए गए हैं। लेकिन देष में लगभग 86 प्रतिषत कृषि योग्य भूमि का स्वामित्व छोटे एवं सीमांत कृषकों के पास है। इन किसानों के लिए विपणन योग्य अधिषेष सीमित होने के कारण मंडियों तक की परिवहन लागत को वहन करना संभव नहीं होता है। परिवहन लागत से बचने के लिए कृषकों को अपनी उपज स्थानीय व्यापारियों को ही बेचनी पड़ती है, भले ही कम कीमत पर क्यों न बेचनी पड़े। मण्डियों के व्यापक तंत्र के आव में छोटे व सीमांत किसानों को अपनी उपज की बिक्री के लिए स्थानीय व्यापारियों पर की सान के सचन के लिए स्थानी ययापारियों पर ही निर्भर रहना होगा।

Keywords: कृषि विकास () कृषि विपणन व्यवस्था () कृषकों का आर्थिक विकास ()

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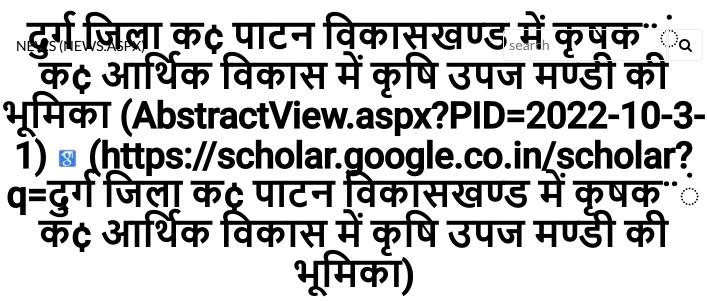
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RESEARCH ARTICLE

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### छत्तीसगढ़ में खनिज संसाधनों का सकल राज्य घरेलू उत्पाद में योगदान

### भारती सिंह कुमेटी<sup>1</sup>, सुनील कुमार कुमेटी<sup>2</sup>

<sup>1</sup>सहायक प्राध्यापक (अतिथि), अर्थशास्त्र विभाग, शासकीय दू. ब. महिला स्नातकोत्तर महाविद्यालय रायपुर (छ.ग.) <sup>2</sup>सहायक प्राध्यापक, अर्थशास्त्र अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्याल रायपुर (छ.ग.) \*Corresponding Author E-mail: **bharti9229@gmail.com** 

### ABSTRACT:

खनिज पदार्थ किसी भी देश की वह प्रकृति प्रदत्त संचित निधि है जो उद्योग धन्धों, यातायात के साधनों एवं अन्य विकास कार्यों की आधारशीला निर्मित करती हैं। दुनियाभर में आधुनिक शहरीकरण, औद्योगीकरण, परिवहन और संचार प्रणाली का विकास स्थायी खनिज संसाधन और विभिन्न क्षेत्रों में उनके उचित उपयोग की उपलब्धियां हैं। सतत् खनिज संसाधनों ने आधुनिक सभ्य औद्योगिक विश्व को आकार देने में महत्वपूर्ण भूमिका निभाई है और अब भी निभा रही है। इसका मतलब यह है कि किसी भी देश का सतत् सामाजिक—आर्थिक मुलभूत संरचना प्राकृतिक संसाधनों में इसकी समृद्धि, इसकी तकनीकी जानकारी, खनिज संसाधनों का पता लगाने और दोहन करने की क्षमता और अंत में राष्ट्र की विकास गतिविधियों में उन संसाधनों का उचित उपयोग करने में उनकी समझदारी का संकेत है। विकास गतिविधियों में विकासशील देश आमतौर पर विकसित देशों की तुलना में बहुत पीछे हैं। यह मुख्य रूप से प्राकृतिक संसाधनों की कमी, समुचित शिक्षित मानव संसाधनों और सुदृढ़ सामाजिक—आर्थिक स्थितियों के अभाव के कारण है। एक स्थायी और मजबूत समाज की दिशा में प्रगति के लिए छत्तीसगढ़ जैसे प्रदेश को अपने मौजूदा खनिज संसाधनों के विकास को प्राथमिकता देनी चाहिए, जो प्रदेश के सामाजिक—आर्थिक बुनियादी ढ़ांचे को आकार देने में प्रमुख भूमिका निभा सकती है।

KEYWORDS: छत्तीसगढ, खनिज संसाधन, सकल घरेलू उत्पाद, आर्थिक विकास।

### प्रस्तावनाः

भारत के संदर्भ में यह कहा जाता है कि प्रकृति ने उदारतापूर्वक भारत को प्राकृतिक संसाधन दिये हैं, किन्तु भारतवासी उनसे समूचित लाभ उठाने में असमर्थ रहे हैं। यही स्थिति छत्तीसगढ़ प्रदेश की भी है। प्रदेश में भी प्राकृतिक संसाधनों की बहुलता है। इन सबके बावजूद छत्तीसगढ़ आर्थिक विकास की दौड़ में अन्य प्रदेशों की तुलना में पीछे है। प्रदेश में प्राकृतिक संसाधनों में सबसे प्रमुख यहां के खनिज संसाधन हैं। यहां लगभग 28 प्रकार के खनिज ज्ञात हैं। किन्तु यहां 20 प्रकार के खनिजों का खनन एवं विपणन का कार्य किया जाता है। यहां लौह अयस्क, कोयला, मैगनीज़, डोलोमाइट, ग्रेनाईट, चूना पत्थर, बॉक्साइड, क्लोराईट, सीसा, तांबा, टिन, क्वार्टजाईट, केओलिन इत्यादि के प्रचुर भण्डार उपलब्ध हैं। इसके अतिरिक्त यहां पर स्थानीय स्तर पर अनेक बहुमूल्य खनिज विद्यमान हैं। इन खनिजों संसाधनों के विदोहन से तीव्र आर्थिक विकास की दर को JRUA-छत्तीसगढ में स्व.सहायता समूह के माध्यम से महिलाओं के सामाजिक एवं आर्थिक सशक्तिकरण का अध्ययन (दुर्ग एवं राजनांदगांव जिला के विशेष संद…

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Author(s<mark>): अर्चना सेठी</mark> (search.aspx?key=अर्चना सेठी), ओमप्रकाश वर्मा (search.aspx?key=ओमप्रकाश वर्मा)

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अपने मेहनत और ल सहायता समूह के सा सकता है। प्रस्तुत अध के स्व-सहायता समूह सशक्तिकरण पर प्रभ में स्व-सहायता समूह सशक्त थी एवं स्व-सा महिलाएं सशक्त हो ग सदस्यता से पूर्व 38.5 समूह की सदस्यता ने अर्थात हमारी प्रथम इ सदस्यों के सामाजिक पड़ा है, अस्वीकार कं क्रमशः दोनों जिलों में हुई एवं वुर्ग जिले में म हुई एवं वुर्ग जिले में म हुई एवं वुर्ग जिले में म की सदस्यता से पूर्व 0 पश्चात 0.75 हो गया। सूचकांक स्व-सहायत सहायता समूह की स अध्ययन करने हेतु क 7.36 तालिका मूल्य अस्वीकार की जाती के संतुष्टि में कोई सा के माध्यम से महिला, सहायता समूह का अ सहायता समूह का अ	प्रेक्ष में विशेषकर ग्रामीण क्षेत्र में महिलाओं ने 1न के बल पर यह साबित कर दिया कि स्व 4 जुड़कर एक नया मुकाम हासिल किया जा प्रयन में छत्तीसगढ़ के दुर्ग एवं राजनांदगांव जिले का महिलाओं के सामाजिक एवं आर्थिक ाव एवं संतुष्टि का अध्ययन किया गया है। दुर्ग जिले की सदस्यता से पूर्व 37.3 प्रतिशत महिलाएं हायता समूह की सदस्यता के पश्चात 41.6 प्रतिशत ाई। राजनांदगांव जिले में स्व-सहायता समूह की 5 पश्चात 46.8 प्रतिशत महिलाएं सशक्त हो गई 17 प्रविशत महिलाएं सशक्त थी एवं स्व-सहायता 5 पश्चात 46.8 प्रतिशत महिलाएं सशक्त हो गई 17 प्रविक स्पतिकरण में कोई सार्थक प्रभाव नही 1 जाती है। स्व-सहायता समूह की सदस्यता से 4.3 एवं 8.3 प्रतिशत अतिरिक्त महिलाएं सशक्त तिहेला सशक्तिकरण सूचकांक स्व-सहायता समूह 6.64 था जो स्व-सहायता समूह की सदस्यता के राजनांदगांव जिला में महिला सशक्तिकरण 1 समूह की सदस्यता से पूर्व 0.65 था जो स्व- दस्यता के पश्चात 0.78 हो गया। संतुष्टि का 1.00 से छोटा है। अतः शून्य परिकल्पना ई किकवेय र परीक्षण किया गया है। परिगणित मूल्य 1.00 से छोटा है। अतः शून्य परिकल्पना औं के संतुष्टि में सार्थक प्रभाव पड़़ा है। स्व- य को प्रभावित करने वाले तत्वों का अध्ययन करने गमन गुणांक का प्रयोग किया गया है। स्व- ार्य, स्व-सहायता समूह का निर्माण अवधि, स्व- ाकार या सदस्यों की संख्या, सदस्यों की शिक्षा, हण का आकार, समूह द्वारा दिये गये ऋण का द आय को धनात्मक रुप से प्रभावित कर रहे है।	Discover the world's research • 25+ million members • 160+ million publication pages • 2.3+ citatic Join for free	
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# 360 DEGREE WASTE MANAGEMENT VOLUME 1

# Fundamentals, Agricultural and Domestic Waste, and Remediation



Edited by Nishikant A. Raut Dadasaheb M. Kokare Bharat A. Bhanvase Kirtikumar R. Randive Sanjay J. Dhoble



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# Economics of waste management

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### 11.1 Introduction

In recent years, the amount of waste has increased significantly around the world. The main factors behind this are rise in community standard of living, urbanization and increase in population. Waste management is a pivotal environmental issue in many developing countries. Wastes are the by-products of human activities in the form of production, consumption and distribution of various goods by the society. It has both the positive and negative effects on the environment. The positive effect is witnessed in the form of recycling and reuse of the biodegradable products into manures. But, on the other hand, when we talk about the present context, the drastic increase in the medical wastes and e-wastes poses big challenges for efficient and sustainable management [1].

The relationships between the environment and society have changed in the last century, especially in developing countries, due to rapid industrialization, population explosion and intensifying urbanization around the world. Despite splendid increases in the production of food and manufactured goods, larger social inequalities have developed within the countries and also between the rich and the poor countries. Along with this, an increase in supply (industrialization) and demand (population growth) of goods and services have caused considerable environmental pressure.

Apart from global transformations, significant alteration in relation to India have been seen, particularly in economic growth indicators and better access of the population to consumption patterns. According to the International Monetary Fund (IMF), India will have the sixth largest economy and the third largest economy in the world in 2021, both in terms of nominal GDP (\$ 3.05 trillion) and purchasing power parity (PPP) respectively. As access to goods and services improves, other variabilities in consumer habits increase the desires for natural resources. People are increasingly dependent on nature to satisfy their wants. As a result, increasing pressure is placed on the environment.

The quality of the environment in many developing countries, particularly in the urban areas, is rapidly deteriorating day by day. Owing to population explosion, industrialization, increased urban housing and economic prosperity, there has been a significant spurt in

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### Millennium Development Goals: Information and Communication Technology in Rural Chhattisgarh

ORIGINAL ARTICLE



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### Abstract

Information is the key to democracy. Information empowerment is an instrumental for a successful democracy. Further the introduction of information technology (IT) has nurtured the swift emergence of a global "Information Society" that is changing the way people live, learn, work and relate. In order to achieve the Millennium Development Goal of; having the number of people living in extreme poverty by the year 2015 which is a mile away, information and communication technology has been more emphasized. Everyone, the Governments, civil society, and private sectors have a vital stake in fostering digital opportunity and putting ICT at the service of development. Thus, the objectives of the present paper are to analyse the access to communication technology in rural Chhattisgarh, to analyse the access to information technology in rural Chhattisgarh, to find out the genderbased access to ICTs in rural Chhattisgarh and to suggest measures for future implications. The primary and the secondary data has been used for the study and the findings shows that all the 80 (100%) sample respondents are not having access to telephone facility in their locality but

they are having access to mobiles. All the 80 males and 80 females have their own personal mobiles. Further, 42.5% male respondents are having access to internet through mobile while only 37.5% female respondents are having access to it. Also, the Gender based Information and communication Technology Index (GICTI) in Rural Chhattisgarh. reflects that Gender based use of information and communication technology is maximum in Mahasamund districts (0.65); and the tribal district of Uttar Bastar Kanker has a least score of 0.62. However, the district wise comparison shows that in both the districts there is a strong positive gender-based information and communication technology index. Thus, the study concludes that providing accessibility of digital services in the rural areas is necessary. Also, there is an urgent need to implement effective policies and programmes for the promotion of the millennium development goals in the rural Chhattisgarh, which further strengthens the sustainable development targets.

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Analysis of Growth of Beneficiaries Benefited from MUDRA in the State of Chhattisgarh

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#### Abstract

The research work determined the growth of number of beneficiaries under various Yojanas of MUDRA. For the state of Chhattisgarh Shishu yojana registers highest growth rate and highest number of beneficiaries. However, the determined trend indicates that the new beneficiaries as compared to previous year is slowing down which calls for a check to maintain the essence of the scheme.

Keyword: MUDRA, growth rate, beneficiaries.

#### Introduction

MUDRA or the Micro Units Development and Refinance Agency is an institution that provides refinance support to micro business. The main scope of the yojana is to enable entrepreneurship especially in those sectors that are unconventional but bears tremendous potential to outperform in terms of year by year growth, return on investment, and one time infusion of funds. Under the MUDRA offerings refinance of micro units to commercial banks / NBFCs/ RRBs/ SFBs/ MFIs is divided into three categories –

Shishu - up to 50000 INR

Kishor - 50000 to 5 Lakh INR

Tarun - 5 Lakh to 10 Lakh INR

Chhattisgarh is state that holds numerous micro entrepreneurs. Thus, these entrepreneurs take support of MUDRA to refinance their businesses and to get on the track on profitability and growth. The research thus analyses how the number beneficiaries are growing under different

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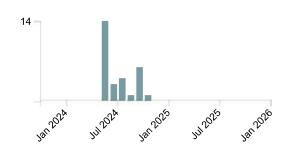
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### Abstract

Because conventional chemotherapy for cancer does not specifically select cells only that are tumor, it is limited in its ability to cure cancer, so is easily associated with harmful and adverse effects. Delivery that are targeted, can lessen a drug's harmful and adverse effects on healthy tissues as well cells while increasing the concentration of desired medication at the intended location. Novel delivery technologies for drugs, such as surface-modifiable and biocompatible nano carriers, are employed to precisely and controllably target locations of tumor. Since nano carrier systems have promising properties and potential to increase healing efficacy, they are widely employed in cancer imaging, diagnostics, and therapies. A useful technique for creating targeted nano carriers is to adorn them with ligands that can attach to certain receptors overexpressed on cancerous cells surfaces. To create systems selective to tumor drug delivery, number of ligands, such as folic acid, hyaluronic acid, transferrin, polypeptides etc. have been thoroughly investigated. This study centers on the development of several nano-delivery methods for anticancer medications that are intended to target exterior of cancer cells. We think that actively directed nano-drugs in oncology will become eminent game-changer and essential tool to precise chemo therapy via ongoing researches.

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Khusboo Agrawal, Anshita Gupta, & Swarnlata Saraf. (2023). Novel Nano Cargoes as Chemotherapeutic Agents. *Pharmaceutical and Biosciences Journal*, 14-20. Retrieved from https://www.pharmabiosciencejournal.com/index.php/pbj/article/view/2329 JRUA-छत्तीसगढ में स्व.सहायता समूह के माध्यम से महिलाओं के सामाजिक एवं आर्थिक सशक्तिकरण का अध्ययन (दुर्ग एवं राजनांदगांव जिला के विशेष संद…

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Author(s)<mark>: अर्चना सेठी</mark> (search.aspx?key=अर्चना सेठी), ओमप्रकाश वर्मा (search.aspx?key=ओमप्रकाश वर्मा)

#### Juni Khyat ISSN: 2278-4632 (UGC Care Group I Listed Journal) Vol-12 Issue-10 No.02 October 2022 FOOD GRAINS PRODUCTION FORECASTING IN INDIA TIME SERIES ANALYSIS BASED ON ARIMA MODEL.

<u>549</u>

Mrs. Bhumika Sharma, Assistant Professor, Department of Economics, Govt.K.I.Arts & Commerce College Bagbahra, Distt - Mahasamund (C.G), sbhumika79@gmail.com Dr.Archana Sethi Assistant Professor, SOS Economics. Pt.Ravishankar shukla University, Raipur.(C.G)

Abstract: The present study aims to serial correlation in time series data, selection of the estimated model and its diagnosis and forecasting the future value of the food grains production in India, based on various parameters. High adjusted R<sup>2</sup>, low sigma<sup>2</sup> low standard of regression , relatively low AIC SIC Values, after residuals diagnostics the ARIMA(3,1,1) Model has been identified as the best model for forecasting using the fitted model ,prediction were made for the period from 2022Y-2030Y(09 observation), based upon past data from 2001 to 2021(21 observation) .it is found from the analysis that ARIMA Model gives good forecasting for time series analysis.

KEYWORDS: Food grains Production. ARIMA, Forecasting, India

The current population of India is about 152 crores .Based on the current rate, the population is growing at the rate about 1 percent per year.it is very important for government of any country to know the need and availability of food grains and make predictions for the future .According to the data of 2021, the annual availability of food grains per person has been 185kg per year .India is land of Agriculture and there is a great uncertainty about the outcome for any crop year. There are a number of functions

Functions which totally depends upon the outcome of crop. We can review the dependencies as follow which totally depends upon the outcome of crop.

\*The agriculture Productivity in India is sensitive to climate change which is adversely affecting the

food grains productivity and it may become a serious threat to food security in India. \*FCI always face a problem of storage every year a lot of grains is lost due to no storage if they have idea about the yield of any particular year than they can manage storage capacity according to yield . \*If we have a rough idea of crop yield for next year then we can purchase the food grains from other

countries in case of shortage and can sale the excess in case of bumper yield. \*If farmer have an idea about the yield of his crop her, he can apply new techniques and precaution

timely crop forecasting also helps farmer in budget management for the next crop. Above is brief idea the need of crop forecasting .above discussion proves the impressive forecasting up to extent .In this paper we are using the data of 20 year for our applications .

1. Kumar Ajay, Sharma Pretty, and Ambrammal Kumar Sunil (2006): In India large number of studies show that climate change has decreased the productivity of most of food grain crops **Review of Literature** 

- in different states. There is limited research on account of the impact of climate change on crop productivity of various food grains at country level.
- 2. Sharma H.R., Singh Kamlesh and Kumari Shanta (2006): The analysis shows an increase in average production of major food grain crops, namely rice, wheat, maize, bajra, pulses and
- total food grains in the 90's over 80's. The analysis once again underscores the importance of technology in raising yield levels and thereby boosting food grain production in the country. 3. Pradhan Chandra Purna (2012): Now the question may arise since agriculture productivity
- depend upon many factor such as rainfall irrigation facility, Monsoon, Climate, Soil, Fertilizers etc.

# Organic Farming and Sustainable Development in Chhattisgarh

\*Bhumika Sharma \*\* Archana Sethi

550

#### Abstract

Chhattisgath is an agricultural state, where about 80% of the population depends on agriculture for livelihood The number of agricultural families in the state is 34.46 lakhs, irrigation is available in 36% of the state's irrigation sources and the contribution of agriculture to the state's total income is 10.09% (as of 2022). State and centrally sponsored schemes have been implemented to encourage organic farming in Chhattisgarh. Initially these schemes have been fully implemented in some districts of Chhattisgarh, in the remaining districts this scheme is being implemented in one development block each Organic agriculture is being promoted in an area of 57.290 acres in 2020-21 under the Centrepromoted paramparagat krishi vikas yojna and State-promoted Jaivik kheti mission. The Godhan Nyaya Yojana related to organic agriculture was started in 2020-21, this has not only ensured the easy availability of organic manure, but has also provided a source of additional income for the farmers. 58888 quintals of organic manure has been produced by Gauthan self-help groups.

Key- words: Sustainable Development, Organic Farming.

### Introduction

Sustainable or inclusive development refers to such development, in which the present resources are used in such a way that along with benefiting the present generation, the resources are left for the future generation, that is, the resources are not exploited in such a way that its benefit is present. Until be limited, but continue to get its benefits without any loss in the future as well.

If sustainable development is understood in the context of agriculture, then the expansion and development of agriculture should be done in such a way that the natural resources can be used without any harm, by the use of minimum harmful drugs and chemical fertilizers, by the use of biological substances available in nature. The development of agriculture can be possible by the use of substances and agricultural residues can be used as other sources of income generation.

### **Concept of organic farming**

The concept of organic Farming mainly includes those things, which are called farming system agriculture. This farming is self-sustaining farming. In this way, all the inputs used in farming, such as fertilizers, water and insecticides, are all in the field. This is also called "on-farm input management". More and more depends on its own resources than organic farming. In this way, methods of farming without chemical fertilizers, insecticides and pesticides come in organic agriculture goes.

### Sustainable development and organic agriculture in Chhattisgarh

Chhattisgarh is an agricultural state, here about 80% of the population depends on agriculture for livelihood and the number of agricultural families in the state is 34.46 lakhs, Irrigation is available in 36% of the area from all the irrigation sources in the state.

Although the concept of organic agriculture is not new to Chhattisgarh, it is included in the traditional agriculture here, as well as it has been emphasized on the initial agricultural policies of the state. " after green revolution, Excessive use of chemical inputs, use of heavy elements, pesticides.

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संपादक

सैयद नजमुल रज़ा रिज़वी

इतिहास दृष्टि

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### Exports of Goods and Servicesin India: Time Series Analysis and Forecasting

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#### Abstract

A healthy economy is one in which exports and imports are increasing. This generally indicates economic strength and a sustained trade surplus or deficit. An increase in exports means an inflow of money into the country, which increases consumer spending and contributes to economic growth. Export plays a significant role in India's economic development. For India, exports remain an important engine of economic growth. The study is based on secondary data collected from a government source. The main objective of the study is to test the stationarity of time series data on exports of goods and services of India(% of GDP) and to effectively predict the exports of goods and services (% of GDP) of India for the next 10 years using the most appropriate ARIMA model. To enable government and policymakers to make decisions related to the export of goods and services and plan accordingly.

Keywords: Export, Import, Economic growth, Stationarity, Forecast, ARIMA.

### 1. Introduction

Exports are extremely important to modern economies because they provide individuals and companies with many more markets for their products. One of the primary functions of diplomacy and foreign policy between governments is to promote economic trade and promote exports and imports for the benefit of all trading parties. Governments encourage exports and generally want to increase exports relative to imports. Exports create jobs, lead to higher wages, raise the living standards of the country's residents and increase foreign exchange reserves and liquidity. Because exports bring international money into a country and imports send money abroad, governments often resort to trade defense measures such as: imposing tariffs to increase import prices national industries. Alternatively, countries often enter into trade agreements with each other that reduce trade defenses such as tariffs and create mutually beneficial trade relationships.

### 1.1How trade can boost India's economic growth

Trade successes are a sign of growing confidence in the Indian economy. Proactive government programs such as the Merchandise Export Program, Customs Duty Exemption Program, Capital Goods Export Promotion, Transportation and Marketing Assistance Program have helped the export sector. Recently, Niti Aayog, in collaboration with the Competitiveness Institute, prepared the Export Readiness Index (EPI) 2021 for Indian states. There are wide variations in the PPI based on trade policy, trade ecosystem, export ecosystem and performance. The Ministry of Commerce and Industry recently announced that India has achieved its merchandise export target of \$400 billion in the current fiscal year. Despite the disruption caused by Covid, this steady growth in exports, which averaged nearly \$30 billion in the last 12 months, has contributed to India's economic recovery. Exports grew at a healthy average rate of nearly 65% in FY22. While India's exports recovered in FY22 and accounted for nearly 12.3% of FY10 GDP. With a share of 8% in FY21, the share of exports in India's GDP has been steadily declining over the last decade, from nearly 17% in FY12 to 12% in FY21 today. India's future export strategy requires a systematic approach to address the supply-side issues plaguing the export sector.

### **1.2Export Promotion Measures in India**

The Government of India has set up a number of export promotion institutions. The export and import functions are overseen by the Ministry of Commerce. The government formulates export and import policies and programs that control exports. The Exim policy aims to provide export assistance in the form of export credit, cash assistance, import replenishment, licensing, free trade zones, port development, quality control and pre-shipment inspection, and guidelines for Indian entrepreneurs in setting up businesses abroad

### **1.3 Strategies for Export Promotion**

The strengths and weaknesses of India's export policies identified both at the governmental (macro) and industry (micro) levels to come up to the required global standards. Export strategy needs to be reformulated as an integral component of the national macro-economic strategy. Special focus has to be built in this exercise on micro-level planning of exports based on a smaller selective number of niche products (and services) and niche markets than

Vol.5, No. 14: D)c-2022

Reviving Indian Agriculture @ 75 for Sustainable Development

Pragati Krishnan\* B.L.Sonekar \*\* Sunil Kumeti

#### ABSTRACT

Agriculture is the backbone of Indian Economy; it is considered to be one of the prime moving factors of economy and is responsible for generating huge dividends in the form of revenue. In spite of high growth rate of Indian economy, it is still not in good shape. Even after the 75 years of independence there are many issues and challenges of the agriculture sector that are paid lax attention; therefore, the revival of the Indian agriculture is necessary. Not only this, agriculture also plays a pivotal role in the process of socio- economic development. In this parlance the objectives of this study are to study the area, Production and Productivity of major food grains for a period of 72 years, to find out the compounded annual growth rate (CAGR) of area, Production and Productivity of major food grains for a period of 72 years. Further to analyze the trends of production and productivity of rice, wheat, coarse cereals and pulses for a period of 72 years followed by studying the impact of area, production and productivity of major food grains in the GDP of India for a period of 72 years and to suggest recommendations for future implications. The findings of the study show that during 1950-51 to 1954-55 the CAGR of area under cultivation, production and productivity of major food grains are 2.08,6.005 and 3.86 respectively. But there is a negative CAGR witnessed in the year 1970-71 to 1974-75 and 1975-76 to 1979-80 with respect to area, production and productivity. The results of multiple regression shows that there is a significance impact of area, production and productivity of total food grains in the GDP of India. Further the p-value of the coefficients explains that individually the area, production and productivity of total food grains has no such impact on the GDP. The value of coefficient for area under cultivation is 0.012 and that of productivity is 0.011. It means that area under cultivation of total food grains has more impact on GDP than that of productivity of total food grains. The study concludes that, despite a strong linkage between agriculture and other economic sectors, the agriculture sector has not received the required attention during the reform period. Henceforth, the input supply for agricultural breakthrough is necessary for its development and for better sustainable development.

Keywords: agriculture, compounded annual growth rate, gross domestic product, sustainable development.

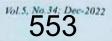
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2) it is still not in good shape (Jibran & Mufti,2019). Even after the 75 years of independence there are many issues and challenges of the agriculture sector that are paid lax attention; therefore, the revival of the Indian agriculture is necessary. Not only this, agriculture also plays a pivotal role in the process of socio- economic development. In India, agriculture is the primary source of livelihood for about 58 percent of the population (IBEF, 2021) and approximately 70 percent of the rural households depend on agriculture only.

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प्रधान संपादक

यशदेव शल्य : मुकुन्द लाठ

संपादक

अम्बिकादत्त शर्मा

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Shubhi Singh

### An Analysis of Socio- economic Profile and Empowerment in rural women through Self-Help Groups in Raipur District of Chhattisgarh

### Dr. Sunil Kumar Kumeti

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### Abstract

Study after study has taught us that there is no more effective development tool than girls' education and women's empowerment. No other policy will increase economic productivity, reduce child and maternal mortality, improve nutrition and promote health. When women are fully engaged, the benefits are immediate. Families are healthier and better nourished; income, savings and reinvestments increase. And what affects families also affects communities and ultimately entire communities."- Kofi Anan (former UN Secretary-General) SHGs are considered one of the most important instruments for implementing a participatory approach to women's economic empowerment. This study is conducted in Raipur district of Chhattisgarh state, used primary data to analyze the socio-economic characteristics and assess empowerment of rural women through self-help group.

# Keywords: Rural Women, Women empowerment, Socio-economic condition, Self-Help Group.

#### **1. Introduction**

"Women are the designer and developer of country's prospect; she is supreme inspiration Forman's onward march. Woman is the builder and modular of nation's destiny" said by great Indian poet and noble laureate Rabindra Nath Tagore. As of 2021, there 3.97 billion males in the world, representing 50.42% of the world population. The population of females in the world is estimated at 3.905 billion, representing 49.58% of the world population. Increasing the economic productivity of rural women is an important way to improve the well-being of India's 60 million BPL (below poverty line) families. It is well known that the lack of economic, political and social empowerment of rural women, as well as their lack of knowledge and skills, is a serious obstacle to the country's economic progress.  $See \ discussions, stats, and author \ profiles \ for \ this \ publication \ at: \ https://www.researchgate.net/publication/390313830$ 

# Analyze the PVTG Women's Socio-economic development through NRLM in Chhattisgarh

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### Analyze the PVTG Women's Socio-economic development through NRLM in Chhattisgarh

### Sunil Kumar Kumeti

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### Abstract

The aim of this study is to understand the developmental dimensions of women in two PVTG communities in two districts (Dhamtari and Kabirdham) of Chhattisgarh and to analyze the contribution of the National Rural Livelihood Mission of Chhattisgarh that led to changes in lives and livelihoods has women's wives. Since the NRLM works primarily with women, the term PVTG in the context of this study will refer to women with PVTG in the future. The study will cover aspects related to low literacy and high dropout rates in PVTG despite primary education dissemination programs. The study will also seek to understand debt levels and demand for microcredit through financial inclusion. Currently, there is limited investigation into the life and livelihood of PVTG representatives Baiga and Kamar living in the state. The study will represent an important part of the scientific work as it documents various dimensions of the socio-economic and political development of the PVTG.

## Keywords: PVTGs, NRLM, Baiga, Kamar, Socio-economic profile, livelihood.

### 1. Introduction

The term "Scheduled Tribes" is defined in the Constitution of India in Article 366(25) as "those tribes or tribal communities or parties or groups within such tribes or tribal communities which are deemed to be Scheduled Tribes under Article 342 for the purposes of this Constitution." Article 342 of the Constitution of India lays down the procedure for determining which tribes or communities shall be considered Scheduled Tribes. The tribes are the aborigines (founded or  $See \ discussions, stats, and author \ profiles \ for \ this \ publication \ at: \ https://www.researchgate.net/publication/390312680$ 

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### Exports of Goods and Services in India : Time Series Analysis and Forecasting

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संपादक

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संपर्क

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## Exports of Goods and Servicesin India: Time Series Analysis and Forecasting

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#### Abstract

A healthy economy is one in which exports and imports are increasing. This generally indicates economic strength and a sustained trade surplus or deficit. An increase in exports means an inflow of money into the country, which increases consumer spending and contributes to economic growth. Export plays a significant role in India's economic development. For India, exports remain an important engine of economic growth. The study is based on secondary data collected from a government source. The main objective of the study is to test the stationarity of time series data on exports of goods and services of India(% of GDP) and to effectively predict the exports of goods and services (% of GDP) of India for the next 10 years using the most appropriate ARIMA model. To enable government and policymakers to make decisions related to the export of goods and services and plan accordingly.

Keywords: Export, Import, Economic growth, Stationarity, Forecast, ARIMA.

## 1. Introduction

Exports are extremely important to modern economies because they provide individuals and companies with many more markets for their products. One of the primary functions of diplomacy and foreign policy between governments is to promote economic trade and promote exports and imports for the benefit of all trading parties. Governments encourage exports and generally want to increase exports relative to imports. Exports create jobs, lead to higher wages, raise the living standards of the country's residents and increase foreign exchange reserves and liquidity. Because exports bring international money into a country and imports send money abroad, governments often resort to trade defense measures such as: imposing tariffs to increase import prices national industries. Alternatively, countries often enter into trade agreements with each other that reduce trade defenses such as tariffs and create mutually beneficial trade relationships.

## 1.1How trade can boost India's economic growth

Trade successes are a sign of growing confidence in the Indian economy. Proactive government programs such as the Merchandise Export Program, Customs Duty Exemption Program, Capital Goods Export Promotion, Transportation and Marketing Assistance Program have helped the export sector. Recently, Niti Aayog, in collaboration with the Competitiveness Institute, prepared the Export Readiness Index (EPI) 2021 for Indian states. There are wide variations in the PPI based on trade policy, trade ecosystem, export ecosystem and performance. The Ministry of Commerce and Industry recently announced that India has achieved its merchandise export target of \$400 billion in the current fiscal year. Despite the disruption caused by Covid, this steady growth in exports, which averaged nearly \$30 billion in the last 12 months, has contributed to India's economic recovery. Exports grew at a healthy average rate of nearly 65% in FY22. While India's exports recovered in FY22 and accounted for nearly 12.3% of FY10 GDP. With a share of 8% in FY21, the share of exports in India's GDP has been steadily declining over the last decade, from nearly 17% in FY12 to 12% in FY21 today. India's future export strategy requires a systematic approach to address the supply-side issues plaguing the export sector.

## **1.2Export Promotion Measures in India**

The Government of India has set up a number of export promotion institutions. The export and import functions are overseen by the Ministry of Commerce. The government formulates export and import policies and programs that control exports. The Exim policy aims to provide export assistance in the form of export credit, cash assistance, import replenishment, licensing, free trade zones, port development, quality control and pre-shipment inspection, and guidelines for Indian entrepreneurs in setting up businesses abroad

## **1.3 Strategies for Export Promotion**

The strengths and weaknesses of India's export policies identified both at the governmental (macro) and industry (micro) levels to come up to the required global standards. Export strategy needs to be reformulated as an integral component of the national macro-economic strategy. Special focus has to be built in this exercise on micro-level planning of exports based on a smaller selective number of niche products (and services) and niche markets than

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	Vol-13, Issue-11, No.01, November: 2023 MARKET FOR NEW EMPLOYMENT RI MUDRA YOJANA (PMMY)

Deepak Kashyap Research Scholar SOS, Economics, Pt. R.S.U. Raipur Chhattisgarh Dr. B. L. Sonekar, Professor, SOS, Economics, Pt. R.S.U. Raipur Chhattisgarh

#### Abstract

Financial inclusion is one of the most treasured strategies in India. Our monetary arrangements has driven by a basic plan of a practical and comprehensive development. The major concern behind the monetary policy is to cover all the segments of population under monetary administrations .The major steps is to "the fund the unfunded" "Micro enterprises segment". In the presented research work, the amount of new employment created through the Pradhan Mantri Mudra Yojana has been analysed as to what amount is being released into the market for each employment creation. Through research work, it is known that Rs. 19656.7 rupees in the Shishu category, Rs. 170463.3 rupees in the Kishor category and Rs. 733653.3 rupees in the Tarun category are being released for new employment generation. At the end of the research, a suggestion has been presented that it is necessary to increase the loan limit in the Shishu category so that more employment can be

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JRUA-Women Empowerment: Liberty of Economic Decision among the Salaried Women

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## **ABSTRACT:**

After the constitution of India came into force, such laws were made which gave equal right to women. After independence, many schemes have been continuously made for women empowerment whether it is to stop feticide, whether it is education or health related or security. Efforts are being made continuously for women and to bring them equal in every field. Researchers identified eight factors infusing of the present study; SPSS 'version 20' and Jamovi 'version 2.2.2' has been used for processing of the data and Independent T-test has been performed to test the relationship. T-test result shows that with marital status, MHB, RP, RV and DTV are statically significant at 5% level of significant (p-value < .05); but Know ATM password, DIA, ME and DJC are statically not significant at 5% level of significant at 5% level of significant (p-value < .05); but Know ATM password, DIA, ME, DTV and DJC are statically not significant at 5% level of significant (p-value > .05). Study results find out that there is no significant difference between the liberty of economic decision of married and unmarried, low income level and high income level salaried woman. It is clear that women need to get more aware for regarding economic decisions.

Keywords: Women Empowerment () Economic liberty () Economic Decision () Salaried women () Income level ()

## Cite this article:

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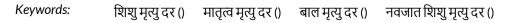
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ABSTRACT: छत्तीसगढ में स्वास्थ्य स्थिति बहुत खराब है। विश्व स्वास्थ्य संगठन के अनुसार 1000 ब्यक्तियों पर 1 जाक्टर की अपिन के अनुसार 1000 ब्यक्तियों पर 1 जाक्टर की अपिन के अनुसार करने में भारत को 6 वर्ष लगेगा और छत्तीसगढ को 18 वर्ष लगेगा। छत्तीसगढ में 2017 में शिशु मृत्यु दर 37प्रदि के अखिल भारत में यह 33 प्रति हजार है। बारहवीं पंचवर्षीय योजना में शिशु मृत्यु दर 25 प्रति हजार का लक्ष्य था जो प्राप्त नहीं हो सका। भारत में औसत जीवन प्रत्याशा 65.2 वर्ष है और छत्तीसगढ में 62.5 वर्ष है। जो अखिल भारतीय स्तर से काफी कम है। छत्तीसगढ में शिशु मृत्यु दर अखिल भारतीय स्तर से अधिक है। ग्रामीण क्षेत्र में शिशु मृत्यु दर शहरी क्षेत्र से अधिक है। ग्रामीण क्षेत्र में विकित्सा सुविधाओं का अभाव है। बालिका वर्ग में शिशु मृत्यु दर अधिक हैं। बालिका वर्ग में शिशु मृत्यु दर अधिक होने का मुख्य कारण उसे जन्म से ही भाइयों से घटिया भोजन ,वस्त्न सुविधा,शिक्षा ,चिकित्सा,उपलब्ध होती है। छत्तीसगढ में मातृत्व मृत्यु दर अखिल भारतीय स्तर से अधिक है।



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# Reviving Indian Agriculture @ 75 for Sustainable Development

Pragati Krishnan\* B.L.Sonekar \*\* Sunil Kumeti

## ABSTRACT

Agriculture is the backbone of Indian Economy; it is considered to be one of the prime moving factors of economy and is responsible for generating huge dividends in the form of revenue. In spite of high growth rate of Indian economy, it is still not in good shape. Even after the 75 years of independence there are many issues and challenges of the agriculture sector that are paid lax attention; therefore, the revival of the Indian agriculture is necessary. Not only this, agriculture also plays a pivotal role in the process of socio- economic development. In this parlance the objectives of this study are to study the area, Production and Productivity of major food grains for a period of 72 years, to find out the compounded annual growth rate (CAGR) of area, Production and Productivity of major food grains for a period of 72 years. Further to analyze the trends of production and productivity of rice, wheat, coarse cereals and pulses for a period of 72 years followed by studying the impact of area, production and productivity of major food grains in the GDP of India for a period of 72 years and to suggest recommendations for future implications. The findings of the study show that during 1950-51 to 1954-55 the CAGR of area under cultivation, production and productivity of major food grains are 2.08,6.005 and 3.86 respectively. But there is a negative CAGR witnessed in the year 1970-71 to 1974-75 and 1975-76 to 1979-80 with respect to area, production and productivity. The results of multiple regression shows that there is a significance impact of area, production and productivity of total food grains in the GDP of India. Further the p-value of the coefficients explains that individually the area, production and productivity of total food grains has no such impact on the GDP. The value of coefficient for area under cultivation is 0.012 and that of productivity is 0.011. It means that area under cultivation of total food grains has more impact on GDP than that of productivity of total food grains. The study concludes that, despite a strong linkage between agriculture and other economic sectors, the agriculture sector has not received the required attention during the reform period. Henceforth, the input supply for agricultural breakthrough is necessary for its development and for better sustainable development.

Keywords: agriculture, compounded annual growth rate, gross domestic product, sustainable development.

 Introduction: Agriculture is the backbone of Indian Economy; it is considered to be one of the prime moving factors of economy and is responsible for generating huge dividends in the form of revenue. In spite of high growth rate of Indian economy,

2) it is still not in good shape (Jibran & Mufti,2019). Even after the 75 years of independence there are many issues and challenges of the agriculture sector that are paid lax attention; therefore, the revival of the Indian agriculture is necessary. Not only this, agriculture also plays a pivotal role in the process of socio- economic development. In India, agriculture is the primary source of livelihood for about 58 percent of the population (IBEF, 2021) and approximately 70 percent of the rural households depend on agriculture only.

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Article - Engineering, Technology and Techniques

# Epileptic Seizure Detection Using Deep Learning Based Long Short-Term Memory Networks and Time-Frequency Analysis: a Comparative Investigation in Machine Learning Paradigm

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## HIGHLIGHTS

- A hybrid approach using time frequency analysis and deep learning for risk stratification of epileptic seizure is proposed.
- An extensive comparative study of various machine learning and feature selection techniques is conducted.
- Implemented andevaluatedthedeep learning based long short-term memory networks.

Abstract: Epilepsy is a noncontagious brain abnormality, which causes electrical distraction and strains the neural system. Generally, epilepsy is treated and diagnosed through continuous examination and interpretation of the electroencephalography (EEG) signals. This is a very time-consuming and tedious job. Further, it is subjected to observational errors and observer variability. Hence, the development of an efficient automatic alarm system to recognize epileptic seizure signals is of important concern. The objectives of the present study are to investigate deep learning based long short term memory (LSTM) networks for the classification of epileptic EEG signals using time-frequency analysis. Additionally, a comparative investigation is carried out to evaluate the various state-of-the-art feature selection and classification models for automatic classification of EEG signals for Epilepsy detection. Features based on statistics, entropy, and fractal were extracted from both the time domain and frequency domain. The extracted features were supplied to LSTM networks and traditional machine learning models for epileptic EEG classification. High classification accuracy of 100% (under hold out and 10-fold protocol) and 99.80% (under 10-fold protocol) is achieved by the proposed LSTM strategy followed by the Back Propagation Artificial Neural network (BPANN) which achieves 99.6% classification accuracy when all the 150 EEG biomarkers were used as input to the classifier

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# GREEN AND INCLUSIVE GROWTH FOR SUSTAINABLE DEVELOPMENT

- Inclusive Green Economy
- Improved Human Well-Being and Social Equity Reducing Environmental Risks and Ecological Scarcities
- Challenges of Urbanization and Resource Scarcity to Climate Change and Economic Volatility
- Low Carbon, Efficient and Clean in Production
- Inclusive Consumption and Outcomes Based on Sharing, Circularity, Collaboration, Solidarity, Resilience, Opportunity and Interdependence
- Environmental Sustainability -Targeted and Appropriate Fiscal and Social Protection Policies by Strong Institutions
- Inclusive and Green Economy for Jobs, Income and also for Health, Environment and Future
- Enhanced Prosperity and Growing Social Equity Within the Contours of a Finite and Fragile Planet
- Green Growth and Sustainable Development Goals





# The Indian Economic Journal

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# Reviving Indian Agriculture @ 75 for Sustainable Development

Pragati Krishnan\* B.L.Sonekar \*\* Sunil Kumeti

## ABSTRACT

Agriculture is the backbone of Indian Economy; it is considered to be one of the prime moving factors of economy and is responsible for generating huge dividends in the form of revenue. In spite of high growth rate of Indian economy, it is still not in good shape. Even after the 75 years of independence there are many issues and challenges of the agriculture sector that are paid lax attention; therefore, the revival of the Indian agriculture is necessary. Not only this, agriculture also plays a pivotal role in the process of socio- economic development. In this parlance the objectives of this study are to study the area, Production and Productivity of major food grains for a period of 72 years, to find out the compounded annual growth rate (CAGR) of area, Production and Productivity of major food grains for a period of 72 years. Further to analyze the trends of production and productivity of rice, wheat, coarse cereals and pulses for a period of 72 years followed by studying the impact of area, production and productivity of major food grains in the GDP of India for a period of 72 years and to suggest recommendations for future implications. The findings of the study show that during 1950-51 to 1954-55 the CAGR of area under cultivation, production and productivity of major food grains are 2.08,6.005 and 3.86 respectively. But there is a negative CAGR witnessed in the year 1970-71 to 1974-75 and 1975-76 to 1979-80 with respect to area, production and productivity. The results of multiple regression shows that there is a significance impact of area, production and productivity of total food grains in the GDP of India. Further the p-value of the coefficients explains that individually the area, production and productivity of total food grains has no such impact on the GDP. The value of coefficient for area under cultivation is 0.012 and that of productivity is 0.011. It means that area under cultivation of total food grains has more impact on GDP than that of productivity of total food grains. The study concludes that, despite a strong linkage between agriculture and other economic sectors, the agriculture sector has not received the required attention during the reform period. Henceforth, the input supply for agricultural breakthrough is necessary for its development and for better sustainable development.

Keywords: agriculture, compounded annual growth rate, gross domestic product, sustainable development.

1) Introduction: Agriculture is the backbone of Indian Economy; it is considered to be one of the prime moving factors of economy and is responsible for generating huge dividends in the form of revenue. In spite of high growth rate of Indian economy,

2) it is still not in good shape (Jibran & Mufti,2019). Even after the 75 years of independence there are many issues and challenges of the agriculture sector that are paid lax attention; therefore, the revival of the Indian agriculture is necessary. Not only this, agriculture also plays a pivotal role in the process of socio- economic development. In India, agriculture is the primary source of livelihood for about 58 percent of the population (IBEF, 2021) and approximately 70 percent of the rural households depend on agriculture only.

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# Study of the Enhanced Efficiency of Crystalline Silicon Solar Cells by Optimizing Anti Reflecting Coating using PC1D Simulation (AbstractView.aspx?PID=2023-35-2-1)

Sustainability, Agri, Food and Environmental Research, (ISSN: 0719-3726), 12(2), 2024 http://dx.doi.org/10.7770/safer-V13N1-art662

Disposable face/cloth masks during COVID-19 pandemic: a precursor for the synthesis of valuable bioproducts for Environment.

Máscaras faciales/de tela desechables durante la pandemia de COVID-19: un precursor para la síntesis de bioproductos valiosos para el medio ambiente.

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#### ABSTRACT

Different surgical, cloth, and disposable face masks have become required personal protective equipment for preventing the COVID-19 pandemic. Disposable face masks are produced using thermoplastic polymers, and because they may be quickly transformed into useful bioproducts and because their use has significantly increased, their detrimental environmental effects are a very severe subject of worry. The most often utilised interventions for respiratory protection and other airborne transmission are face masks and respirators. This review article highlighted numerous methods and opportunities for contaminated masks, as well as how to turn waste into the most useful byproducts. With these methods, it is important to completely stop the COVID-19 virus from spreading through the air.

Keywords: COVID-19, Disposable face masks, Bioproducts, Pyrolysis

#### RESUMEN

Diferentes mascarillas quirúrgicas, de tela y desechables se han convertido en equipos de protección personal obligatorios para prevenir la pandemia de COVID-19. Las máscaras faciales desechables se fabrican con polímeros termoplásticos, y debido a que pueden transformarse rápidamente en bioproductos útiles y debido a que su uso ha aumentado Eco. Env. & Cons. 29 (January Suppl. Issue) : 2023; pp. (S12-S19) Copyright@ EM International ISSN 0971–765X

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# Detection of Azoxystrobin in Environmental Samples using FTIR Spectroscopic Method

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(Received 2 May, 2022; Accepted 4 July, 2022)

#### ABSTRACT

A new UV-Visible spectrophotometric method for determination of fungicide azoxysrtobin was developed. The method is based on the bromination of azoxystrobin to form dibromoazoxystrobin which react with Potassium iodide, Potassium iodate mixture in the presence of leucomalachite green (LMG) to form a bluish green colored complex. Characterization was done for the synthesis of bluish green colored complex by using UV-Vis spectrophotometer and FTIR methods. As a result, the UV-Visible absorption spectrum was observed at 615 nm. The limits of detection and limits of quantification were observed at  $0.0019 \,\mu g \, ml^{-1}$  and 0.0059 µg ml<sup>-1</sup> respectively. We have also studied the conformational and functional group (such as most characteristic band of O-H stretching frequency observed at 3346.49 cm<sup>-1</sup>, Bonding N-H symmetrical is 1645.50 cm<sup>-1</sup>, C=C bending is 691.07 cm<sup>-1</sup>, Symmetrical stretching C-N is 1493.13 cm<sup>-1</sup> and 1404.70 cm<sup>-1</sup>, C-C stretching and other vibrational is 1059.74 cm<sup>-1</sup>). Involved in the complexation between azoxystrobin and bromination by FTIR method. This developed method has been successfully applied for the detection of azoxystrobin in various environmental samples. Beer's law obeyed over the concentration range of 0.5-13 µg mL<sup>-1</sup> in final solution volume of 10 ml. The reproducibility assessed by carrying out seven days replicate analysis of a solution containing 5 µg ml<sup>-1</sup> of azoxystrobin in a final solution of 10 mL. The molar absorptivity of the colour system is  $1.936 \times 10^6$  L mol<sup>-1</sup> cm<sup>-1</sup> and Sandell's sensitivity is  $0.800 \times 10^4$  µg cm<sup>-2</sup>. The relative standard deviation (RSD) for the absorbance value was found to be 1.9%. The suggested method is free from the interference of other toxicant agents. The analytical parameters were optimized and the method was applied to the determination of azoxystrobin in water, soil and food samples.

Key words : UV-Visible Spectrophotometer, FTIR, Azoxystrobin, Bromination and Leucomalachite green (LMG).

#### Introduction

Pesticides are the major basis with signicant role in ensuring safety from the destruction caused by many pests. At present time, the viable food production can't achieved without the vital role of pesticides. Pesticides are applied directly on the plants which are able to determine for long time in vegetables. When pesticides are use in the field, it is assessed that only about 1% of the pesticide is able to





## **Polycyclic Aromatic Compounds**

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# Distribution, Variations, Fate and Sources of Polycyclic Aromatic Hydrocarbons and Carbon in Particulate Matter, Road Dust, and Sediments in Central India

Yogita Nayak, Suryakant Chakradhari, <mark>Khageshwar Singh Patel, Raj</mark> Kishore Patel, Sema Yurdakul, Harald Saathoff & Pablo Martín-Ramos

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## Article Evaluation of Selected Medicinal, Timber and Ornamental Legume Species' Seed Oils as Sources of Bioactive Lipophilic Compounds

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Abstract: Bioactive lipophilic compounds were investigated in 14 leguminous tree species of timber, agroforestry, medicinal or ornamental use but little industrial significance to elucidate their potential in food additive and supplement production. The tree species investigated were: Acacia auriculiformis, Acacia concinna, Albizia lebbeck, Albizia odoratissima, Bauhinia racemosa, Cassia fistula, Dalbergia latifolia, Delonix regia, Entada phaseoloides, Hardwickia binata, Peltophorum pterocarpum, Senegalia catechu, Sesbania sesban and Vachellia nilotica. The hexane-extracted oils of ripe seeds were chromatographically analysed for their fatty acid composition (GC-MS), tocochromanol (RP-HPLC/FLD), squalene and sterol (GC-FID) content. A spectrophotometrical method was used to determine total carotenoid content. The results showed generally low oil yield (1.75–17.53%); the highest was from *H. binata*. Linoleic acid constituted the largest proportion in all samples (40.78 to 62.28% of total fatty acids), followed by oleic (14.57-34.30%) and palmitic (5.14-23.04%) acid. The total tocochromanol content ranged from 100.3 to 367.6 mg 100  $g^{-1}$  oil. D. regia was the richest and the only to contain significant amount of tocotrienols while other oils contained almost exclusively tocopherols, dominated by either  $\alpha$ -tocopherol or  $\gamma$ -tocopherol. The total carotenoid content was highest in *A. auriculiformis* (23.77 mg  $100 \text{ g}^{-1}$ ), S. sesban (23.57 mg 100 g<sup>-1</sup>) and A. odoratissima (20.37 mg 100 g<sup>-1</sup>), and ranged from 0.7 to 23.7 mg 100 g<sup>-1</sup> oil. The total sterol content ranged from 240.84 to 2543 mg 100 g<sup>-1</sup>; A. concinna seed oil was the richest by a wide margin; however, its oil yield was very low (1.75%). Either  $\beta$ -sitosterol or  $\Delta$ 5-stigmasterol dominated the sterol fraction. Only C. fistula oil contained a significant amount of squalene (303.1 mg  $100 \text{ g}^{-1}$ ) but was limited by the low oil yield as an industrial source of squalene. In conclusion, A. auriculiformis seeds may hold potential for the production of carotenoid-rich oil, and H. binata seed oil has relatively high yield and tocopherol content, marking it as a potential source of these compounds.

Keywords: Fabaceae; Leguminosae; phytostanol; bean; tocochromanol

#### 1. Introduction

Plant seeds contain various biologically active substances, including lipophilic substances such as phytosterols, tocochromanols and carotenoids, and are major sources of these micronutrients in the diet. Legume seeds tend to have low oil content; exceptions to this include soy, peanuts and *Pongamia pinnata*; however, low oil content does not exempt



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Article



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# **Comparative Analysis of Traditional Oriental Herbal Fruits as Potential Sources of Polyphenols and Minerals for Nutritional Supplements**

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**Abstract**: There are a plethora of plant species in India, which have been widely used in vegetable dishes, soups, desserts and herbal medicine. In addition to these traditional uses, today there is the extra possibility of also being able to use these plants in the nutritional supplements industry due to their favorable antioxidant and mineral composition. In this sense, thirteen vegetable species—*Chanania lanzan, Ziziphus mauritiana, Nilumbo nucifera, Terminalia catappa, Terminalia arjuna, Terminalia bellirica, Terminalia chebula, Lagenaria siceraria, Luffa aegyptiaca, Praecitrullus fistulosus, Benincasa hispida, Citrullus lanatus var. lanatus and Cucurbita maxima—have been analyzed. In this paper we discuss the distribution of polyphenols and minerals (Na, K, Mg, Ca, Al, P, S, Cr, Mn, Fe, Cu, Zn, Mo, As and Pb) in different seed parts (the rhizome, pericarp, carpel, seed coat and kernel) of the above species and their possible use in the nutritional supplements industry. The concentrations of total polyphenols, flavonoids and minerals ranged from 407 to 3144 mg rutin hydrate/100 g, 24 to 3070 mg quercetin/100 g and 1433 to 7928 mg/100 g, respectively. K, Ca, P and S were abundant in these herbal fruits. In two species of herbal fruits, <i>Terminalia arjuna* and *Terminalia chebula*, only part of the seed structure was suitable for use in nutritional supplements.

Keywords: herbal seeds; fruit seeds; polyphenols; minerals; nutritional supplements

#### 1. Introduction

Seeds contain vital nutrients and ultra-trace elements, which reduce the risk of cardiovascular disease and diabetes [1] and promote different healthy functions in human beings [2,3]. Many plants also contain polyphenols and flavonoids with strong antioxidant and disease-preventing properties, and could be valuable sources of these compounds in the preparation of nutritional supplements [4–7].

Ziziphus mauritiana (as Ziziphus jujuba (L.) Gaertn., and Ziziphus jujuba (L.) Lam.) is widely cultivated, especially in southeastern Asia, as a commercial crop [8]. The fruit is eaten raw or preserved and its seeds contain a number of medically active compounds, including saponins, triterpenes, flavonoids and alkaloids. It is hypnotic, narcotic, sedative, stomachic and tonic, and is used internally in the treatment of palpitations, insomnia, nervous exhaustion, night sweats and excessive perspiration [9]. *Buchanania lanzan* is a medium-sized deciduous tree with edible fruits and seed kernels. Its seed kernel and extracted kernel oil are used in the preparation of several Indian dishes and are a potential source of phytochemicals, tocopherols and essential fatty acids including oleic, linoleic and linolenic acid [10].



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## TRAFFIC NOISE POLLUTION AND ITS EFFECT ON HUMAN HEALTH IN RAIPUR CITY

## Soumen Mondal and Anusuiya Baghel

#### ABSTRACT

This paper analyzes the noise pollution level at selected traffic points due to road traffic and their effects on exposed people. The present study based on primary data and monitored noise levels at six major traffic points in October and November in 2020. Raipur city has faced a low ratio of road capacity compared to vehicles and created traffic congestion. During peak hours maximum increased of passenger car units (PCU) at Tatibandh. Two-wheelers and cars share more congestion than other vehicles in city's core area. On working days, noise pollution is more and Noon session is more polluted than other session. The maximum polluted traffic point is Fafadih and the maximum peoples suffer sleep disturbance in the city around every traffic point. Trucks & Lorries generated maximum average noise pollution. Excessive noise has created pollution and adverse effect on human health such as hearing loss, headache, sleep disturbance, etc.

Keywords: Noise Pollution, Traffic Volume, Human Health.

#### Introduction

The term noise simply expressed is an unnecessary sound emitted from the vibrating body and reaching the ear through the nervous system. Generally, noise consists of three elements - Source, transmission, and receiver (Dev& Singh, 2011). Noise has been determined as the combination of frequency (Hertz, Hz) and pressure (Pascal, Pa). Noise level is represented in decibel (dB) units based on the intensity of sound or loudness by the measurement of the noise level meter. The noise travels at speeds of about 740 miles per hour in air through the small wave pressure. According to Central Pollution Control Board (2017) reports the human ear can peak response in 2.5 - 3 kHz. The sound becomes continuous and above the limits of the ears, it is termed noise. Noise from road traffic is the most harmful to the environment as well as human issues, behind air pollution (WHO, 1999). Vehicular noise emission is not only emitted from vehicles horn,

it also depends on the road surface, silencer quality, engine quality, driving behavior, tires, vehicular speed, etc.Noise is a serious problem in urban areas as compared to rural areas because more vehicles passing on the road, the establishment of various industries, etc. Traffic can be considered themajor source of noise pollution in any city (Agarwal& Swami, 2009). The Govt. of India recommended a noise limit from various motor vehicles under 1986 Environment (Protection) Rules shall be applicable from 1st January 2003 (CPCB, 2000). The acceptable noise level (table no.01) shows in the daytime is 75 dB in the Industrial area, 65 dB in the commercial area, 55 dB in the residential area, and 50 dB in the silent area (CPCB, 2021). The Long-term average noise level over 55 dB impacts health with the result of an increase in blood pressure, suppression of the central nervous system, change of breathing and heart rates, cardiovascular diseases, hypertension and mental disorders (Munzel, et al., 2014).

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2. Dr. Anusuiya Baghel, Ex-Professor, SoS in Geography, Pt. Ravishankar Shukla University, Raipur, C.G.

## Land Transformation Analysis of Siliguri City using Remote Sensing and GIS techniques

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## Abstract

During past four decades, Siliguri city has attracted a large number of population due to economic hub of the entire north Bengal, which led to the rapid transformation of its LULC pattern. Therefore, this study is aimed to analyse the LULC changes during 1991 to 2021 by giving special emphasize on built up transformation. The Landsat TM, ETM and LISS IV data has been used for the LULC classification of the Siliguri city. Modified Maximum Likelihood Classifier approach has been adopted to generate the classified image. From the analysis it is found that there is a drastic change in built-up 1254.54 percent in respect to 1991. While teagarden, agriculture land and waterbody declined by -90.06, -97.17 and -88.76 percent, respectively. These changes are harmful for the ecological balance of the city surrounding. It can further impact on the city's sustainable development.

Keywords: Land Use Land Cover (LULC), Built-up, Maximum Likelihood Classifier, Urban expansion.

## Introduction

As per the World Bank report 2009, Secondary cities have tremendous potential for upgrading the regional and national Development (World Bank., 2009). In this report significance of medium sized class 1 cities has been given more importance for the betterment of Historically South and South East Asia has the highest population world economy. concentration. In the last few decades, mainly second half of the last century rapid growth of urban population has led to the speculation of urban explosion in this region . On the other hand, the population growth of the developed countries almost stagnant because they already passed the phage. It is worth mentioning that their rate of urban growth also stagnant. Among the Asian countries India and China alone will account for more than 64% of the overall growth of urban populations in Asia and a 42% share of global urban population growth from 2005 to 2025(Sankhe et al., 2011). India with a total urban population of 377 million as per 2011 census, the second largest in the world after China and expected to increase up to 590 million by 2031. According to 2011 census between 2001 and 2011, 92 million people were added to the urban population, the largest decadal increase in the last one hundred years, and for the first time, the net addition to urban population exceeded that of the rural population (Shaw, 2018). Urbanization is a process whereby productive agricultural lands, forests, surface water bodies and groundwater prospects are being irretrievably lost((Pathan et al., 1991). In India, unprecedented population growth coupled with unplanned developmental activities has resulted in urbanization, which lacks infrastructure facilities(Sudhira, Ramachandra, & Jagadish, 2004). Development of new urban areas and expansion of existing cities is inevitable as it is an essential part of sustainable economy but uncontrolled and haphazard urban growth may raise serious problems related to environmental pollution, changes in urban micro climate, loss of biodiversity and ecological balance, human and traffic congestion and moreover quality of urban life (Dutta & Rahman, 2017). Physical expansion of the city, population growth induce land cover change and land transformation are natural process we can't stopped the transformation. It can be regulated trough proper planning and management. The urbanization in India is resulting tremendous changes at ground level which are not given due attention in the discourse of planning, development, administration and policy making. One such area that did not receive much attention is the development, planning and governance is 'urban fringe', (Nallathiga, Taneja, Gupta, & Gangal, 2018) as the city grows to the periphery, many geographical changes at the urban periphery are associated with the transfer of land from rural to urban purpose. The current trend of spatial urban growth in almost all Indian cities has a haphazard pattern, particularly along the urban-rural fringe(Farooq & Ahmad, 2008)

Volume 45(1)

# Educational Level and Infant Mortality in Scheduled Tribes Population in Surguja District, Chhattisgarh

## Tike Singh<sup>1</sup> & Anusuiya Baghel

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*Keywords:* mortality, education, society, family

Mortality forms a basic component in population studies. To determine mortality in any region, the age structure makes the most significant demographic factor. The age-specific mortality is found to be higher for infants and old. However, infant mortality plays a key role in determining the mortality of any region.

Any region's infant mortality rate (IMR) makes a sensitive index in determining the region's development. The Geographers take a keen interest in infant mortality studies because itreflects the socioeconomic development of the region, in addition to its demographic significance. It is found that the mortality rate declines with the increase in age. It is the highest for infants. It gradually decreases with the age of persons due to several factors. The factors influencing mortality can

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छत्तीसगढ़ में ब्रिटिश नियंत्रण काल (1818ई. से 1830ई.तक) एक ऐतिहासिक पुनरावलोकन

## डॉ.डी.एन.खुटे

सहायक प्राध्यापक इतिहास अध्ययन शाला, पंडित रविशंकर शुक्ल विश्वविद्यालय रायपुर (छ.ग.)

सारांशः-

नवंबर 1817 ई. के सीतावर्ल्डी युद्ध में अंग्रेजों द्वारा भोंसला अधिपति अप्पा साहब की पराजय के बाद मराठों की शक्ति समाप्त होने लगी। अंग्रेजों द्वारा नागपुर विजय के बाद पेशवा का आनुवंशिक पद को समाप्त कर दिया गया। इसके उपरांत यदि अंग्रेज चाहते तो नागपुर व उसके अधीनस्थ भू–भाग छत्तीसगढ़ को ब्रिटिश साम्राज्य में शामिल कर सकते थे, परन्तु ऐसा नहीं किया। वे धीरे-धीरे साम्राज्य के लक्ष्य को हासिल करना चाहते थे। इसलिये अंग्रेजों ने नागपुर फतह करने के बाद भी उसे ब्रिटिश साम्राज्य में संविलय नहीं किया हालांकि उनका अंतिम लक्ष्य सत्ता को हस्तगत करना ही था। गर्वनर जनरल लार्ड हेस्टिंगज के शासन की मूल प्रवृत्ति युद्ध प्रधान एवं साम्राज्यवादी थी। ब्रिटिश शासन ने पुरसोजी की विधवा दुर्गा बाई को पुत्र गोद लेने के लिये कहा। इसके लिये रघुजी द्वितीय की पुत्री बानुबाई के 10 वर्षीय पुत्र बाजीवा गुजर को चुना गया। गोद लेने का संस्कार 16 जून 1818 को सम्पन्न हुआ। इस उत्तराधिकारी का नाम रघुजी बापू साहब रखा गया जो इतिहास में रघुजी तृतीय के नाम से प्रसिद्ध हुए। रघुजी तृतीय के वयस्क होने तक नागपुर सहित छत्तीसगढ़ का शासन ब्रिटिश संरक्षण में चला गया। इस संरक्षण काल में ब्रिटिश रेजीडेन्ट जेनकिन्स को नागपुर राज्य का संरक्षक नियुक्त किया गया। प्रशासन की सुविधा के लिये सम्पूर्ण प्रदेश को 5 सूबों (जिलों) में विभाजित किया गया और प्रत्येक सूबे के मुख्यालय में एक-एक ब्रिटिश अधीक्षक रखा गया। वे जिले थे- नागपुर, भंडारा, चांदा, छिन्दवाड़ा और छत्तीसगढ़। जिले में नियुक्त होने वाले सूबे के प्रमुख अंग्रेज अधिकारी को अधीक्षक कहा गया। छत्तीसगढ़ का प्रशासन चलाने हेतु भी ब्रिटिश अधीक्षक की नियुक्ति की गई। सन् 1818 से 1830 ई. तक का काल ब्रिटिश संरक्षण काल माना जाता है।

Volume 45(1)

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# छत्तीसगढ़ में ब्रिटिश नियंत्रण कालीन शासन की प्रमुख विशेषताएं (1818 ई. से 1830 ई.तक)—एक ऐतिहासिक विश्लेषण

**डॉ. डिश्वर नाथ खुटे** सहायक प्राध्यापक

इतिहास अध्ययन शाला, पंडित रविशंकर शुक्ल विश्वविद्यालय रायपुर (छ.ग.)

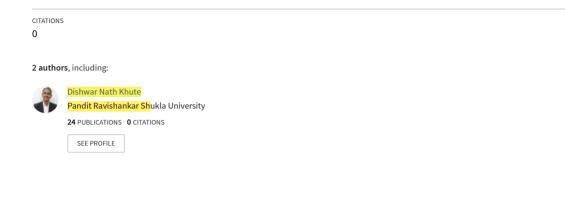
सारांशः-

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See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/390755796

## British Yugin Raipur Zile ki Zamidariyon ka Bhu-Bandobast Evam Bhu-Rajaswa Neeti

Article · December 2022



संपादक डॉ. गिरिराजशरण अग्रवाल डॉ. मीना अग्रवाल

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विश्वविद्यालय अनुदान आयोग द्वारा मान्यता प्राप्त शोध पत्रिका

अक्टूबर-दिसंबर 2022 शोध अंक 60/5 500.00 रुपए संपादकीय कार्यालय संपादक हिंदी साहित्य निकेतन, 16 साहित्य विहार, डॉ॰ गिरिराजशरण अग्रवाल बिजनौर 246701 (उ॰प्र॰) 07838090732 फोन : 0124-4076565, 09557746346 प्रबंध संपादक ई-मेल : shodhdisha@gmail.com डॉ॰ मीना अग्रवाल वैब साइट : www.hindisahityaniketan.com संयुक्त संपादक डॉ॰ शंकर क्षेम क्षेत्रीय कार्यालय प्रमोद सागर हरियाणा उपसंपादक डॉ॰ मीना अग्रवाल डॉ॰ अशोककुमार ए-402, पार्क व्यू सिटी-2 सोहना रोड, 09557746346 गुड़गाँव (हरियाणा) डॉ॰ कनुप्रिया प्रचण्डिया कला संपादक दिल्ली एन॰सी॰आर॰ गीतिका गोयल/ डॉ॰ अनुभूति डॉ॰ अनुभूति सी-106, शिवकला अपार्टमेंट्स विधि परामर्शदाता बी 9/11, सेक्टर 62, नोएडा अनिलकुमार जैन, एडवोकेट फोन : 09958070700 आर्थिक परामर्शदाता (सभी पद मानद एवं अवैतनिक हैं।) ज्योतिकुमार अग्रवाल, सी॰ए॰ शुल्क आजीवन (दस वर्ष): छह हजार रुपए वार्षिक शुल्क : एक हजार रुपए यह प्रति : पाँच सौ रुपए प्रकाशित सामग्री से संपादकीय सहमति आवश्यक नहीं है। पत्रिका से संबंधित सभी विवाद केवल बिजनौर स्थित न्यायालय के अपने न्यायालय के अपने न्यायालय के संबंधित सभी विवाद केवल बिजनौर स्थित

न्यायालय के अधीन होंगे। शुल्क की राशि 'शोध दिशा' बिजनौर के नाम भेजें। (सन् 1989 से प्रकाशन-क्षेत्र में संक्रिय) में सक्रिय)

स्वत्वाधिकारी, मुद्रक, प्रकाशक डॉ॰ गिरिराजशारण अग्रवाल द्वारा श्री लक्ष्मी ऑफसैट प्रिंटर्स, बिजनौर 246701 से मुद्रित एवं 16 गांचित हो॰ गिरिराजशारण अग्रवाल द्वारा श्री लक्ष्मी ऑफसैट प्रिंटर्स, बिजनौर 246701 से मुद्रित एवं 16 साहित्य विहार, बिजनौर (उ॰प्र॰) से प्रकाशित। पंजीयन संख्या : UP HIN 2008/25034

<sup>संपादक</sup>ः डॉ॰ गिरिराजशरण अग्रवाल

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### ब्रिटिशयुगीन रायपुर जिले की जमींदारियों का भू-बंदोबस्त एवं भू-राजस्व नीति डॉ॰ डी॰एन॰ खुटे

सहा॰ प्राध्यापक एवं शोध निर्देशक, इतिहास अध्ययनशाला पं॰ रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ॰ग॰) अदिति श्रीवास्तव, शोध छात्रा, इतिहास अध्ययनशाला पं॰ रविशंकर शुक्ल विश्वविद्यालय रायपुर (छ॰ग॰)

भारत देश प्राचीनकाल से ही कृषि प्रधान देश रहा है। कृषि व्यवस्था का प्रत्यक्ष तथा अप्रत्यक्ष प्रभाव, समाज के आर्थिक, राजनीतिक एवं सामाजिक संरचना पर पड़ता है। देश के अप्रत्यक्ष प्रभाव, समाज के आर्थिक, राजनीतिक एवं सामाजिक संरचना पर पड़ता है। देश के इतिहास के अंतर्गत अनेक विदेशी शासकों ने भारत पर शासन किया, लेकिन उन्होंने भारत की इतिहास को जंतर्गत अनेक विदेशी शासकों ने भारत पर शासन किया, लेकिन उन्होंने भारत की संस्कृति को निम्न परिवर्तन के साथ स्वीकृत किया तथा वे स्वयं ही यहाँ की संस्कृति में एकीकृत हो गए। विदेशी व्यापारी के रूप में भारत आए तथा उन्होंने स्वयं की कूटनीतिक क्षमता से राष्ट्र पर अधिकार जमा लिया। साथ ही यहाँ की संस्कृति को खत्म करने का प्रयत्न किया। अँग्रेजों की व्यापारिक अंतर्वृत्ति ही उनकी नीति का निर्धारक तत्त्व बना। इसलिए उन्होंने कृषि व्यवस्था के क्षेत्र में ऐसी नीतियों का प्रतिपादन किया जिससे उन्हें अधिक-से-अधिक लाभ प्राप्त हो सके। अँग्रेजों की इस नीति के परिणाम यह हुए कि कृषि की परंपरागत व्यवस्था को आघात पहुँचा तथा आर्थिक, राजनीतिक एवं सामाजिक क्षेत्र में नवीन अंतर संबंधों के समीकरण निर्मित हुए।

आधुनिक छत्तीसगढ़ में भूमि नीति एवं भूमि-कर प्रशासन के अंतर्गत अनेक महत्त्वपूर्ण परिवर्तन एवं सुधार हुए।

रायपुर जिले की जमींदारियों की भू-राजस्व प्रणालियों में निरंतर परिवर्तन होते गए। ब्रिटिश भू-राजस्व नीति में समय-समय पर प्रयोग होते रहे, जिसका सामाजिक एवं आर्थिक प्रभाव, क्षेत्र की जनता पर पडा़।

संबंधित साहित्य का पुनरावलोकन एवं विषय से संबंधित महत्त्वपूर्ण अध्ययन

1. प्यारेलाल गुप्त, प्राचीन छत्तीसगढ़, रविशंकर शुक्ल विश्वविद्यालय, रायपुर, प्रथम संस्करण 1973

उपर्युक्त पुस्तक के माध्यम से छत्तीसगढ़ में समय-समय पर भिन्न-भिन्न क्षेत्रों में होने वाले कृषक विद्रोह की विस्तृत जानकारी प्राप्त होती है।19वीं शताब्दी के दौरान भारतीय किसान को कई आर्थिक समस्याओं का सामना करना पड़ा। अँग्रेजों की भूमि प्रणालियों ने उनके लिए बड़ी मुसीबतें पैदा कर दीं। देश में छोटे-छोटे उद्योगों के ह्रास से भूमि पर बहुत अधिक दबाव पड़ा एवं जनसंख्या की वृद्धि से यह दबाव बढ़ता ही गया। अत: कृषकों को अपने हक के लिए विद्रोह करने पड़े जो कि इस पुस्तक के माध्यम से ज्ञात होता है।

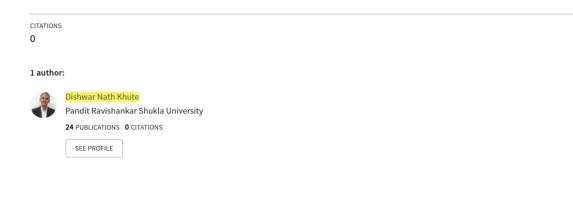
2. रमेंद्रनाथ मिश्र, ब्रिटिश कालीन छत्तीसगढ़ का प्रशासनिक इतिहास, पुस्तक प्रकाशन सत्ती

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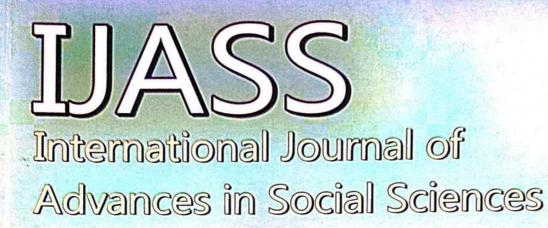
### Madhya Prant Mein Vyaktigat Satyagrah Evam Sarkari NeetiyanEk Aitihasik Punrawalokan

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CONTENT Subscription Rate for more than any loss Green Recruitment and Selection: An Innovative Approach towards Organizational Development and Environmental Sustainability Status and direction of white revolution in cooperative sector Amishaben N. Prajapati dial 14 ton rate of the the letter is because 70 - 1 सतनाम दर्शन एवं महिला समानता late land bat most bat and bar and प्रो. सीमा जायसी, डॉ. विनोद कुमार साहू nede stainspring tomine 74 advertise in a unit, and a relation for publication दुर्ग जिले के शिवनाथ नदी में पर्यटन एवं रोजगार की संमावनायें चेतना गजपाल, डॉ. कुबेर सिंह गुरुपंच 80 समकालिन छत्तीसगढ़ में आर्य समाज का शिक्षा के क्षेत्र में योगदान समकालिन छत्तासगढ़ न जान समय डॉ.सीमा पाण्डे, श्री गोविंद सिंह ठाकुर set aster Lace uniter 90 ... 0012 1.7.1 रियल एस्टेट व्यवसाय की विकास संमावनाओं एवं चुनौतियों का आर्थिक अध्ययन(रीवा जिले के विशेष संदर्भ in the second state of the second Aborthony to 2 of the second mait raften el unitariada até bagiavaria महिमा गर्ग, डॉ. आर. पी. गुप्ता . 96 जनसंख्या परिवर्तन एवं जीवन स्तर में जल संसाधन की भूमिका (दुर्ग एवं धमधा विकासखंड के विशेष संदर्भ . ins els recial, consequendot en Brateriate (Gates provide 10 anteriate as of the International Same 2 to Ff 1.26 Constructions of the interesting, consegurated Second an Internet All Second nue benerie and developing in 1964 entre deservation developing in चेतना गजपाल, डॉ. कुबेर सिंह गुरुपंच 106 मध्यप्रांत में व्यक्तिगत सत्याग्रह एवं सरकारी नीतियाँ : एक ऐतिहासिक पुनरावलोकन डाँ. डी. एन. खुटे 115 Instruction to Authors ..... 122 the colors in a fair that if Front Presenter of their The well's a month of the manufactor

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# मध्यप्रांत में व्यक्तिगत सत्याग्रह एवं सरकारी नीतियाँ : एक ऐतिहासिक पुनरावलोकन

### डाँ. डी. एन. खुटे

सहायक प्राध्यापक, इतिहास अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर छत्तीसगढ़. \*Corresponding Author E-mail:

### ABSTRACT:

ABSTRACT. व्यक्तिगत सत्याग्रह में ब्रिटिश सरकार ने जो नीति अपनाई उसके अनुसार समाचार पत्रों पर प्रतिबंध सूचनाओं का आदान-प्रदान तथा भारत रक्षा कानून की धाराओं के अधीन दंडित किए जाने की सूचनाओं के परिणाम ब्रिटिश शासन के लिए लाभदायक रहे। व्यक्तिगत सत्याग्रह से संबंधित समाचारों के प्रकाशन पर प्रतिबंध लगाये जाने से समाचार पत्रों का प्रकाशन बंद हो गया। मध्यप्रांत से प्रकाशित होने वाले अधिकांश समाचार ने ब्रिटिश शासन की नीतियों का अनुसरण करते हुए सत्याग्रह से संबंधित समाचारों का प्रकाशन नहीं किया। यद्यापि यह नीति जनता के भाषण तथा अभिव्यक्ति को व्यक्तिगत स्वंतत्रता के विरोधी थी परंतु भारत जैसे देश में जो उस समय ब्रिटिश साम्राज्यवाद के अधीन था यह अप्रत्याशित नहीं था। महात्मा गांधी जी ने अपने समाचार पत्र 'हरिजन' का प्रकाशन बंद कर शासन की इस नीति का विरोध अवश्य किया परंतु अधिकतर समाचार पत्र सरकार को सहयोग प्रदान करते रहे। इसी सूचनाओं के आदान—प्रदान की नीति ने ब्रिटिश सरकार को बेहतर स्थिति में ला दिया। केन्द्रीय गृह विभाग के अधीन कार्यरत सेंट्रल इंटेलिजेंस ब्यूरो के अधिकारी कांग्रेस की योजनाओं तथा गतिविधियों की जानकारी समय से पूर्व प्राप्त कर केन्द्रीय शासन को प्रेशित करते थे।

KEYWORDS: व्यक्तिगत सत्याग्रह, एडवायजर, सेंसरशिप, हड़ताल, कर्मवीर, सेंट्रल इंटेलिजेंस ब्यूरो, प्रेस एमरजेंसी एक्ट.

#### प्रस्तावना —

अध्ययन का उद्येश्य:--

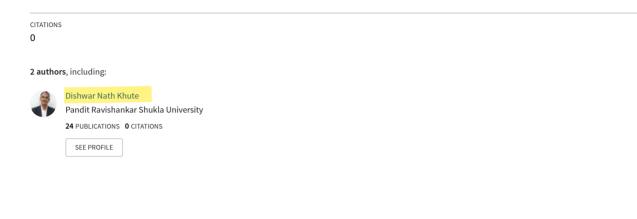
मध्यप्रांत में व्यक्तिगत सत्याग्रह के प्रारंभ होने के कारण और इसका प्रभाव का अध्ययन करना तथा उस समय की तत्कालीन परिस्थितियों में ब्रिटिश सरकार की नीतियों का विश्लेशण कर भारतीय राष्ट्रीय आंदोलन में इनका महत्व पर प्रकाश डालना।

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al formation dependent white former and hope in the second इस शोध पत्र के लिए प्राथमिक अध्ययन स्रोत के अंतर्गतं प्रकाषित रिपोर्टस, राष्ट्रीय अभिलेखागार पद्धति तथा दितीयक स्रोत के रूप में पुस्तकों का उपयोग किया गया है। at a child is a super since on many See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/390756168

### Unneeswi Shatabdi Mein Chhattisgarh ki Marathakalin Samajik Sthiti Ek Adhyayan

Article · October 2022



संपादक डॉ. गिरिराजशरण अग्रवाल डॉ. मीना अग्रवाल

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यह प्रति : चार सौ रुपए

प्रकाशित सामग्री से संपादकीय सहमति आवश्यक नहीं है। पत्रिका से संबंधित सभी विवाद केवल बिजनौर स्थित न्यायालय के अधीन होंगे। शुल्क की राशि 'शोध दिशा' बिजनौर के नाम भेजें। (सन् 1989 से प्रकाशन-क्षेत्र में सक्रिय)

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शैलेश मटियानी के कथासाहित्य में स्त्री-विमर्श एवं स्त्री-संघर्ष/ कालजयी काव्य रामचरितमानस/ शिव वर्षिनी, डॉ॰ जी॰ शांति 121 125 मैत्रेयी पुष्पा के इदन्नमम उपन्यास में चित्रित संस्कृति डॉ॰ गौकरण प्रसाद जायसवाल, शुचिता देशमुख 130 आचार्य भिखारीदास के काव्य में श्रीराम के काव्यशास्त्रीय संदर्भ और भक्ति-भावना/ अशोष उपाध्याय 135 कंचनलता सब्बरवाल के कथासाहित्य में स्त्री विमर्श/ सुधा देवी 142 चित्रा मुद्गल कृत 'गिलिगडु': महानगरों में विलुप्त होता बुजुर्ग/ सोनिया यादव, डॉ॰ सुमन शर्मा 147 मीरा और रसखान के काव्य में बिंबगत सौंदर्य/ डॉ॰ सुमन शर्मा 154 शरीरमाद्यं खलु धर्मसाधनम्/ डॉ॰ बृजेन्द्र सिंह गुर्जर 160 हिंदी गद्य साहित्य में आलोचना के विकास का अध्ययन/ मनोज उपाध्याय, अनिता मिश्रा 165 योगिक ग्रंथों में मुद्रा का स्वरूप/ डॉ॰ अंकित कुमार, डॉ॰ नीशु कुमार 169 भारतीय परिदृश्य में जनसंख्या वृद्धि : समस्याएँ, चुनौतियाँ एवं समाधान/ दिनेश रघुवंशी, पूजा सिंह परिहार 172 अस्थिबाधित दिव्यांगों के हस्तशिल्प एवं इनके प्रति समूह-कारकों की अभिक्रिया का अध्ययन/ बबीता कुमारी, प्रज्ञा शर्मा 176 सतपुड़ा मैकल की श्रेणियों में पर्यटन उद्योग हेतु संभावनाओं का समीक्षात्मक अध्ययन : जिला बैतूल के विशेष संदर्भ में/ गौरव डेरिया, पूजा सिंह परिहार 179 कन्नड साहित्य के सृजनशील साहित्यकार : डॉ॰ एस॰एल॰ भैरप्पा/ 182 डॉ॰ जयलक्ष्मी एफ पाटील बैतूल जिले के आदिवासी समुदाय में पाश्चात्य संस्कृति के प्रभावों का लिंगाधार के संदर्भ में तुलनात्मक अध्ययन/ जयन्त मिश्रा, सारिका गर्ग 186 190 दलितों का जीवन-संदर्भ/ डॉ॰ जोयिस टॉम 196 सांस्कृतिक चेतना एवं राष्ट्रवाद/ डॉ॰ कविता भट्ट उन्नीसवीं शताब्दी में छत्तीसगढ़ की मराठाकालीन सामाजिक स्थिति : 205 एक अध्ययन/ ममता धुव, डॉ॰ डिश्वर नाथ खुटे 'सत्य के साथ मेरे प्रयोग' में महात्मा गांधी के व्यक्तिगत प्रयोगों का मूल्यांकन/ 211 पप्पलराम 217 हिंदी सिनेमा में विशिष्ट सांगीतिक विधाओं का प्रयोग/ प्रोमिला देवी लड़ाकू पेशवा : बाजीराव प्रथम के काल में मराठा शक्ति का विस्तार/ 224 राकेश कुमार जनसामान्य में न्याय एवं अद्वैत वेदांत दर्शन का प्रचारक ग्रंथ: विचार सागर/ 230 डॉ॰ सच्चिदानंद स्नेही 235 प्राचीन भारत में सिंचाई व्यवस्था/ डॉ॰ संजय कुमार सिंह

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12 = शोध-दिशा (शोध अंक-60/4)

# उन्नीसवीं शताब्दी में छत्तीसगढ़ की मराठाकालीन सामाजिक

### स्थिति : एक अध्ययन

#### ममता ध्रुव, शोधार्थी

डॉ॰ डिश्वर नाथ खुटे, शोध निर्देशक, इतिहास अध्ययनशाला पं॰ रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ॰ग॰)

छत्तीसगढ़ वर्षों की राजनीतिक उथल-पुथल तथा ऐतिहासिक और राजनीतिक परिवर्तनों के बावजूद आज भी अपनी प्राचीन परंपराओं को अक्षुण्ण बनाए रखा है। यहाँ अरण्यक और अर्द्धनगरीय सभ्यताओं के विकास का स्पष्ट इतिहास दिखाई देता है। अरण्यक सभ्यता के रूप में जनजातियों की अनोखी रीति-नीति दिखाई पड़ती है। वहीं अर्द्धनगरीय सभ्यता उन लोगों में दिखाई देती है, जो अन्य प्रांतों से आकर यहाँ निवास करने लगे प्रदेशवासी प्रकृति की अनुकंपा प्राप्त करने के लिए अनेक देवी-देवताओं की पूजा-अर्चना करते रहे हैं। उन्नीसवीं शर्ताब्दी में भी लोग स्वभाव से सरल, कृतज्ञ, सहिष्णु एवं उदार होते थे। शिक्षा तथा जागरूकता का अभाव था। यह पिछडापन आज भी परिलक्षित होता है। छत्तीसगढ़ में यद्यपि वर्ण-व्यवस्था का प्रचलन उन्नीसवीं शताब्दी में भी था तथापि उनमें कट्टरता का अंश कम है। आदिवासी सभ्यता के प्रभाव से मैदानी क्षेत्रों का समाज भी अछूता न रहा और तंत्र-मंत्र संबंधी कृत्यों के लिए संपूर्ण छत्तीसगढ़ एक ही प्रकार की मान्यता वाला क्षेत्र बन गया। अंधविश्वास का बोलबाला था। कभी-कभी तो यह भावना पराकाष्ठा को पहुँच जाती थी और उच्चाटन सम्मोहन, वशीकरण आदि विद्याओं में निपुण व्यक्तियों को ग्राम-बहिष्कार, शारीरिक यातना, कभी-कभी प्राण-दंड भी भोगना पड़ता था।

प्राचीनकाल में भी गाँवों में निवास करने वाले लोगों की आजीविका प्राय: कृषि पर ही निर्भर होती थी। अर्थव्यवस्था में सभी वर्गों के बीच सहकारिता की भावना होती थी। कुम्हार, खाती, लुहार, नाई, धोबी, आदि को विशेष अवसरों पर यथेष्ट सम्मान मिलता था तथा समाज में यथासंभव समानता का व्यवहार किया जाता था। ब्रिटिश शासन के पूर्व छत्तीसगढ़ की सामाजिक स्थिति का उल्लेख अँग्रेजी अभिलेखों में भी प्राप्त होता है। छत्तीसगढ़ की सामाजिकी को प्रकाशित करने वाले अभिलेख अध्ययन की दृष्टि से महत्त्वपूर्ण हैं।

छत्तीसगढ़ के इतिहास में 10वीं शताब्दी से लेकर 18वीं शताब्दी तक कलचुरि राजवंश सत्ता में रही। प्राचीन राजवंशों में कलचूरियों का इतिहास भी अभीष्ट रहा और 1742 ई॰ में सत्ता का सूर्यास्त हो गया तथा नागपुर से चलने वाले मराठों के अधीन भांसलों का प्रभुत्व स्थापित हो गया। रघुजी भांसले-प्रथम, मराठों का साहसी एवं महत्त्वाकांक्षी सरदार था, वह अन्य मराठा सरदारों होल्कर, सिंधिया, गायकवाड की भाँति अपने प्रभाव एवं विस्तार के लिए प्रयत्नशील था।

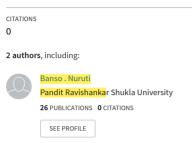
नागपुर के राजा रघुजी भोंसले ने अपने चारों पुत्रों के मध्य भोंसला राज्य का बॅंटवारा कर दिया। छत्तीसगढ़ प्रदेश उसके छोटे पुत्र बिंबाजी भोंसले को प्राप्त हुआ था।<sup>2</sup> 1755 ई॰ में रघुजी भोंसले की मृत्यु के बाद छत्तीसगढ़ में मराठों के प्रतिनिधि शासन का आरंभ हुआ। बिंबाजी 1758

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# Muriya Janjati ki Kashthkala ( Baster ke vishesh sandarbh mein)

Article · September 2022



### संपादक डॉ. गिरिराजशरण अग्रवाल डॉ. मीना अग्रवाल

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### मुरिया जनजाति की काष्ठकला

### (बस्तर के विशेष संदर्भ में) डॉ॰ बंसो नुरूटी, शोध निर्देशक पुरोहित कुमार सोरी, शोधार्थी

जनजातियाँ कला को दृष्टि से विश्व में अपनी एक अलग विशिष्ट पहचान रखती हैं। यद्यपि वे लोग विज्ञान एवं प्रौद्योगिकी की बारीकियों को नहीं जानते परंतु इसका तात्पर्य यह नहीं है कि उनकी कला में विशिष्टता नहीं है। जनजातियों की कला उनकी भौगोलिक वातावरण तथा पर्यावरण से प्रभावित होती है, जिससे उनकी कला को प्रेरणा मिलती है।

ई॰आर॰ लीच के अनुसार, 'जनजातीय लोग कला की वस्तुओं का उपयोग धार्मिक उत्सवों, निजी वस्तुओं की सजावट तथा मृत पूर्वजों की याद में स्मारक इत्यादि बनाने हेतु करते थे। इनकी कला धार्मिक तथा धर्मनिरपेक्ष होने के साथ-साथ उपयोगितावादी तथा आलंकारिक दोनों होती है अर्थात् इनकी कला शुद्ध रूप से कलात्मक होती है।"

मुरिया जनजाति के लोग अपनी आवश्यकतानुरूप प्रत्येक काष्ठवस्तु का निर्माण स्वयं करते हैं। परंपरागत रूप से मुरिया जनजाति लकड़ी की बनी वस्तुओं को अपनी जीवन पद्धति में समाहित करती रही है इसलिए मुरिया जनजीवन में काष्ठ निर्मित प्रत्येक वस्तु में सौंदर्य और अलंकरण का सार परिलक्षित होता है। इस कला में विभिन्न रूपाकारों को अपनी कला प्रदर्शन की सुविधा और स्वतंत्रता है इसलिए काष्ठ पर मुरिया की स्मृति और स्वप्न भी अंकित होते हैं। बस्तर की काष्ठ शिल्पकला मुरिया जनजाति की आदिम कला का अद्वितीय उदाहरण है।<sup>2</sup>

बस्तर में काष्ठकला का प्रचलन आदिकाल से है। मानव ने पत्थर के बाद लकड़ी को सबसे पहले अपनी सुरक्षा के लिए अपनाया। हथियार के रूप में यही लकड़ी धीरे–धीरे जीवनयापन का प्रमुख अंग बनती गई। जिस पर उसने सुंदर बेल–बूटे, फूल–पत्तियाँ आदि कलाकृतियाँ उकेरीं और हथियार में लगा रहनेवाला यह लकड़ी का बेत उनकी कलात्मक अभिरुचि बन गई।'

काष्ठकला की परंपरा बहुत प्राचीन और समृद्ध है। लकड़ी ने विभिन्न रूपाकारों को उतारने की कोशिश मनुष्य ने आदिम युग से शुरू कर दी थीं। प्राचीनकाल से ही लकड़ी (काष्ठ) का उपयोग सामान्य घरों के निर्माण के साथ-साथ विशालतम भवनों के निर्माण में होता रहा है। कौटिल्य के अर्थशास्त्र के अध्ययन से पता चलता है कि पाटलीपुत्र के मौर्यकालीन राजप्रासाद का निर्माण लकड़ियों से ही हुआ था। इस तथ्य की पुष्टि पुरातत्त्व विभाग कि खुदाई के दौरान वर्तमान पटना शहर के पास लकड़ी के राजप्रासाद के अवशेष मिलने से हुई है। काष्ठकला का इतिहास आज से लगभग 3500 वर्ष पुराना है। ऋग्वेदकाल के पहले से ही भारतीयों को काष्ठकला का ज्ञान था। वर्तमान बस्तर संभाग के जनजातीय लोगों ने आज भी काष्ठकला के महत्त्व को सँजोए रखा है। संपूर्ण बस्तर संभाग के विभिन्न क्षेत्रों में रहनेवाले जनजातीय समूह जैसे कि गोंड, मुरिया, माड़िया, भतरा, धुरवा, हल्बा एवं परजा जाति के लोग विभिन्न प्रकार के आर्थिक क्रियाकलापों में

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विश्वस्तरीय शोध-पत्रिका केंद्रीय हिंदी संस्थान, आगरा से अनुदान प्राप्त UGC APPROVED CARE LISTED JOURNAL विश्वविद्यालय अनुदान आयोग द्वारा मान्यता प्राप्त शोध पत्रिका

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संपादकीय कार्यालय हिंदी साहित्य निकेतन, 16 साहित्य विहार, बिजनौर 246701 (उ॰प्र॰) फोन : 0124-4076565, 09557746346 ई-मेल : shodhdisha@gmail.com वैब साइट : www.hindisahityaniketan.com	संपादक डॉ॰ गिरिराजशरण अग्रवाल 07838090732 प्रबंध संपादक डॉ॰ मीना अग्रवाल संयुक्त संपादक
क्षेत्रीय कार्यालय	डॉ॰ शंकर क्षेम
हरियाणा	डॉ॰ प्रमोद सागर
डॉ॰ मीना अग्रवाल ए-402, पार्क व्यू सिटी-2 सोहना रोड, गुड़गाँव (हरियाणा) <u>दिल्ली एन॰सी॰आर॰</u> डॉ॰ अनुभूति सी-106, शिवकला अपार्टमेंट्स बी 9/11, सेक्टर 62, नोएडा	उपसंपादक डॉ॰ अशोककुमार 09557746346 डॉ॰ कनुप्रिया प्रचण्डिया कला संपादक गीतिका गोयल/ डॉ॰ अनुभूति विधि परामर्शदाता अनिलकुमार जैन, एडवोकेट
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प्रकाशित सामग्री से संपादकीय सहमति आवश्यक नहीं है। पत्रिका से संबंधित सभी विवाद केवल बिजनौर स्थित न्यायालय के अधीन होंगे। शुल्क की राशि 'शोध दिशा' बिजनौर के नाम भेजें। (सन् 1989 से प्रकाशन-क्षेत्र में सक्रिय)

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विश्व में प्रत्येक युग एवं स्थान में समय पर ऐसे युग पुरुष जन्म लेते हैं, जो अपनी गहन एवं सूक्ष्म अंतर्दृष्टि के कारण तत्कालीन युग में ही नहीं, वरन् अपनी दूरदर्शिता से युगों-युगों तक समसामयिक एवं प्रासंगिक बने रहते हैं। नारी संदर्भ में स्वामी विवेकानंद की विचार दृष्टि आज भी उतनी ही प्रासंगिक है, जितनी उस युग में थी। स्वामी विवेकानंद ने संपूर्ण नारी-जाति, विशेषत: भारतीय नारी की महिमा प्रतिष्ठित की है। उनके अनुसार, 'ईश्वर की प्रथम अभिव्यक्ति वह हाथ हैं जो पालना झुलाते हैं।' नारी का परम उत्कर्ष, मातृत्व में है और माँ, परमात्मा का स्वरूप है।

भारत को यदि जीवित रहना है और यदि प्रगति करते हुए अपने खोए हुए गौरव को प्राप्त करना है, तो अपनी राष्ट्रीय समस्याओं का हल उन्हें स्वामी विवेकानंद में ही ढूँढना होगा। भारत एवं उसकी परंपराओं के अध्ययन मनन में डूबकर स्वामीजी मानो 'आरात्मा' हो गए थे। उन्होंने स्वयं ही कहा है 'मैं घनीभूत भारत हूँ।' स्वामी विवेकानंद का कहना था कि वे देश ही उन्नति कर सकते हैं, जहाँ महिलाओं को उचित स्थान दिया जाता है तथा उनकी शिक्षा का भी उचित प्रबंध किया जाता है।<sup>1</sup> शिक्षा के संदर्भ में स्वामी विवेकानंद जी का कहना था कि वे देश ही उन्नति कर सकते हैं, जहाँ महिलाओं को उचित स्थान दिया जाता है तथा उनकी शिक्षा का भी उचित प्रबंध किया जाता है।<sup>1</sup> शिक्षा के संदर्भ में स्वामी विवेकानंद जी का कहना था कि शिक्षा का उद्देश्य होना चाहिए व्यक्ति में अंतर्निहित पूर्णता की अभिव्यक्ति। वास्तव में व्यक्ति के अंदर उपस्थित गुणों का विकास करना ही वास्तविक शिक्षा है। वास्तव में यह परिपूर्णता बाहर से नहीं आती है, वरन् व्यक्ति के भीतर ही छिपी रहती है। स्वामीजी स्त्री शिक्षा पर इसलिए भी अधिक बल देते थे कि उनकी सोच थी कि समाधान स्वत: हो जाएगा।

स्वामी विवेकानंद नारी शिक्षा पर बल देते हुए उसे मानसिक रूप से आत्मनिर्भर बनाना चाहते थे। उनका कहना था कि हमें नारियों को ऐसी स्थिति में पहुँचना चाहिए, जहाँ वे अपनी समस्या को अपने ढंग से स्वयं सुलझा सकें। उनके लिए यह कार्य न कोई कर सकता है, न किसी को करना चाहिए। वेद और उपनिषद् युग में मैत्रेयी, गार्गी और अन्य स्त्रियों को ले सकते हैं जिन्होंने मंत्रों, स्मृतियों की रचना में ऋषि-मुनियों का साथ दिया। गार्गी ने तो प्रकांड विद्वानों की सभा में याज्ञवलक्य को ब्राह्मणवाद पर बहस (तर्क) में अपनी तार्किक तथा बौद्धिक क्षमता से परिचय गार्गी और अन्य स्त्रियों ने दिया उन्हें आध्यात्मिक ज्ञान था, तथा उनके आदर्श ऊँचे थे। स्वामी विवेकानंद जी ब्रह्मवादिनी गार्गी की चर्चा करते हुए कहते हैं कि विदेहराजा जनक की राजसभा में धर्म के गूढ़ तत्त्वों पर जब महर्षि याज्ञवलक्य के साथ वाद-विवाद हुआ, तो इसमें ब्रह्मवादिनी गार्गी ने विशेष रूप से भाग लिया था। उसने कहा था मेरे दो प्रश्न मानो कुशल धनुषधारी के हाथ दो तीक्ष्ण बाण हैं। यहाँ पर उसके महिला होने के संबंध में कोई प्रसंग तक नहीं उठाया गया।' उन्होंने कहा कि Akshara Multidisciplinary Race

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# The History & Culture of India

**Guest Editor** 

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माड़िया जनजाति के जनजीवन में लोककथा का महत्त्व

#### डॉ. बंसो नुरूटी

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विश्व एवं भारत के विभिन्न क्षेत्रों में आदिवासी समुदाय के लोग बडी संख्या में निवास करते हैं। पृथक- पृथक क्षेत्रों में निवास करने वाले भिन्न-भिन्न त्तंत्कृति के लोगों की हजारों ऐत्ती नान्यताएं है। आदिवासी समुदाय की देवी–देवता एक बडी संख्या में मजर आते है जो इन्हें दुख के त्तनय तुख शांति प्रदान करते हैं। वे प्रकृति के गोद में रात-दिन रचे बसे हैं। और खाली समय में वे अपने परिवार के साथ मनोरंजन करते हुए जीवन की विषमताओं को दूर करने के लिए कथा, कहावतें, लोकनृत्य, गीत इत्यादि को सुनाकर सहयोगियों का मनोरंजन करते रहते हैं। लोक जीवन में लोक कथा का अत्यंत ही नहत्व है। इसके संरक्षण एवं अनुशीलन के द्वारा लोककथा का विकास किया जा सकता है। लोककथा में धर्म , समाज, सदाचार आदि वातों का समावेश मिलता है। इसके अतिरिक्त लोककथा के द्वारा त्यानीय इतिहास एवं भूगोल संबंधी जानकारी मिलती हैं। लोककथा में अधिक मात्रा में मौखिक ऐतिहात्तिक तथ्य पाये जाते हैं। जिसके माध्यम से आंचलिक एवं राष्ट्रीय स्तर की ऐतिहासिक घटनाओं को क्रनबद्ध करने में सहायता मिलती है। विभिन्न क्षेत्रों के लोक गीतों द्वारा वहाँ के स्वर्णिनय अतीत , उदयोग, व्यापार-व्यावत्ताय, आर्थिक दशा आदि की जानकारी निलती है।

शब्द कुंजी : लोककथा , ऐतिहासिक, मौखिक, भारतीय समाज, प्रकृति, संरक्षण। भूमिका :

लोक कथाएं तथा गीत आदिवासियों कं सुख–दुख आदि को दर्शांते है। यह व्यंग्य और कौतुहल से परिपूर्ण होती है। यह कथाएं दैनिक जीवन के सहचार्य के रूप में जैसे कि वृक्ष, पुष्प, पशु-पक्ष, नदी-नालें, छोटे-वडे पर्वत उनकी कथाओं का अनिन्न अंग बन गये है। यह लोक कथाये आदिवाली समुदाय के लोगों के अभिव्यक्ति का महत्वपूर्ण अंग है। जितना इतिहास पुराना है, उतनो हो उनकी कहानियां भी पुरानी हैं। उनकी लोककथाओं में संस्कृति का संरक्षण ही नहीं हुआ बल्कि यह लोक संस्कृति का संवाहक के रूप में भी काम करते आ रही हैं। यह एक पीढी से दूसरी पीढी तक लोकज्ञान पहुंचाने का कार्य करती है। इसका माध्यम मौखिक होने के कारण जिसमें कुछ पुराने अंश छुट जाते हैं। और कई बार नये अंश जुड़ भी जाते हैं। इसीलिए लोककथाओं में परिवर्तन देखने को निलता है। समय और परिवेश के साथ-साथ मनुष्य जीवन में भी परिवर्तन अनिवार्य हो जाता है । जिसका प्रभाव लोक कथाओं में भी दिखाई देता है। जैसे कि – किसी दादी ने अपने पोते को उसके बचपन में कहानी सुनाई हो वह पोता बुढ़ा हो जाने के बाद उस कहानी को ठीक उसी तरह नहीं सुनायेगा जैसे कि उसके दादों ने उसे सुनाई थी। यह मौखिक परंपरा की विशेषता है। यह मनोरंजन के साथ-साथ जातीय एवं सामाजिज रीति–रिवाजो को जीवित रखा है। तथा धार्मिक विश्वासों को अधिक प्रभावशील बनाया है। देवी–देवता विषयक धारणाओं को बलवती बनाने में इन कथाओं का योगदान सदा स्नरणीय होना।

लोक कथाओं की भाषा–शैली सरल एवं प्रवाहमयी होती है। आदिवासियों को कई बोलियों हैं। मूल बोली में कही गई ये कथाएँ बड़ी रोचक और कर्ण-प्रिय लगती हैं। इनके माध्यम से आदिवासियों की

संस्कृति एवं सभ्यता को समझने में सरलता हुई है। 2

### उत्पत्ति

कथा शब्द संस्कृत के कथ धातु से बना है। जिसका अभिप्राय कहने के अर्थ के रूप में होता है। "कथा" शब्द के लिए ही पयुक्त होने वाला कहानी शब्द कथा का ही अपभ्रंश है। कथा शब्द के भाव 'आख्यान' एवं 'आख्यायिका' शब्दों में देखने मिलता है। आख्यान एवं आख्यायिका शब्द साहित्य से संबंधित हैं। जबकि कथा शब्द साहित्य और लोक साहित्य में उभयनिष्ठ हैं।' लोक कथाओं की उत्यत्ति के विषय मे विद्वानों ने विभिन्न मत प्रस्तुत किये हैं। लेकिन कल्पना और अनुमान के आधिव्य के कारण किसी एक मत को पूर्ण रूप से स्वीकार नहीं किया जा सकता है। मौखिक परम्परा म होने के कारण लाक कथा का कोई

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सुसम्बद्ध इतिहास भी नहीं मिलता। इसलिए विद्वानों में इसकी उत्पत्ति के संबंध में इतना अधिक मतभेद

यूरोप में लोक कथाओं की उत्पत्ति के संबंध में मुख्य रूप से दो मत प्रचलित हैं। एक मत के लेखको के अनुसार 'लोक' को ही समस्त कथाओं का रचयिता माना गया है। दूसरे मत के लेखकों की मान्यता है कि जिस कविता का रचयिता व्यक्ति विशेष होता है। उसी प्रकार लोक कथा भी व्यक्ति विशेष की ही रचना होती है। लेकिन वास्तविकता इन दोनों मतों के मध्य स्थित प्रतीत होती है। वस्तुतः अपने मूलरूप में लोक कथाओं का रचयिता विशेष होता है। किंतु मौखिक परभ्परा में होने के कारण उनमें लोक द्वारा निरन्तर संशोधन तथा परिवर्तन होता रहता है। यह मान्यता लोक कथाओं के विकासशील स्वभाव को

लोक कथाओं की उत्पत्ति का श्रेय पूरे समुदाय को ही जाता है। जब कोई व्यक्ति हर्षोल्लास मे होता था, और नृत्य एवं संगीत के माध्यम से अपने सुख को अभिव्यक्त करता था तो अन्य लोग भी वैसे ही नृत्य आदि के द्वारा इस भावना का अनुभव करते थे। हर्ष एवं प्रसन्नता के अवसरों यथा मेलों तथा धार्मिक पर्वो पर लोग एक समुदाय में एकत्र हो जाते थे। ऐसे समय में अपने हर्षोल्लास को व्यक्त करने

लोक कथाओं की परम्परा सदैव मौखिक रही है। अतः यह बहुत संभव है कि कथाओं के लेखकों

का नाम लुप्त हो गया। लोक कथाओं की उत्पत्ति के विषय में विविध विद्वानों द्वारा प्रतिपादित मतों का

1 लोक कथा की परम्परा मौखिक रही है।

2 लोक कथा सम्पूर्ण समाज की निधि रही है।' इसलिए कहा जा सकता है कि मूल रूप में लोक कथाएँ

अधिकांशतः किसी व्यक्ति विशेष के प्रयास से ही निर्मित होती है, वह व्यक्ति अपने व्यक्तित्व को समष्टि में विलीन कर देता है। लोक समाज को सौंपकर वह रचना से अलग हो जाता है। समयानुसार समाज उसमें परिवर्तन करता रहता है। और लोककथा एक सामाजिक निधि बन जाती है। सम्पूर्ण समाज ने इनके विकास में योगदान दिया है। इस कारण ये सबकी सम्पत्ति है। 1. स्वरूप एवं परिभाषा

लोककथा शब्द हिन्दी अंग्रेजी के 'बैलेड' के पर्याय के रूप में माना जाता है, 'बैलेड' शब्द 'लैटिन' भाषा के 'बेलोर' शब्द से निकला है। 'बेलोर' का अर्थ है नृत्य करना। संभवतः प्रारंभ में नृत्य के सहयोग से गाये जाने वाले गीत को "बैलोड" कहा जाता था, लेकिन वर्तमान में अर्थात्मक गीतो को ही "बैलोड" कहा जाता है। विभिन्न विश्वकोषों एवं शब्द कोषों में भी लोक कथाओं की परिभाषाएँ दी गई हैं।

इन्साइक्लोपीडिया ब्रिटेनिका के अनुसार – ''लोककथा ऐसी पद्यात्मक रचना हैं, जिसका रचयिता अज्ञात हो, जिसमें साधारण उपाख्यान का वर्णन हो। और जो सरल, मौखिक परम्परा के लिए उपयुक्त तथा ललित कला की सूक्ष्मताओं से रहित हो।" इस कथन में सरलता, स्वाभाविकता एव सहजता को लोक

प्रकृति की सुन्दरता आदिवासियों की आँखों में रात–दिन झूमती है। अवकाश के समय ये अपने परिवार के साथ मनोविनोद करते हुए जीवन की विषमताओं के काले चित्र खीचते हैं और कभी-कभी भूत-प्रेतों की कथाएँ सुनाकर अपने परिवार के सदस्यों एवं सहयोगियों को चकित कर देते है।"

ये कथाएँ वनवासियों के सुख–दुख को प्रदर्शित करती हैं। इनके सामाजिक संगठन की एक प्राचीन रूपरेखा प्रस्तुत करती हैं। तथा धार्मिक विश्वासों का एक विस्तृत इतिहास बताती है। संसार कैसे वना ? आकाश चारों ओर कैसे फैल गया ? वृक्ष किस प्रकार धरती पर खड़े हो गये है ? सागर का पानी कैसे खारा बना ? नदियों के जल पर नाव कैसे चलती है ? आदि हजारों ऐसी कथाएँ इन आदिवासियों मे प्रचलित हैं, जो इन वनवासियों की उर्वर-कल्पनाशक्ति को प्रदर्शित करती हैं।12

आदिवासी मानव का मरितष्क कल्पना शून्य नहीं है। अपनी जाति की उत्पत्ति तथा सृष्टि रचना आदि के सबंध में प्रत्येक जनजाति में भिन्न-भिन्न धारणाएँ रही है, जो कि बाद में कल्पित कथाएँ बन गई। इन कथाओं में सृष्टि की उत्पत्ति तथा रचना के वर्णन के अतिरिक्त अनेक देवीय घटनाओं का वर्णन भी होता है. जिनमें लोगों का अदूट विश्वास होता है। तथा वे उन्हें सत्य मानकर चलते है। परन्तु एक ही विषय म दा विभिन्न जनजातियां के भिन्न-भिन्न विचार हो सकते हैं। जैसे सृष्टि की उत्पत्ति के बारे में एक जनजाति म जो कथा प्रचलित है दूसरे में कोई अन्य हो सकती है।'

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### RESEARCH ARTICLE

1920 में छत्तीसगढ़ का प्रथम मजदूर आंदोलन एवं ठा.प्यारेलाल सिंह

### डॉ. डी. एन. खुटे

सहायक प्राध्यापक, इतिहास अध्ययनशाला, पं.रविशंकर शुक्ल वि.वि., रायपुर (छ.ग.) \*Corresponding Author E-mail:

#### ABSTRACT:

ABSTRACT: राजनांदगाँव छत्तीसगढ़ को छोटा सा शहर है, किन्तु राजनीतिक चेतना के दृष्टिकोण से सदैव अग्रणी रहा हैं। मजदूरो में दिन-प्रतिदिन असंतोश बढ़ता जा रहा था। परिणामस्वरूप ठाकुर प्यारेलाल सिंह ने मजदूरों तथा महिला मजदूरों को जागृत और संगठित करने का काम आरंभ किया। मजदूरों में राजनीतिक तौर पर सन् 1919 में पहली बार चेतना जागृत हुई जब रौलेट एक्ट के विरोध में राजनांदगाँव शहर तथा मिल बंद रही। पुनः बालगंगाधर तिलक की मृत्यु पर बंगाल—नागपुर—कॉटन मिल के मजदूरों ने दो दिन काम बंद रखा। नवम्बर 1917 से ठाकुर प्यारेलाल सिंह मजदूर आंदोलन से जुड़ गये थे इसी वर्ष ठाकुर साहब की मुलाकात कुछ मिल मजदूरों से हुई। अपने स्वभाव के अनुसार मजदूतें से हालचाल पूछा तब मजदूरों ने अपने साथ हो रहे अत्याचारो व शोषण के बारे में बताया कि उन्कों 12 घण्टे रोजाना काम करवाने के बाद भी सही मायने में पर्याप्त मजदूरी नही मिलती। मजदूरों की परेशानियों को सुनकर ठाकुर साहब ने मजदूरो के अधिकारों के लिए संघर्ष करने के लिए दृढ़ संकल्पित हो गये।

KEYWORDS: रौलेट एक्ट, बंगाल–नागपुर–कॉटन मिल, ठाकुर प्यारेलाल सिंह, रियासत, खदेशी आंदोलन, सरस्वती पुस्तकालय, पोलिटिकल एजेन्ट, बिसिनियोसिस, हड़ताल, सुपरिटेण्डेन्ट।

#### **INTRODUCTION:**

ठाकुर प्यारेलाल सिंह का जन्म 21 दिसम्बर 1891. को राजनांदगांव के ग्राम दैहान में क्षत्रिय कुल में हुआ था। उनके पिता का नाम ठाकुर दीनदयाल सिंह और उनकी माता का नाम श्रीमती नर्मदा देवी था। वि ठाकुर दीनदयाल सिंह का रहन-सहन काफी शानो-शौकत वाले थे किन्तु वे भी अत्यन्त सरल तथा संह स्वभाव के थे। ठाकुर साहब पर उनकी पिता की गहरी छाप पड़ी थी। उनके पिता तात्कालिन कर्का राजनांदगांव व छुईखदान रियासती स्कूलों के उपनिरीक्षक थे।

ठाकुर प्यारेलाल सिंह का बचपन राजनांदगाँव और दैहान में व्यतीत हुआ। उनकी प्रारंभिक <sup>शि</sup> राजनांदगांव में हई तथा माध्यासिक जिल्ला साल को से की राजन में की राजनांदगांव में हुई तथा माध्यमिक शिक्षा प्राप्त करने के बाद वे 1905 में रायपुर गर्वन्मेन्ट हाई स्कूल में भी हो गये। हिस्लाप महाविद्यालय नागाज के राजने के बाद वे 1905 में रायपुर गर्वन्मेन्ट हाई स्कूल में भी हो गये। हिस्लाप महाविद्यालय नागपुर से उन्होंने बी .ए. और इलाहाबाद विश्वविद्यालय से एल. एल. बी. की उपाधि प्राप्त की तथा उन्हें राजनांद्रगांत के पन्ने कि उपाधि प्राप्त की तथा उन्हें राजनांदगांव के पहले विधि स्नातक होने का गौरव प्राप्त हैं। सन् <sup>1916 मे</sup> है ठाकुर साहब ने दूर्ग में वकालत पार्ट्य की जान की पहले विधि स्नातक होने का गौरव प्राप्त हैं। सन् <sup>1916 मे</sup> हार स्वतंत्री ठाकुर साहब ने दुर्ग में वकालत प्रारंभ की इसके पीछे उनका उद्देश्य था —वकालत करते हुए स्वतंत्रण

Priya Rao, Page No. 375 - 380

### SHODH SAMAGAM

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### Right to Life in Indian Constitution With Special Focus on Right to Food

Priya Rao, (Ph.D.), School of Studies in Law Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, INDIA

### ORIGINAL ARTICLE



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### ABSTRACT

This article focuses on the various aspects of Indian constitution related to the right to food. Special focus has been laid down on the Food Safety and Security Act, 2006. The paper addresses the important judgments laid down in the field of right to food. India is signatory to many international treaties involving right to food. Indian Constitution also indirectly refers to right to food. Therefore, there is an obligation for the Indian Government (Centre and states) to fulfill the right to food of the people.

### **KEY WORDS**

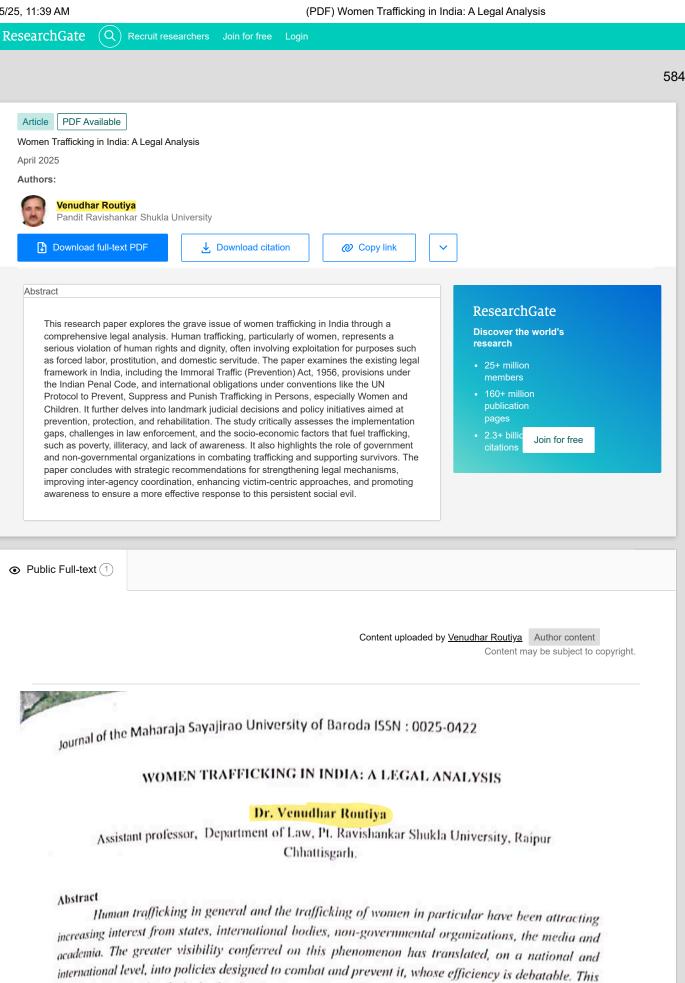
**Right to Life, Right to Food, Constitution, Hunger, Food Safety, Initiatives.** 

### **INTRODUCTION**

The right to life and individual liberty are the primary early privileges for the development of human character. It is an ethical right that every person wherever should consistently possess. Right to life and individual liberty is the modern term for what has traditionally been regarded as "natural right." It is also regarded as one of the most important inherent and inalienable fundamental rights, which enables a person to live his life as he pleases. Article 3 of the Universal Declaration of Human Rights recognizes the right to life and individual liberty, stating, "Everyone has the right to life, freedom, and individual security." Article 9 of a comparable document states, "No one will be subject to inconsistent capture, detention, or deportation." It proves that the international community is comparable to the protection of human life and liberty. In Part III of the Constitution, under the heading Fundamental Right, the framers of our Constitution incorporated Article 21 which states, "No person shall

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https://www.researchgate.net/publication/390583515 Women Trafficking in India A Legal Analysis#fullTextFileContent

is the result not only of a lack of understanding of the specific features of the trafficking of women, but

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## Certificate of publication for the article titled:

ACRITICAL STUDY OF FREEDOM OF PRESS UNDER ARTICLE 19 (1) (A) AND ARTICLE 32 OF THE CONSTITUTION OF INDIA

Authored by

Dr. Venudhar Routiya

Assistant Professor, School of Studies in Law, Pt. Ravishankar Shukla University, Raipur (C.G.)

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### A CASE STUDY OF MEDIA TRIAL IN INDIA: WITH SPECIAL REFERENCE TO AD- JUDICATURE OF SUPREME COURT AND HIGH COURTS

Ph.D. Scholar (Law), School of Studies in Law, Pt. Ravishankar Shukla University, Raipur Nabee Khan (C.G.)

Dr. Venudhar Routiya Assistant Professor, School of Studies in Law, Pt. Ravishankar Shukla University, Raipur (C.G.)

"The judiciary mandates social interest and non-interference in various spheres of society Media intervention is neither desirable nor tolerable".

-M. P. Lohia Vs. State of West Bengal1 -

This statement is based on the concept of media trial. In this case, the subordinate court refused the anticipatory bail of the accused. In this regard, the judges of the Supreme Court of India expressed that it is not justified to file a special petition against the decision of the subordinate court on the basis of media trial and expect justice.

#### INTRODUCTION:

The main objective of freedom of media is to inform the people about the happenings in the society through communication, so that public awareness is created among the people. However, the role of the media in reporting the criminal cases, in particular, is often criticized these days. The media sometimes goes out of its jurisdiction and starts interfering in the functioning of the court, then the question arises in the mind whether the media should stop reporting such criminal cases, which directly or indirectly interfere with the powers of the court?

The logic of this important question is that the media has begun to function as a public court. It now conducts parallel trials with the court. It fails to recognize the difference between an accused who is presumed innocent till proven guilty and a convict whose guilt is proved beyond reasonable doubt. Trial by media generally refers to a practice where the media starts its own investigation and creates a public opinion against the accused even before the trial begins. As such, it prejudices the trial thereby infringing the right of the accused to a fair trial.<sup>2</sup> Thus, an accused that should be presumed innocent until proven guilty is now presumed guilty, thereby violating his rights.

The impact and growth of electronic media in our country over the past ten years has changed the entire perception of reporting and its associated responsibilities. Where on the one hand the media has well expressed the pros and cons of social issues? There are also incidents

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<sup>&</sup>lt;sup>2</sup> Justice M. Jagannadha Rao, Chairman of Law Commission of India, 200<sup>th</sup> Report on Trial by M. J. Statistics and the Commission of India, 200<sup>th</sup> Report on Trial by Media, Free Speech and Fair Trial under Criminal Procedure Code, 1973, August [0], 52. No. 1 (2010) 2006, pp. 13.

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''दण्ड संहिता 1860 के परिवर्तनीय प्रावधानों का समीक्षात्मक मूल्यांकन'' (भारतीय न्याय संहिता 2023 (प्रस्तावित) के विशेष संदर्भ में)

(Asst. Professor - Law, Pt. Ravishankar Shukla University, Raipur) डॉ.ए.के.साहु

लीना बेडगे

(शोधार्थी)

प्रकृति परिवर्तनशील है, एवं होती रहती है, इस प्रकृति परिवर्तन से जीवो के रवभाव भी परिवर्तित होते रहते है, इन जीवों मे मानव भी है एवं मानव का स्वभाव हमेशा परिवर्तनशील रहा है, व्यक्ति के खभाव के बदलते खरूप के कारण विधियां भी परिवर्तित होती रही है। विधियों के

जन्म से आज तक प्रत्येक देश-काल में विधियों ने अपना स्वरूप बदला है। इन्ही बदलाव के कारण आज हमें राज्य सभा एवं लोक सभा में सत्ताधीन सरकार द्वारा तीन विधियों के परिर्वतन स्वरूप पेश की गई तात्तकालिन व्याख्याओं के परिणाम देखने को मिले, ये विधियां ब्रिटिश काल से प्रचलित भारतीय दण्ड संहिता, भारतीय दण्ड प्रक्रिया संहिता एवं साक्ष्य विधि है। कहा जाता है कि जीवों के भांति विधियों के भी जीवन काल होते है, विधियां भी अपनी बाल्यावरथा, युवावरथा एवं वृद्धावरथा को प्राप्त कर अपनें जीवन काल के अंत में समा जाते है, ऐसे ही 1860 से प्रचलित भारतीय दण्ड संहिता नें अपनें देश काल की वर्तमान परिस्थितियों में बदलाव के लिए अपनी वृद्धावस्था को प्राप्त कर वर्तमान समाज एवं परिस्थिति के अनुरूप अपनें नये स्वरूप को परिलक्षित होता दिख रहा है। भारतीय दण्ड संहिता का नया स्वरूप जिसे भारतीय न्याय संहिता के नाम से देश को सौपा जा रहा है, उसके प्रथम अध्याय से अंतिम अध्याय तक के विधायिका लेखन में एक गम्भीर मानवीय सोंच परिलक्षित हो रही है। विधि की शुरूआत में उन मानवीय समस्याओं को प्राथमिकता दी गई है, जिसे समाज सर्वोपरी मानता है यथा मानवीय अपराधों, महिला अपराधों-शिशु अपराधों पर विधायिका नें पहला चिन्तन कर उक्त विधि में संरक्षात्मक उपाय कर न्याय देने की जो पहल की है वह सराहनीय है।

व्यक्तियों की बदलती जरूरतों और स्वभाव के सांथ कानुन में बदलाव मानव जन्म के जैविकिय क्रमिक विकास की भांती परिस्थितियों के अनुसार समाज के एक विकसीत परिवर्तनशील कदम का सूचक होता है। इसलिए कहा भी जाता है कि "कानून लोगो के लिए और लोगो द्वारा बनाया जाता है," इसलिए तात्तकालिन परिस्थितियों के अनुसार कानून बदलती जरूरतों का अंग होना चाहिए। विधिशास्त्री मोंटेस्क्यू का यह कथन भी वर्तमान भारतीय न्याय संहिता के बदलते रूप की परिस्थितियों को इंगित करता है कि "कानूनी जलवायु, स्थानीय स्थिति, दूर्घटना या धोखे का निर्माण है।2" सेविग्नी ने भी विधियों के समाज में परिवर्तन को नितान्त आवश्यक बताते हुए कहा है कि "समय एक उत्पाद है जिसका रोगाणु राज्य के रोगाणु की तरह समाज के लिए के लिये बने मनुष्य के स्वभाव में मैजुद होता है, जो इस रोगाणुओं के विभिन्न रूपों में विकसीत होता है और यह रूप सिर्फ "लागों की चेतना है, एवं प्रत्येक देश एवं समाज में जो भी विधियां बनी या निरसित हुई, संशोधित या परिवर्तित की गई वह मात्र लागों की चेतना स्वरूप हई।3"

शोध प्रविधि –

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सारांश

# कब्जा एवं प्रतिकूल कब्जे की अवधारणा एवं भारतीय स्थिति

डॉ. आलेख कुमार साह\*

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सारांश:-

'प्रतिकूल कब्जे की याचिका कानून का शुद्ध प्रश्न नहीं है, बल्कि तथ्य और कानून का मिश्रित प्रश्न है। इसलिए, एक व्यक्ति जो प्रतिकूल कब्जे का दावा करता है, उसे दिखाना चाहिए (ए) वह किस तारीख को कब्जा में आया था, (बी) उसके कब्जे की प्रकृति क्या थी (सी) क्या कब्जे का तथ्य दूसरे पक्ष को पता था. (डी) कैसे लंबे समय तक उसका कब्जा बना रहा, और (ई) उसका कब्जा खुला और अबाधित था। प्रतिकूल कब्जे की वकालत करने वाले व्यक्ति के पक्ष में कोई इक्विटी नहीं है। चूंकि वह सच्चे मालिक के अधिकारों को हराने की कोशिश कर रहा है, इसलिए यह उसके लिए है कि वह अपने प्रतिकुल कब्जे को स्थापित करने के लिए आवश्यक सभी तथ्यों को स्पष्ट रूप से प्रस्तुत करे और स्थापित करें ।

ऐतिहासिक रूप से भूमि पर जबरन कब्जा करने या सामंती प्रमुओं, बेरन और विजेताओं द्वारा गरीबों परिचय:-से जीतने से संबंधित प्रतिकूल कब्जे की अवधारणा, जो उन भूमि पर अपने अधिकार और हक की रक्षा नहीं कर सके। प्रायः ज्यादातर पुराने समय में किया जाता था जब एक देश या शासक दूसरे देश पर विजय प्राप्त करते थे तो वे उन विजित भूमि को मूल और सच्चे मालिक से हड़प लेते थे, हालांकि यह अवधारणा समय के

भारत में प्रतिकूल कब्जे की अवधारणा कानून की एक सदी से भी अधिक पुरानी अवधारणा है जो साथ बदल गई है। मुख्य रूप से तीन मूलमूत सिद्धांतों पर आधारित है। पहले, तो, वास्तविक मालिक और भूमि की देखमाल करने वाले व्यक्ति के बीच स्वामित्व के प्रतिस्पर्धी अधिकार। भूमि की देखभाल करने वाले और भूमि का उच्चतम और सर्वोत्तम उपयोग करने वाले व्यक्ति का अधिकार भूमि के वास्तविक स्वामित्व धारक पर होगा जो भूमि की देखभाल नहीं करता है। दूसरे शब्दों में, जो व्यक्ति भूमि का रख-रखाव करता है और उसका सर्वोत्तम उपयोग करता है, उसका भूमि पर अधिकार उस व्यक्ति की तुलना में बेहतर होता है, जिसे भूमि की बिल्कुल भी चिंता होती है। दूसरे, भूमि के मालिकाना हक को लंबे समय तक स्थगित नहीं रखा जाना चाहिए अर्थात ऐसी स्थिति उत्पन्न नहीं होनी चाहिए जिसमें भूमि का मालिकाना हक न हो। तीसरे, यह माना जाता है कि वास्तविक हक धारक ने अपने स्वामित्व अधिकारों को त्याग दिया है, यह जानने के बावजूद कि कोई अन्य व्यक्ति अपनी भूमि पर शत्रुतापूर्ण कब्जे का दावा कर रहा है, लेकिन वह चुप रहने का विकल्प चुनता है

और कानून के तहत उक्त व्यक्ति के खिलाफ कोई कार्रवाई नहीं करता है। भूमि के प्रतिकूल कब्जे की अवधारणा हम्मुराबी की संहिता में वापस आती है जिसमें नियम 30 सहित 282 नियम शामिल हैं जो किसी भी तरह प्रतिकूल कब्जे के कानून से मिलते जुलते हैं जिनका हम आज तक पालन करते हैं। संहिता के नियम 30 में कहा गया है, "यदि कोई सरदार या आदमी अपने घर, बगीचे और खेत को छोड़कर उसे किराए पर लेता है, और कोई और उसके घर, बगीचे और खेत पर कब्जा कर लेता है और तीन साल तक इसका इस्तेमाल करता है: यदि पहले स्वामी लौटकर अपके घर और वाटिका और खेत पर दावा करे, वह उसे न दिया जाए, परन्तु जिस ने उस पर अधिकार कर लिया हो, और उसका उपयोग करता हो, वह उसका उपयोग करता रहे।"

<sup>&#</sup>x27; स.प्रा. विधि पं.रवि.वि.वि., रायपुर

## RELEVANCE OF PESA ACT IN THE LIFE OF TRIBAL COMMUNITY: AN ANALYTICAL STUDY (WITH SPECIAL REFERENCE TO CHHATTISGARH STATE PESA ACT 2022)

#### Dr. Alekh Kumar Sahu<sup>\*</sup>

#### Abstract:

The Panchayats (Extension to Scheduled Areas) Act, commonly known as the PESA Act, is a crucial legislation that aims to empower and protect the rights of tribal communities residing in scheduled areas in India. This study examines the relevance of the PESA Act in the life of tribal communities, with a special focus on the Chhattisgarh State PESA Act of 2022. Through an analytical approach, the study explores the impact and effectiveness of the PESA Act in promoting self-governance, protecting customary rights, and ensuring the socio-economic development of tribal communities in Chhattisgarh. The study employs a comprehensive review of existing literature, including research articles, reports, and case studies, to analyze the relevance of the PESA Act in the context of Chhattisgarh. It examines the provisions of the Chhattisgarh State PESA Act of 2022, comparing them to the national PESA Act of 1996, to identify any specific modifications or enhancements made in the state legislation. Furthermore, the study investigates the implementation of the PESA Act in Chhattisgarh, assessing the progress made in establishing and strengthening gram sabhas, the primary decision-making bodies, and examining the extent to which tribal communities have been able to exercise self-governance and participate in local development processes. this research contributes to a deeper understanding of the PESA Act in the life of tribal communities.

Keywords: self-governance, customary rights, gram sabhas, PESA.

#### Introduction:

Indigenous Peoples are inheritors and practitioners of unique cultures and ways of relating to people and the environment. They have retained social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they live. Despite their cultural differences, Indigenous Peoples from around the world share common problems related to the protection of their rights as distinct peoples.

Indigenous Peoples have sought recognition of their identities, way of life and their right to traditional lands, territories and natural resources for years, yet throughout history, their rights have always been violated. Indigenous Peoples today, are arguably among the most disadvantaged and vulnerable groups of people in the world. Tribals and forest are synonymous and one cannot be separated from the other. They have emotional, psychological, and cultural attachments with the forest and have always lived in the forest. Before the British came in the ruling princes had rights over the forest and in far- flung areas. The tribals lived on forest produce and also by cultivating parts of the forest area. Over the centuries, the tribals were driven into the hills and forests by people who came from the North an took possession of the fertile lands in the river valleys.

The Englishmen brought in the Indian Forest Act 1927, taking away the inherent rights of the tribal people. With one legislative stroke, the tribals became trespassers on their own land and became victims of externally motivated systems of forest management that directly violated various facets of their economic and cultural survival. The final act of atrocity on a largely unsuspecting population was the imposition of an alien judicial system and "law and order" machinery that subjugated them, further compounding their vulnerability and subservience. After independence these rights got transferred to state governments. In the process the inherent rights of the tribals and forest-dwellers got restricted to nistari rights – the right to free grazing and fuel wood – while rights over timber and non-timber produce remained with the state government. Over the years, the unholy nexus between the forest contractors and representatives of the government, for the incentive of getting tribal votes, encouraged large scale felling of forests. Consequently, in 1980 by enacting the Forest Conservation Act, the Government of India took away the rights of state governments to convert forest land for non-forest use. The state government now had to seek permission from the Government of India for any development work within the forest area. The new rules "Forest (Conservation) Rules 2022" state that a project, once approved by the FAC, will then be passed on to the

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## औपनिवेशिक कालीन दण्ड प्रक्रिया संहिता, 1973 के चिन्तनकारी प्रावधानों में बदलाव पर एक समीक्षात्मक अध्ययन (त्वरित न्याय प्रदान प्रणाली के विशेष संदर्भ में)

डॉ.ए.के. साहु & लीना बेडगे"

सारांश :-

अपराधिक न्याय प्रदान प्रणाली के तीन महत्वपूर्ण एवं सारगर्भित पात्र होते हैं, पहला पीड़ित अर्थात जिसे पीड़ा दी गई. दूसरा पीड़ा देने वाला अर्थात दोषी व्यक्ति एवं तीसरा पीड़ित को उपचार तथा दोषी को दण्ड देने के लिए प्राधिकृत व्यक्ति। तीनों पात्र एक विधिवत एवं युक्तियुक्ति प्रक्रिया से बाधित होते है, जो पीड़ित है उसे दिया गया उपचार या न्याय एक उचित प्रक्रिया एवं विधि सम्मत दी गई हो। इसी तरह दण्ड के भागी या दोषी पात्र को दिया गया दण्ड एक युक्तियुक्त प्रक्रिया द्वारा निर्धारीत जांच उपरांत विधि के अनुसार दी गई हो। तीसरा पीड़ित को उपचार या दोषी को दण्ड देने वाला प्राधिकृत व्यक्ति विधि द्वारा प्राधिकृत हो एवं उसका निर्देश-आदेश एक युक्तियुक्त प्रक्रिया के माध्यम से दी गई हो।

किसी अपराधी एवं अपराध को न्याय के कटघरे में लाने की प्रक्रिया में इन तीनो घटकों को हम विधिक रूप से पुलिस अभियोजन एवं न्यायपालिका से संबोधित करतें है। औपनिवेशिक काल की हमारी दण्ड प्रक्रिया एक जटिल प्रक्रिया थी एवं इसी जटिल प्रक्रिया के चलते न्यायपालिका में लम्बित मामलों की संख्या में वृद्धि होती चली गई। न्याय का समुचित समय में निराकरण न हो पाने के कारण भारतीय जेलों में 63% से अधिक विचाराधिन कैदी है। इसके अलावा भारत में पुलिस एवं न्यायपालिका की जवाबदेही निश्चित रूप से तय नहीं की गई। "ईगो", "न्याययिक हठ" नें लम्बी अवधि से पैर पसारना चालु कर दिया एवं धीरे–धीरे ये दोनों आम नागरीकों के पीड़ा का हरण करनें वाले के बजाय पीड़ा को देने का सूचक बनते चले गये। यदि वर्तमान कानूनों में संशोधन का साहस न किया गया तो न्यायवितरण प्रणाली के ये तीनों अंगों को भविष्य में जन

"न्याय" एक सभ्य समाज की पहचान होती है। न्यायोचित प्रक्रिया के बिना समाज असहिष्णुता और कठोर हो जाता है जो समाज को संघर्ष एवं अशांति की ओर ले जाता हैं। उचित प्रक्रिया के बिना न्याय परिदान प्रणाली हमेंशा चिन्तनकारी होती है। अपराध, अपराधी एवं सजा के उचित निर्धारण एवं परीक्षण न्याय व्यवस्था न्याय की चिन्तनकारी पहलू रहें है। एक आरोपी को अपने बचाव के सारे अधिकार सभ्य समाज एवं सरकार दे तो रहा है एवं उसे तब तक निर्दोष मानने को कहता है जब तक की उसका अपराध साबित न हो जाये। वकील, दलील एवं अपील, त्वरित न्याय प्राप्ति के महत्वपूर्ण स्तम्भ है एवं त्वरित न्याय प्राप्ति के चिंताजनक पहलु भी है। "त्वरित न्याय प्राप्ति" नीति, नियमों, कानूनों में तो समाप्त सा दिख रहा है लेकिन जमीनी हकीकत कुछ अलग दृश्य प्रस्तुत कर रहा है।

राम मनोहर लोहिया के राजनीतिक विचार विमर्श टिप्पणी का यह अंश है कि "भारत में पुलिस प्रणाली भी गुंड़ों का विरोध करनें की हिम्मत नहीं जुटा पाती परन्तु, बस स्टॉप के जेब कतरों को पकडनें में देर नहीं करती। इसलिए मेरी नजरों मे न्याय परिदान प्रणाली का यह हिस्सा "क़ुर कायरता" दिखती है। हमारे देश में पुलिस की प्रकृति, जांच कर्ता, न्यायधीश एवं जल्लाद तीनो की भुमिका (1960 के दशक) में दिख रही है। इसलिए प्रक्रियात्मक कानूनों में बदलाव पर चिंतन किया जाना आवश्यक है।<sup>"1"</sup>

किसी सभ्य देश को ''न्यूनतम सभ्य'' होने का प्रतीक. शासकों द्वारा समाज को दी गई उच्चतम् नैतिक मानक से है एवं नैतिक मानक का वास्तविक अर्थ ''प्यासे को उसी समय पानी की उपलब्धता'' से है और यह तभी सम्भव है जब वह देश या शासन अपनें समाज के लिए एक ''बुनियादी प्रक्रियात्मक न्याय प्रणाली'' विकसीत कर ले।

<sup>&#</sup>x27; (सहायक प्राध्यापक)

<sup>\*\* (</sup>शोघार्थी)

## EMPOWERING INDIGENOUS COMMUNITIES: A COMPREHENSIVE STUDY ON INDIAN TRIBAL RIGHTS AND PATHWAYS TO SOCIAL JUSTICE

#### Dr. Alekh Kumar Sahu

#### Abstract

This research paper aims to provide a comprehensive analysis of Indian tribal rights and explore pathways to social justice for indigenous communities in India. Indigenous communities, often referred to as tribal or Adivasi communities, have a long history of marginalization, discrimination, and dispossession of their ancestral lands and resources. This study investigates the legal frameworks, policies, and socio-cultural factors that shape the rights and status of indigenous communities in India. The research begins by examining the historical context of indigenous communities in India, shedding light on the legacy of colonialism, land encroachments, and cultural assimilation policies that have adversely impacted these communities. It delves into the constitutional provisions and international legal instruments that safeguard the rights of indigenous peoples, focusing on the specific legal protections available to Indian tribes. The research also investigates the implementation and effectiveness of these legal frameworks in ensuring the empowerment and social justice of indigenous communities. Moreover, this study explores the socioeconomic challenges faced by indigenous communities, including poverty, lack of access to education, healthcare, and basic amenities. It analyzes the socio-cultural factors contributing to the marginalization of indigenous communities, such as cultural erasure, stereotypes, and limited political representation. The research further investigates the role of grassroots movements, civil society organizations, and governmental initiatives in promoting the rights and well-being of indigenous communities. Finally, this paper identifies potential pathways to social justice and empowerment for indigenous communities in India. It examines successful models of community-led development, sustainable resource management, and inclusive governance that have led to positive outcomes for indigenous populations. It also highlights the importance of participatory approaches, community engagement, and cultural preservation in fostering social justice for indigenous communities. By providing a comprehensive understanding of Indian tribal rights and pathways to social justice, this research aims to contribute to the ongoing discourse on indigenous rights and support efforts to empower and uplift indigenous communities in India. It calls for policy reforms, awareness campaigns, and inclusive initiatives to address the systemic challenges faced by indigenous communities and promote their full and equal participation in Indian society.

Keywords: Discrimination, Social Justice, Marginalization, Indigenous.

#### Introduction:

In the diverse tapestry of Indian society, indigenous communities have long stood as custodians of rich cultural heritage, traditional wisdom, and unique ways of life. These communities, often referred to as tribes or indigenous peoples, have faced historical injustices, marginalization, and the violation of their rights. It is imperative to undertake a comprehensive study that delves into the intricate dynamics of Indian tribal rights, aiming to empower these communities and pave the way for social justice.

The research topic, "Empowering Indigenous Communities: A Comprehensive Study on Indian Tribal Rights and Pathways to Social Justice," seeks to shed light on the challenges faced by indigenous communities in India and explore effective strategies to enhance their rights and overall well-being. By analyzing historical and contemporary contexts, policy frameworks, and socio-cultural dynamics, this study aims to contribute to the ongoing discourse on tribal rights and social justice in India.

This research will address key themes, such as land rights, natural resource management, access to education and healthcare, cultural preservation, and political representation. By examining these interrelated aspects, we can better understand the complexities of indigenous communities' struggles and identify pathways for their empowerment.

#### **DEFINATION OF INDIGENOUS PEOPLE :**

The term "indigenous people" refers to distinct ethnic or cultural groups that are native to a particular region or territory and have a historical connection to the land they inhabit. Indigenous peoples are often characterized by their ancestral ties to the land, unique cultural traditions, languages, and social structures that have evolved over generations.

<sup>\*</sup> Assistant professor, school of studies in Law, Pt. Ravishankar Shukla University Raipur, Chhattisgarh

# **State Surveillance and Corporate Surveillance**

## Priya Rao

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## **ABSTRACT:**

This Research Paper focuses on and deals with the various aspects of Surveillance in India and Internationally. The paper mainly focuses on the State of Surveillance in India and the laws revolving around it as well as the evolution of the Fundamental Right to Privacy in India. The concept of surveillance is divided into two sections of State Surveillance and Corporate Surveillance. It discusses the duty and the Liability of each concerning the Right to Privacy. The Paper also compares India's Privacy and Surveillance policy with The United States of America and The United Arab Emirates. The United States of America dramatically changed its Surveillance Policy after the terrorist attack of 9/11. The United Arab Emirates envisages a more liberal and comprehensive approach towards Surveillance in their State. It gives the detailed comparison between the laws of these three nations and the vices and virtues of these laws of each nation. The advantages and the disadvantages of surveillance are analysed on various aspects and with an international perspective. This paper attempt to give a comprehensive idea of Surveillance and its impact on the people as well as in the international level due to the fast-pacing globalization.

KEYWORDS: State Surveillance, Corporate Surveillance, India, USA, UAE.

## **INTRODUCTION:**

The Surveillance Laws in India started with the enactment of The Telegraph Act, 1885 on 1<sup>st</sup> October 1885. This Law was responsible for surveillance and its regulation for more than a century. Later on, with the enactment of The Information Technology Act, 2000 on 9<sup>th</sup> June 2000; the surveillance laws in India are monitored under both of these laws. Hence, these two statutory regulations are the only ones that protect our newly recognized Fundamental Right of Privacy.

The Judicial Development of the Fundamental Right to Privacy has been complex, with broadly broad views.

The first case to discuss Privacy as a Fundamental Right was M.P. Sharma vs. Satish Chandra<sup>1</sup> in 1954, A bench of 8 Judges held that "There is no concept of Right to Privacy in our Constitution. This Right is available in the United States under the 4<sup>th</sup> Amendment of their Constitution." The second major case in 1963 was of Kharak Singh vs. State of Uttar Pradesh,<sup>2</sup> where a bench of 6 Judges clearly stated that the Right to Privacy is not a guarantee under our Constitution.

However, on the other side, Supreme Court Judgments with minor benches held the Right to Privacy as a Fundamental Right. The Gobind vs. Union of India<sup>3</sup> in 1975, a 3-judge bench held that – "India and the freedom of speech create an independent Right of Privacy as an emanation from them which one can characterize as a Fundamental Right, we do not think that the Right is absolute." In another case of R. Rajagopal vs. State of Tamil Nadu<sup>4</sup> and Peoples Union of Civil Liberties (PUCL) vs. Union of India<sup>5</sup>, a 2 Judge bench held that the Right to Privacy is enshrined in Art 21 of The Constitution of India, 1950.

Finally, due to recent conflicting judgments of the Supreme Court against its landmark judgments made the status of the Right to Privacy ambiguous in the Indian Court. Therefore, to have a clear and explicit position on this, the Supreme Court formed an 11 Judge Bench in the landmark case of Justice K.S. Puttaswamy vs. Union of India<sup>6</sup>. In this the bench unanimously held that the Right to Privacy is a Fundamental Right enshrined in our Constitution and can be traced to Article 14, Article 19 and Article 21 of The Constitution of India. The Court also stressed the need to enact a law on Data Privacy due to globalization and Technology. Therefore, this Judgement cleared the Court's position concerning Privacy. Hence, this Research Paper will also be viewed with the backdrop of the Right to Privacy and Surveillance Laws in India.

#### **DATA PRIVACY BILL:**

In July 2017, a committee was formed in response to the demand of a data protection law. This committee was held under the chairmanship of Justice B.N. Srikrishnan and hence came into being the legal framework draft of Personal Data Protection Bill, 2018. In furtherance of observation laid down in the case of Justice K.S. Puttasawmy vs. Union of India, the Personal Data Protection Bill was drafted based on the report of Justice B.N. Srikrishnan Committee, and introduced in 2019

by the Ministry of Electronics and Information Technology<sup>7</sup>. According to National Crime Record Bureau, there has been an increase of 11.8% in CyberCrime in 2020. Therefore, this Bill is a need of an hour as The Information technology Act, 2000 is the only legislated Law dealing with cyberspace data privacy and offences. The Preamble of this Bill explicitly mentions that the Right to Privacy is a Fundamental Right and that it is necessary to protect this data. Therefore, this Bill strives to protect people from illegal breach of Privacy through means of surveillance, whether done by the State or by any Corporate organization. Some of the Important aspects of this Bill are -1. Types of Data - The Bill distinguishes data into two types - Personal Data and Sensitive Personal Data. The Bill provides more stringent laws for Sensitive Data than Personal Data as it deals with intimate details of a person that would cause significant harm to him if leaked.

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## **REVIEW ARTICLE**

## **Death Penalty: Relevancy and Necessity**

## Dr. Priya Rao

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## **ABSTRACT:**

The most debatable topic nowadays is capital punishment. Where most European countries are abolishing it to align with humanistic approach but some countries still retain this punishment. In our country although there is a shift from sentence of death to lesser sentence but there is also a clear intention of maintaining capital sentence to meet the ends of justice in appropriate cases.

#### KEYWORDS: Death Penalty, Relevancy, Necessity.

#### **INTRODUCTION:**

Since long time our society has been inflicting punishment upon wrongdoer, so that the society could be protected as well as other persons must be refrain from committing the same thing in the society.

The Death Penalty is a form of punishment whereby a state punishes a person who has been convicted of crime to death by execution. The Death Penalty has been widely abolished in most of the countries but also it has not been abolished or reinstated in some countries. In this article I want to discuss the necessity and relevancy of Death Penalty in India and whether or not it is still a relevant punishment in modern society.

#### **Meaning of Capital Punishment:**

The term 'Death Penalty' or 'Capital Punishment' stands for highest level of punishment, which is given in severe, grievous or heinous types of crime. May be the definition and extent varies from different scholars, countries, age group, but generally in jurisprudence, criminology, penology and common usage and sense capital punishment means sentence of death.

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## **HISTORICAL BACKGROUND:**

There is no country where Capital Punishment has never existed. It is an ancient form of sanction. The first glimpse of Capital Punishment we find in Hammurabi Code of Law 18<sup>th</sup> century BC in which there were 25 offences punishable with capital punishment. After that Hitti Penal Code (10<sup>th</sup> century BC) and Derconian Penal Code of Athens (7<sup>th</sup> century BC) in which all offences were punishable with death penalty. Capital punishment for murder, treason, arson and rape was widely employed in ancient Greece under the law of Draco (7<sup>th</sup> century BCE) though Plato agreed that it should be used only for the incorrigible.

The Roman also used it for a wide range of offence, though citizens were exempted for a short period of time during the republic.<sup>1</sup>

Also it supported by Sir Henry Maine who stated that "Roman republic did not abolish death sentence though its non-use was primarily directed by punishment or exile and the procedure of questions.<sup>2</sup>

## JURIST APPROACH AND THEORIS OF PUNISHMENT:

The Criminal Justice system is based on various theories of punishment. Sir Walter Moberly praises the definition given by Grotious that when a wrongdoer does a

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## SHODH SAMAGAM

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## Right to Life in Indian Constitution With Special Focus on Right to Food

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## ORIGINAL ARTICLE



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## ABSTRACT

This article focuses on the various aspects of Indian constitution related to the right to food. Special focus has been laid down on the Food Safety and Security Act, 2006. The paper addresses the important judgments laid down in the field of right to food. India is signatory to many international treaties involving right to food. Indian Constitution also indirectly refers to right to food. Therefore, there is an obligation for the Indian Government (Centre and states) to fulfill the right to food of the people.

## **KEY WORDS**

**Right to Life, Right to Food, Constitution, Hunger, Food Safety, Initiatives.** 

## **INTRODUCTION**

The right to life and individual liberty are the primary early privileges for the development of human character. It is an ethical right that every person wherever should consistently possess. Right to life and individual liberty is the modern term for what has traditionally been regarded as "natural right." It is also regarded as one of the most important inherent and inalienable fundamental rights, which enables a person to live his life as he pleases. Article 3 of the Universal Declaration of Human Rights recognizes the right to life and individual liberty, stating, "Everyone has the right to life, freedom, and individual security." Article 9 of a comparable document states, "No one will be subject to inconsistent capture, detention, or deportation." It proves that the international community is comparable to the protection of human life and liberty. In Part III of the Constitution, under the heading Fundamental Right, the framers of our Constitution incorporated Article 21 which states, "No person shall

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## Evolution & Development of Domestic Violence law in India

## Dr. Priya Rao

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## Aranya Rao Indiker

Research Scholar, School of Studies in Law, Pt. Ravishankar Shukla University, Raipur

## Abstract

The Protection of Women from Domestic Violence Act, 2005 is key piece of legislation in the group of women protection and empowerment legislations. Addressing the lack of specific legislation concerning the subject, it is the only legislation to address what many refer as a silent crime committed inside the four corners and away from the eyes of the public. The Act was a result of focussed efforts of the women rights groups pushing for a legislation like this, and in its working of close to two decades, it has seen a rapidly progressive society which has time and time again tried to combine ancient stereotypical behaviours towards women with modern methods and ways to evade the arms of law. Along the way it has been bolstered by our judiciary to stay updated and match pace with society and the victims, and their needs and development.

## Introduction

Domestic violence, which many more developed jurisdictions across the world have now started to call as intimate partner violence in many developed jurisdictions across the world, is a global phenomenon arising out of the patriarchal & conservative norms of the olden times and has been a key player in the systemic oppression of the women.

The Protection of Women from Domestic Violence Act, 2005 (hereinafter referred to as the Act) was the statutory response of the Indian State to this growing hindrance in the attainment of our Constitutional Goal of Equality between Genders. This appreciable piece of legislation tried to be the comprehensive one stop solution to the multi-faceted evil of Domestic Violence, and rather than stopping at the old notions only concerned with physical wellbeing, it recognized that in the rapidly developing world there are more ways of hurting someone than harming one's physical body.

The long title of the act states that it is: "An Act to provide for more effective protection of the rights of women guaranteed under the Constitution who are victims of violence of any kind occurring within the family and for matters connected therewith or incidental thereto." Ongoing through the provisions of the Act, it becomes apparent that this Act was created to provide civil remedies with the aim of providing protection to the victim and her rights and to provide support necessary for her to stabilize, rather than to hit back on the offender with criminal punishments.

## Genesis of the Domestic Violence law

## The Indian Scenario

Among various types' offences against women, the gravity of "Domestic Violence" is amongst the most extreme. The reason being that it happens exclusive



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## **Combating Human Trafficking in India: An Analysis**

Dr. Priya Rao\* & Yadunandan Chandra\*\*

## ABSTRACT

The paper focuses on the issue of human trafficking which is modern day slavery and one of the most heinous crimes against humanity spread across the globe. The paper briefly tells what constitutes the offence of trafficking, what are the causes and effects of trafficking on the society. The paper argues that cooperation between different agents of the society and between nations an international organisation can only suppress this crime. Accordingly, it provides some preventive measures to address and deal with the problem.

The concept of human trafficking can only be understood by having a brief idea and background about the concept of slavery. The word 'slavery' came up from the term slave which was an English version of the word used for people from central and eastern part of Europe who were called Slavic people. Although some form of slavery existed in all parts of the world and across all cultures. Slaves were humans who were unconditionally under subjugation, obedience and control of some other person who was commonly known as their slave master. Slaves were most commonly used to do labour work but could also be used for other purposes. Slaves had neither any rights of their own nor any control over their own body. They were servitudes and used like property by their masters.

Keywords: Trafficking, human trafficking, prevention, causes and effects

## 1. INTRODUCTION

"Justice will not be served until those that are unaffected are as outraged as those who are." – Benjamin Franklin

The concept of human trafficking can only be understood by having a brief idea and background about the concept of slavery. The word 'slavery' came up from the term slave which was an English version of the word used for people from central and eastern part of Europe who were called Slavic people. Although some form of slavery existed in all parts of the world and across all cultures. Slaves were humans

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# Importance of Webinars in the Skill Development of LIS Professionals of India: A Study

Suryakant Dewangan<sup>1\*</sup> and Maya Verma<sup>2\*\*</sup>

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## ABSTRACT

Currently, information technology is being used extensively all over the country, which has led to a significant change in the way people learn and teach. Webinars are also a part of this transformation of IT and their popularity is increasing day by day. Webinars provide new opportunities for people to build their skills. The whole study is based on library science professionals from all over India. The data have been collected by the survey method using Google Forms in the online medium and sent to 500 LIS professionals through E-mail. Out of which, we have received responses from 389 (77.8%). The data were analysed in Excel using simple percentages. The findings revealed that Library Professionals have high-level awareness of Webinars and they are using open source tools such as Google Meet, YouTube, WebEx and Zoom ext. There is some different perception of library professionals for attending webinars, in which many participants get e-certificates and get some fresh ideas and knowledge. Webinars have many technical issues, with Internet connectivity being the most common. The overall importance of the webinar respondents rated it as very useful. This study is significant because, during the Corona crisis, webinar events are increasing continuously and our dependence on them is increasing.

Keywords: Webinar, Library professionals, Information technology, Skill development, Web applications, Internet

## INTRODUCTION

The continuous development in information technology has taken the form of the information revolution. The inclusion of the information revolution in our daily life has started yielding maximum results in minimum time. Whether it is education or industry, agriculture or health, the importance of information technology has increased rapidly. Easy access to mobile phones and the Internet has played an essential role. This revolutionary influence of information technology has also influenced our life culture. A class affected by the information revolution is becoming technically rich; on the other hand, the untouchable class is slowly developing based on traditional knowledge due to all kinds of work conducted through the Internet. Our society has adopted this technology with chaos and the Internet has become an essential part of our lives.

The education sector is benefiting the most from the use of the Internet. Nowadays, the Internet has made the content and curriculum for learners worldwide relatively easy and convenient. Through a computer and Internet connection, we can attend classes anywhere or participate in discussions, seminars and webinars. The webinar is an online presentation that conducts Humanities and Social Science Studies, Vol. 12, Issue 1, No. 1, January - June : 2023

## AN ASSESSMENT OF WEB INFORMATION SEEKING BEHAVIOR AND DIGITAL LITERACY SKILLS AMONG PRINT AND ELECTRONIC MEDIA JOURNALIST OF RAIPUR, CHHATTISGARH

## Suryakant Dewangan<sup>1</sup>\* Dr. Maya Verma<sup>2</sup>

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- Professor, School of Studies in Library and Information Science, Pandit Ravishankar Shukla University, Raipur, Chhattisgarh \*Corresponding Author

## Abstract:

Digital information has become one of the most important resources for social development in the present era, benefiting all sections of society, especially students, researchers, teachers as well as journalists in their field of work. New journalists rely heavily on the Internet for their professional and personal activities. However, there is a lot of information on the Internet that is not suitable for learning use. The ability to efficiently search and retrieve information online is therefore crucial for journalists. This study aims to assess the web information search behavior and digital information literacy skills of Raipur city journalists. In this study, a structured 200 questionnaires were randomly distributed to journalists, and 153 (76.5%) questionnaires were submitted. The questionnaire analysis revealed that 41.18% of journalists needed web information for news writing. 36.60% of journalists have difficulty accessing the Internet. Most respondents were familiar with computer knowledge and its functioning. Some respondents have good Internet literacy skills, while others have average or low Internet literacy skills.

**Keywords:** Web, Information Seeking, Information Behavior, Journalists, Digital Literacy, Information Literacy

## Introduction:

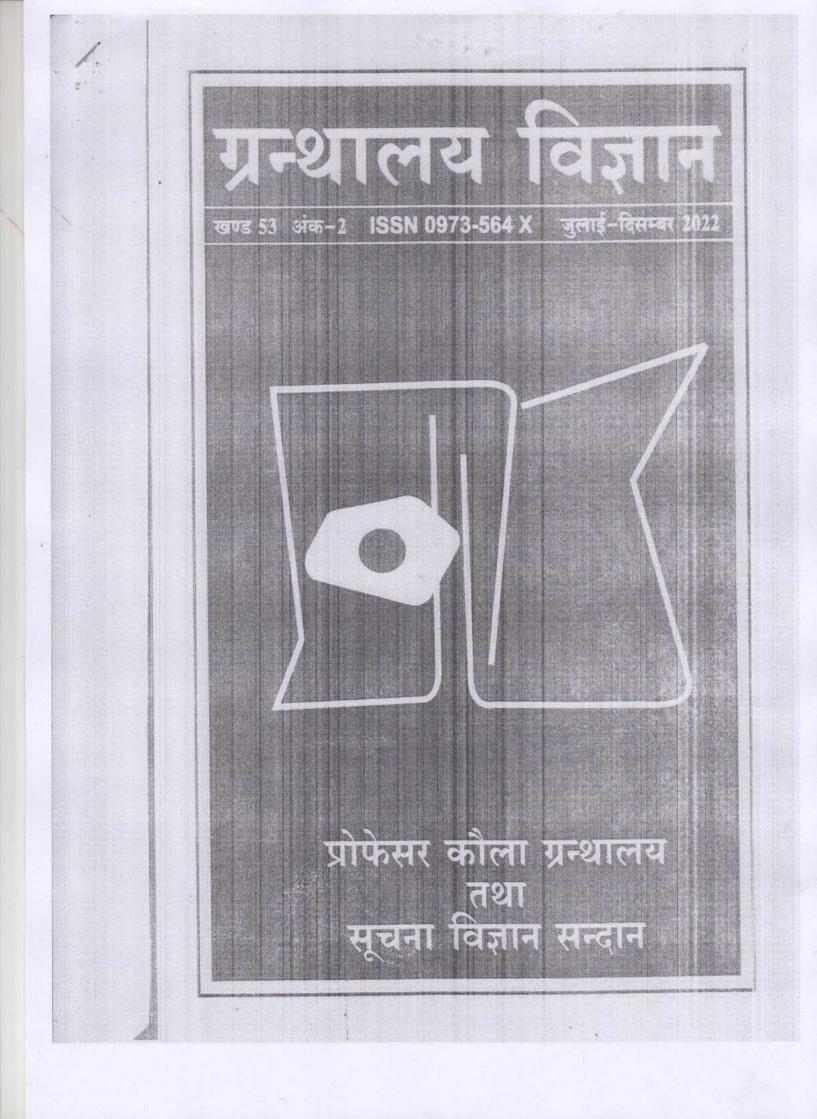
In the 21st century, due to the continuous changes in the field of information-receiving, media institutions have wholly changed their journalism work by adopting web-internet-related technologies. The new generation of journalists has become heavily dependent on the Internet for their professional, academic, and personal activities. Journalists quickly access various types of information through the Internet, some of which are suitable for them, some of which are not. Journalists also need competencies related to digital literacy to access information through the web that helps them efficiently search and retrieve information online.

According to the American Library Association's (ALA) Presidential Committee on Information Literacy, Final Report, "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use the needed information effectively."

Media professionals are defined as specialized candidates or information seekers. They are information consumers and communicators who use their energy to provide information to the public. This study aims to determine how much digital literacy journalists have and how much access they have to webbased information for their work.

## **Raipur's Journalism: An Overview**

Chhattisgarh's Raipur city has a long history of journalism, where many newspapers and magazines were published before independence. Currently, more than 20 electronic news channels and 100 Newspapers are broadcast and published here. Among them are the Dainik Bhaskar, NaiDuniya, Patrika, Navbharat, Haribhoomi, Chhattisgarh, Navpradesh, Mahakaushal, and Hitwada, Chronicle, and other electronic media, such as IBC 24, INH News, Doordarshan Raipur, Media 24, News-18,



(विश्वविद्यालय अनुदान आयोग द्वारा वर्ष 2017–2018 एवं 2018–2019 हेनु अनुमोदित ग्रन्थालय एवं सूचना विज्ञान विषय की हिन्दी की एकरान्न पत्रिका)

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# ग्रन्थालय विज्ञान

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खण्ड 53 अंक 2 जुलाई-दिसम्बर, 2022

मुख्य सम्पादकः डॉ. एस.पी. सूद सह सम्पादकः डॉ. नीरजा वर्मा उप सम्पादकः डॉ. अरविन्द कुमार शर्मा डॉ. अनिल कुमार धीमन् सहायक सम्पादकः डॉ. गौतम सोनी उमेश शर्मा

प्रोफसर कौला ग्रन्थालय तथा सूचना विज्ञान संदान

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## मेण्डले : संदर्भ प्रबंधन का प्रमुख साधन

## (Mendeley : An Important Tool for Reference Management)

मोनिका त्रिपाठी शर्मा" डॉ. संतू राम कश्यप\*\*

[मेण्डले संदर्भ प्रबंधन सॉफ्टवेयर की चर्चा करता है। मेण्डले शोधपत्र या शोधप्रबंध लेखन के समय संदर्भों के प्रबंधन का प्रमुख साधन है।]

1. परिचय (Introduction)

आज के तकनीकी युग में वेब 2.0 का उद्भव सूचना एवं संचार के क्षेत्र में एक नई क्रांति लाने वाला साबित हुआ है। विभिन्न क्षेत्रों में वेब 2.0 के उद्भव से नई तकनीकें विकस्ति हुई हैं। वेब 2.0 भौक्षणिक शोधार्थियों को उनके शोध में सहयोग करने, वांछित शोध सामग्री खोजने, समान विषय पर कार्यरत अन्य शोधार्थियों से सहयोग प्राप्त करने, अपने शोध को प्रसारित करने और यह जानने के लिए कि किसी विशिष्ट विषय क्षेत्र पर किस शोध का व्यापक प्रभाव पड़ा है, समझने में सहायक सिद्ध हुआ है।

विश्वविद्यालय एवं महाविद्यालय उच्चस्तरीय शैक्षणिक संस्थान होते हैं. जहाँ पर अध्ययन--अध्यापन के अतिरिक्त शोध कार्य भी सम्पन्न किए जाते हैं। शोध कार्य के अंतर्गत एक शोधकर्ता द्वारा किसी विशिष्ट विषय शीषर्क पर शोध कार्य किया जाता है। जिसे शोध प्रबंध (Thesis) अथवा शोध पत्र के रूप में प्रस्तुत किया जाता है। शोध प्रबंध अनेक अध्यायों में विभक्त रहता है, जिनमें से कुछ भाग उद्धरण (Cite), संदर्भसूची (Reference) एवं ग्रंथसूची (Bibliography) के होते हैं।

किसी भी शोधार्थी को अपने शोधपत्र या शोधप्रबंध लेखन के समय मुख्य समस्या उद्धरणों (Citations) एवं संदर्भों (References) के व्यवस्थित प्रबंधन सम्बंधी होती है। शोधार्थी को शोध लेखन के समय उद्धरण (Citation) देना और ग्रंथसूची (Bibliography) बनाना एक अनसाध्य कार्य

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A Bibliometric Study on Professional Journal of Library and Information Technology During 2016 - 2020

## Dr. Santu Ram Kashyap

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## Received on 02.02 .2022, Received on 28.02.2022

#### ABSTRACT

The study aimed to determine article distribution by year, author productivity, author collaboration level, page length, and cited / referred documents. Study results show that out of 150 articles, 38 (25.34%) were published in 2016 while 17 (11.33%) were published in 2020. From 255 contributors, 60 (23.52%) articles were written by a single author, 152 (59.60%) articles by two authors, 39 (15.29%) by three authors, and only 04 (1.56%) by four authors. Out of 150 articles, 10 articles (6.66%) were contributed by Sanjay Kumar Sharma. During the study period 2016 - 2020, there was 0.764 degree of author collaboration.

*Keywords*: Bibliometric Study, Authorship Pattern, Citation, Degree of Collaboration, Productive Authors and Productive Institutions.

## Introduction

The Professional Journal of Library and Information Technology is a well known and **reputed UGC – Approved journal No. 47973 (Old list)** in the field of library and information science. It is a Bi-Annual Peer Reviewed and Referred journal. It published from Shree Kala Prakashan Delhi, email: shreekalaprakashan@gmail.com with twice a year in the month of January and July. The editor in chief and managing editor of this journals are Dr. Anil Kumar Dhiman and Dr. Sanjay Kumar Sharma. The aim of this journal is to encourage research work in the field of management, library science and Information technology. Alan Pritchard, a British librarian, coined the term Bibliometrics in 1996. It is among the most popular studies in the field of library & information science. An analysis of bibliometrics is the statistical analysis of publications in a specific journal RNI REGN. No. : UPENG/2010/37607

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Information Needs and seeking behaviour among the Social science faculty of Pt. Ravishankar Shukla University, Raipur and Atal Bihari Bajpai University Bilaspur: A Comparative Study

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## ABSTRACTS

This paper highlights the comparison of information needs and seeking behavior among the faculty of social science of Pt. Ravishankar Shukla University, Raipur and Atal Bihari Bajpai University Bilaspur. The study was based on the survey method and for the collection of related data, well structured questionnaire was used as a tool. There were 410 questionnaires distributed among the respondents of which 308 (75.12%) questionnaires were received back. The study revealed that 87.5% of the faculty of Pt. Ravishankar Shukla University, Raipur and 88.83% of Atal Bihari Vajpayee University, Bilaspur find information for teaching. It is clear that the printed and electronic information sources consulted by Pt.Ravishankar Shukla University, Raipur and Atal Bihari Vajpayee University, Bilaspur are quite different concerning all the resources. There are 90% of the faculties of Pt. Ravishankar Shukla University, Raipur uses reference books and 84.57% faculty of Atal Bihari Vajpayee University, Bilaspur use textbooks to seek information. The faculty of both universities gave 1st rank to the internet as an information source. It was also found that faculty preferred keyword search techniques to find web-based information. In the context of the problems encountered in seeking information, it was found that the faculties of Pt. Ravishankar Shukla University (61.33) and Atal Bihari Vajpayee University (62.02) have to face the main problem of inadequacy of library resources while searching for the necessary information.

*Keywords*: Information Needs, Seeking Behavior, Social Science, Faculty Member, Pt. Ravishankar Shukla University, Atal Bihari Vajpayee University, Social Sciences.



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## E-resources: To the Perspective of Library

## Neelam Markande<sup>1</sup>, Santu Ram Kashyap<sup>2</sup>

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**Abstract:** This paper aim to determine the needs, types, advantages, disadvantages and effect of eresources to the libraries'-resources has led to tremendous change in the way libraries function and offer services to their users. This paper will provide the information about how e-resources promote the use of library and solve many problems faced by researcher and other library users. The basic objective of this paper is to inform all aspects of E-resources.

**Keywords:** e- resources, Print resources, Types & Characteristics of e- resources, Need of eresources. Advantages and Disadvantages of e – resources. Publishers and websites. e – Resources and library.

#### Introduction

The advent of technology has led to prodigious use of e-resources. Which has rapidly change the pattern of library housekeeping operations and also changed the way of information dissemination. Increasing technology has almost ended the trend of print resources and started the trend of digital resources / e-resources.

E-resources not only help in overcompensate the geographical limitation but also eliminates the time boundation which has a profound effect on academic life. E-resources consist of databases, articles, thesis, dissertation, e-books, e-journals, e-newspaper, CD-ROMs which is best alternative of print media.

The main aim of using electronic resources is to promote the library use and solve the problems faced by library user such as Students, teachers and research scholars.

#### What is E- Resources?

An e-resource is information resource that requires electronic media to access its content. e - resources refer to all the products that a library provides through a network whether it is provided online or offline. Example CD ROM, e-books, e-newspaper, bibliographic data-bases and digital collection of data etc.

## **Objectives**

The objectives of this study are as follows.

- 1. To know the needs of E- Resources.
- 2. To study Types and Characteristics of E- Resources.
- 3. To know advantages and disadvantages of E- Resources.
- 4. To know the publishers and its website of E- Resources.
- 5. To know the similarities and difference between Print and E- Resources.
- 6. To study about E- Resource and library.

## Impact of Information Technology in Multidisciplinary Researches

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Role of Information and Communication Technology (ICT) in Multidisciplinary Research

> \*विनोद कुमार खुंटे \*\*डॉ. संतू राम कश्यप

## सारांश (Abstract)

सूचना एवं संचार प्रौद्योगिकी एक व्यापक और विस्तृत शब्द है, जिसे आधुनिक तकनीकी के बुनियादी ढाँचे के संदर्भ में अधिकाधिक परस्पर उपयोग कर रहे हैं। अनुसंधान के क्षेत्र में सूचना एवं संचार प्रौद्योगिकी का उपयोग सभी प्रकार के शोध में चाहे वह मात्रात्मक शोध हो या गुणात्मक शोध हो, के लगभग प्रत्येक चरण में किया जाता है जिसमे आकड़ों को एकत्रित करना, आकडों का विश्लेषण करना, प्रस्तुतीकरण एवं परिणाम प्राप्त करने की प्रक्रिया को आसान बनाने और संसाधन विकास को बढ़ाने की क्षमता वृद्धि के लिए उपयोग किया जाता है। सूचना एवं संचार प्रौद्योगिकी ने अनुसंधान में सुधार किया है जिसकी मदद से शोधकार्य में आकडों का संकलन, आकडों का विश्लेषण एवं संदर्भों को अनुक्रमित करने जैसे सबसे महत्त्वपूर्ण और जटिल कार्य को भी कुशलता एवं सफलतापूर्वक कर रहे है जिसकी वजह से शोध की गुणवत्ता बढोत्तरी हो रही है।

## शब्द संकेत (Keyword)

सूचना एवं संचार प्रौद्योगिकी अनुसंधान, कम्प्यूटर, इंटरनेट, नेटवर्किंग, गुगल फार्म, टेलीफोन, मल्टीमिडिया

## प्रस्तावना (Introduction)

सूचना एवं संचार प्रौद्योगिकी एक बहुआयामी शब्द है जो फ्रेंच भाषा के informatique शब्द और रशियन भाषा के informative से बना है। यह एक ऐसा उपकरण है जिसके माध्यम से कम से कम समय में सूचनाओं को संग्रहित (Store), रिकार्डिंग, स्थानान्तरण (Transfer) तथा प्रसारण किया जाता है। जिसमें कम्प्यूटर, इंटरनेट (वेबसाइट, ब्लाग एवं ई मेल, लाइव प्रसारण तकनीक रेडियो, टेलीविजन एवं वेब कास्टिंग) रिकार्डेड प्रसारण तकनीक और टेलीफोन

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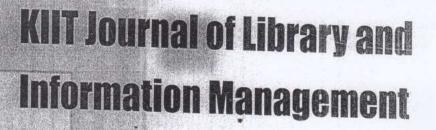
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# KIIT - Journal of Library and Information Management

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# Research Trend in Library and Information Science from 1991-2020: A Case Study of Chhattisgarh State

## Santu Ram Kashyap<sup>1\*\*</sup>

Sunil Kumar Satpathy2\*

Submitted: 10-12-2022; Revised: 23-02-2023; Accepted: 02-03-2023

## ABSTRACT

The paper attempts to make an extensive study of research trends in prominent universities of Chhattisgarh during the last three decades with an intense focus on doctoral researches, PhD supervisors, topic wise distribution of theses submitted to universities of Chhattisgarh. The study reveals that research on recent trends of modern libraries, use of various ICT tools and techniques in libraries, e-resources, digital library among other have not so far been focus areas of research. The reasons may be the course curriculum of these universities which are primarily based on traditional courses on Library and Information science rather than recent trends, poor faculty strength, and poor ICT infrastructure. It also indicates towards poor library system and services of the state during the period that needs to be taken care of. Moreover, the study reveals that the research work of G.G. University, Bilaspur is little more than Pt. R.S. University, Raipur and numbers of supervisors are almost same in both universities.

Key words: Library and information science, Research trends, Pt. Ravishankar Shukla University, Guru Ghasidas University

## INTRODUCTION

Research is a process to invent new knowledge, means a process which leads toward unknown from known. Research is a continuous process which is result of human, curiosity. Human knowledge is ever increasing and there is constant growth of advancements and human knowledge in every field of knowledge and Library and Information Science field is not an exception a new discovery, research again starts to discover new knowledge. Library and information centers have undergone many changes over the years in terms of collections and organization of library resources, introduction of new Information Communication Technology, software, services etc. to provide satisfactory services to library users. Libraries and Information centers have transformed from traditional libraries to modem/ digital libraries. Accordingly, the Library and Information Science subject has also changed drastically in terms of study and research. To cope up with the changing demands of users, technology and social changes, researcher of LIS have carried out researches in various aspects of LIS and the research outputs are reflected in the

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# Research Productivity in Ph. D. Thesis in Agronomy of Indira Gandhi Krishi Vishwavidyalaya, Raipur During 2001-2021: A Study

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## \*Corresponding Author: hari197479@yahoo.in

ABSTRACT: In the present research paper, the research productivity of the subject of Agronomy at Indira Gandhi Agricultural University, Raipur has been studied from 2001-2021. For the study, the data on the subject of Agronomy at Indira Gandhi Agricultural University, Raipur has been collected from Krishikosh of Indian Council of Agricultural Research. Research productivity, authorship productivity, crop distribution, etc. have been described in the study. A total of 54 research works were completed in the subject of Agronomy from 2001-2021, out of which 45 male researchers and 09 female researchers were involved. Highest number of research work was done in year 2016 09, second place in 2017 and 2019, Dr. Narendra Pandey, Dr. G.K. Shrivastava , Dr. M.C. Bhrambri has the maximum number of 06 research scholars and Dr. Rajendra Singh Lakpale, Dr. B.L. Chandrakar , 04 researchers has been directed by Dr. G.S. Tomar and Dr. S.S. Kolhe. Research has been done on the maximum crop paddy and the second number, research has been done on maize.

Keywords - Agriculture, Rice, Agronomy, Research Productivity, Research Output.

## Introduction:

The Indira Gandhi Agricultural University, the only agricultural university of Chhattisgarh in central India, is located in Raipur. Before 1987, this university was under the Jawaharlal Nehru Agricultural University, Jabalpur, Madhya Pradesh. Indira Gandhi Agricultural University, Raipur was established in the year 1987, and the Department of Agronomy was established in the year 1994. Since then date, research is being done on this subject.(Indira Gandhi Krishi Vishwavidyalaya, Raipur)

Agronomists generally work with crops that are grown on a large scale (e.g., small grains) and that require relatively little management. Agronomic experiments focus on a variety of factors relating to crop plants, including yield, diseases, cultivation, pest and weed management, and sensitivity to factors such as climate and soil. Agronomists may specialize in plant breeding and biotechnology to improve crops. Many agronomists also utilize ecological principles to conserve and protect agriculture, of negative effects the environment from the agroecology.(Encyclopedia)

Agriculture provides us food, feed, fiber, fuel, furniture, raw materials, feedback materials for and from factories, funds, flood control, a free, fair, and new environment, abundant food driving out famine friendship eliminating fights. In the present study, the research productivity of the subject of agronomy at Indira Gandhi Agricultural University, Raipur is to be studied. The study aims to find out the trends of research in comparison to other subjects of the university. The author aims to study the research areas taking place in production agronomy.

## **Review of Literature**

Nimat, Ravindra B. (2015) the study is to analyze the authorship pattern of Citations in Agronomy Ph.D Thesis at Agricultural University of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. To accomplish the present study was conducted on 85 samples from Dr. Panjabrao Deshmukh Krishi

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## Use of Social Networking Sites among Students of Library and Information Science, Pt. Ravishankar Shukla University, Raipur

Harish Kumar Sahu\*

School of Studies in Library & Information Science, Pt. RavishankarShukla University, Raipur (Chhattisgarh) India.

#### hari197479@yahoo.in

\*Corresponding Author: hari197479@yahoo.in

Abstract: This study examines the social networking sites among college students in India have significantly increased. The purpose of the study is to investigate the use of social networking sites among students of Library and Information Science, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh. Structured questionnaires were used to collect the data from a representative sample of **61** (B. Lib. & I. Sc. **33**, M. Lib. & I. Sc. **18** and **10** research scholars) students who were selected. The collected data were analyzed using different statistical methods. The result indicates that all Library and Information Science students are aware of social networking sites. They are using at least one form of social networking website to interact with family members and friends and also connect to their classmates for online study. Facebook and Whatsapp are the commonly used social networking sites among the Library and Information Science students and they use them for friendly communication. There are benefits of using social networking sites as well as dangers associated with social networking sites which are discussed in this paper.

Keywords- Socialnetworking sites, Social media, Social networking, University, Library and Information Science.

#### Introduction

In this present era, Social Media enables users to generate interpersonal connections based on common grounds. Social networking sites (SNS), such as Facebook, YouTube, Whats-app, Friendster, LinkedIn, MySpace Orkut, Flixter, Twitter, My Life, and Wikipedia set up personal communities, allow users to make comments on the profiles of their friends and send private messages. So SNS are being currently used regularly by millions of people. Because of this, the impact of SNS has increased. It is a modern communication channel through which people connect to share with one another their experiences, ideas, messages, pictures, and information of interest. In the modern age, social networking sites are boon for internet users.

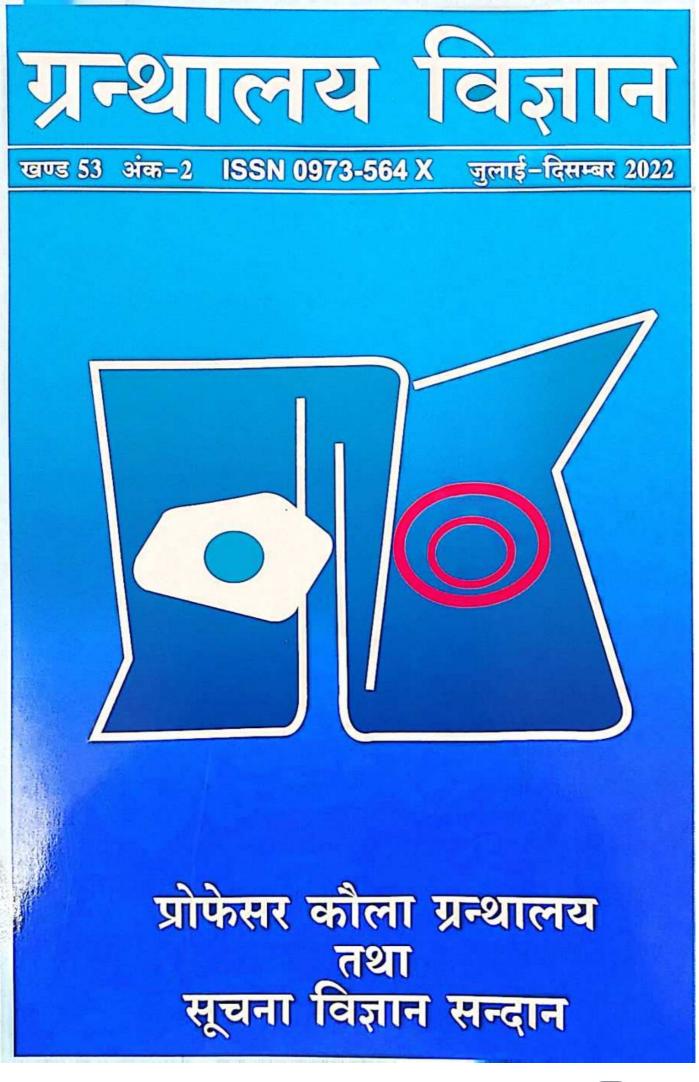
#### **Objectives of the Study**

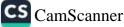
- To identify the benefits and purpose of using social media in students of Library and Information Science, Pt. Ravishankar Shukla University.
- To know the various categories of social networking sites using social media.

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DOI: 10.52228/JRUA.2022-28-2-2







पादप प्रजनन एवं आनुवंशिकी विषय के सन् 1999 से 2021 तक कृषि वैज्ञानिकों की शोध उत्पादकता का अध्ययन : इंदिरा गॉधी कृषि विश्वविद्यालय, रायपुर के विशेष संदर्भ में (Study of Research Productivity of Agricultural Scientists from the year 1999 to 2021 on the subject of Plant Breeding and Genetics : With special reference to Indira Gandhi Krishi Vishwavidyalaya, Raipur)

श्रवण यादव

डॉ. हरीश कुमार साहू\*\*

[कृषि शिक्षा के क्षेत्र में कृषि संकाय के विशय पादप प्रजनन एवं आनुवंशिकी (Plant Breeding & Genetics) का महत्वपूर्ण स्थान है। इंदिरा गॉधी कृषि विश्वविद्यालय, रायपुर (छ.ग.) में पादप प्रजनन एवं आनुवंशिकी (Plant Breeding & Genetics) विशय में 1999 से 2021 तक कुल 49 शोध कार्य हुए हैं। पादप प्रजनन एवं आनुवंशिकी विभाग के शोध उत्पादकता, शोध प्रवृत्ति तथा शोध के विषय क्षेत्र का अध्ययन कर निष्कर्ष प्रस्तुत करता है।]

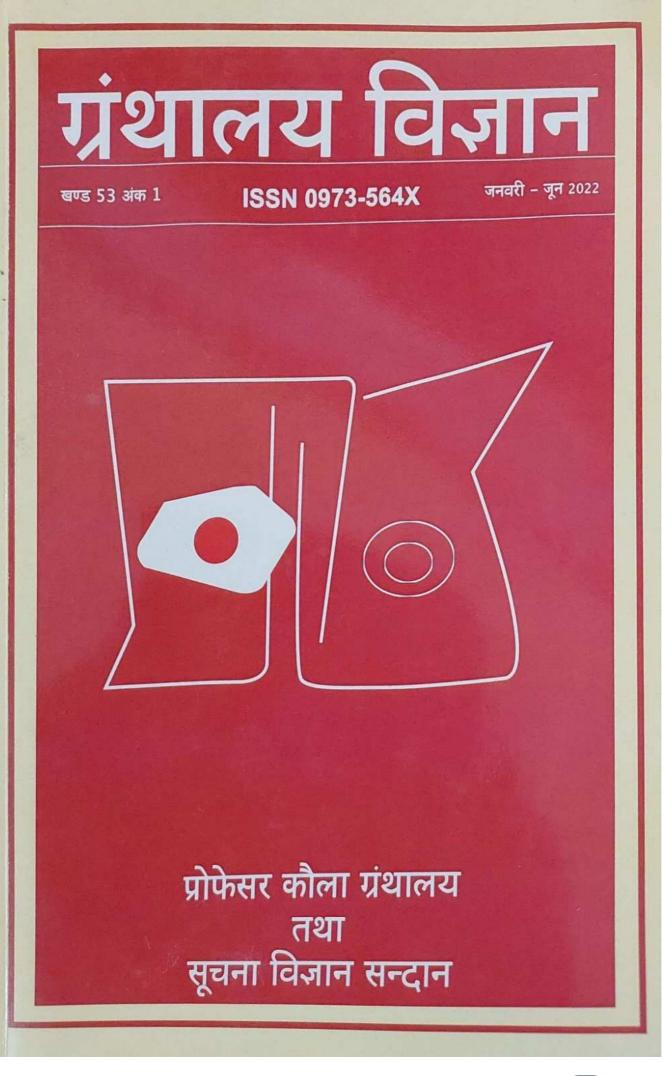
## 1. परिचय (Introduction)

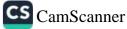
पादप प्रजनन में फसलों की ऐसी नई तथा उन्नत गुणवत्ता वाली किस्मों को विकसित किया जाता है, जिनमें वर्तमान तथा प्राचीन किस्मों से अच्छे गुण विद्यमान हो। यह तभी संभव है जब वर्तमान किस्मों में आनुवंशिक बदलाव (Hereditary change) लाया जाए। यह बदलाव पादप प्रजनन की विधियों के प्रयोग द्वारा लाया जा सकता है। पादप प्रजनन में शुद्ध वंशक्रम (Pure lines) का संकरण (Crossing) सम्मिलित है। इस संकरण के बाद कृत्रिमचयन कर अधिक उत्पादन देने वाली रोग प्रतिरोधी, पोषण किस्मों को अलग कर लिया जाता है। संकरण द्वारा दो जनेटिकली अलग जनकों के बीच क्रॉस कराकर नई किस्में विकसित की जाती है। पादप प्रजनन में आनुवंशिकी (Genetics), आण्विक विज्ञान (Molecular biology) तथा उत्तक संवर्धन (Tissue culture) विधियों का निममित प्रयोग करके साथ–साथ आनुवंशिकी अभियांत्रिकी (Genetic Engineering) का प्रयोग भी वर्तमान समय में किया जा रहा है।

 शोधार्थी, ग्रंथालय एवं सूचना विज्ञान अध्ययन शाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.) ई–मेल : <u>shrawanyadav12@gmail.com</u>

\* वरिष्ठ सहायक प्राध्यापक, ग्रंथालय एवं सूचना विज्ञान अध्ययन शाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.) ई–मेल : <u>hari197479@yahoo.in</u> 606







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# वर्ल्ड डिजिटल लाइब्रेरीज : एन इन्टरनेशनल जर्नल पत्रिका, 2008 – 2019 का ग्रंथमिति अध्ययन (Bibliometric Study of World Digital Libraries: An International Journal from 2008- 2019)

#### डाँ. हरीश कुमार साहू\*

[वर्ल्ड डिजिटल लाइब्रेरीज : एन इन्टरनेशनल जर्नल पत्रिका के खण्ड संख्या 1 (2008) से लेकर 12 (2019) तक में प्रकाशित लेखों का ग्रंथमिति अध्ययन प्रस्तुत करता है।]

#### 1. परिचय (Introduction)

ग्रंथालय एवं सूचना विज्ञान के क्षेत्र में "वर्ल्ड डिजिटल लाइब्रेरीज : एन इन्टरनेशनल जर्नल" एक बहुत ही महत्वपूर्ण पत्रिका है। इस पत्रिका का प्रकाशन टेरी (द एनर्जी एण्ड रिर्सोसेस इंस्टीट्यूट) द्वारा अर्ध —वार्षिक रूप से किया जा रहा है । इस आलेख में "वर्ल्ड डिजिटल लाइब्रेरीज : एन इन्टरनेशनल जर्नल" पत्रिका के लेखों का ग्रंथमिति अध्ययन किया गया है। ग्रंथमिति अध्ययन में आकडों को उद्धरण विश्लेषण द्वारा विश्लेषित किया जाता है। गंथमिति अध्ययन के अंतर्गत किसी भी विषय या साहित्य के विभिन्न पक्षों का संख्यात्मक एवं गणनात्मक अध्ययन किया जाता है। उद्धरण विश्लेषण को किसी भी विषय के लिए ग्रंथमिति अध्ययन हेतु एक महत्वपूर्ण तकनीक माना जाता है।

प्रस्तुत अध्ययन में पत्रिका के लेखों का प्रकाशन का वर्षानुसार विवरण, वर्षानुसार उद्धरण का विवरण, उद्धरित प्रलेखों के प्रकार, वर्षानुसार ग्रथों में लेखकत्व प्रभाव, एकल लेखक एवं सह लेखकों के योगदानों की दशा स्थिति के मान को गणितीय सांख्यिकीय अध्ययन की सहायता से दर्शाया गया है।

## 2. उद्देश्य (Objectives)

इस अध्ययन का मुख्य उद्देश्य "वर्ल्ड डिजिटल लाइब्रेरीज : एन इन्टरनेशनल जर्नल" पत्रिका में प्रकाशित लेखों का ग्रंथमिति अध्ययन प्रस्तुत करना है। इसके अंतर्गत हैं:

 "वर्ल्ड डिजिटल लाइव्रेरीज : एन इन्टरनेशनल जर्नल" पत्रिका में प्रकाशित 24 खण्ड तक लेखों एवं लेखकों की संख्या बताना ।



वरिष्ठ सहायक प्राध्यापक, ग्रंथालय एवं सूचना विज्ञान अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.) ई--मेल : hari197479@yahoo.in

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# भारत के चयनित संस्थाओं में कृषि विज्ञान का 2017 से 2021 तक प्रकाशन उत्पादकता : एक अध्ययन (Publication Productivity of Agricultural Science in Selected Institutions of India from 2017 to 2021: A Study)

#### श्रवण यादव\* डॉ. हरिश कुमार साहू''

[कृषि आधारित प्रकाशन उत्पादकता की प्रमुख पाँच कृषि संस्थाओं का तुलनात्मक अध्ययन करता है। अध्ययन के लिए वर्षानुसार वितरण, प्रमुख लेखक अनुसार उत्पादकता एवं प्रलेख अनुसार उत्पादकता का उपयोग करते हुए आंकड़ों का विश्लेषण का निष्कर्ष प्रस्तुत करता है।]

#### 1. परिचय (Introduction)

भारत कृषि प्रधान देश है, ग्रामीण भारत के लगभग 80 प्रतिशत व्यक्ति कृषि उत्पाद या कृषि से संबंधित गतिविधियों पर कार्य कर रहे हैं, उसी परिपेक्ष्य में कृषि शिक्षा भी एक है। कृषि उत्पादों, कृषि तकनीकों, कृषि विकास में बढ़ोत्तरी के लिए कृषि शिक्षा की आवश्यकता महत्वपूर्ण होती है।

भारत में कृषि शिक्षा का इतिहास मध्यकाल से जाना जाता है, जब नालंदा एवं तक्षशिला में कृषि को पाठ्यकम में सम्मिलित किया गया था। 20वीं भाताब्दी के प्रारंभ शुरुआत में ही कृषि शिक्षा औपचारिक पाठ्यकम में प्रारंभ हुई जब छः कृषि महाविद्यालय थे : कानुपर, लायलपुर, कोयंबटूर, नागपुर, पुणे और सबौर। आजादी के स्वतंत्रता के पश्चात बाद कृषि शिक्षा के विकास के लिए भारत सरकार द्वारा भारतीय कृषि अनुसंधान परिषद की स्थापना की गई, जिसका कार्य कृषि शिक्षा का विकास, नियम और प्रारूप तैयार करना था। सन् 1960 में भारत का पहला कृषि विश्वविद्यालय की पंतनगर (उत्तराखंड) में स्थापना हुई थी। प्रकाशन उत्पादकता किसी भी लेख के इनपुट और आउटपुट का अनुपात है। प्रकाशन उत्पादकता एक निश्चित समय में एक चयनित इकाई द्वारा प्रकाशित लेखों की संख्या से व्यक्त की जाती है। प्रकाशन गतिविधि के तीन स्तर हो सकते हैं 1. व्यक्तिगत एवं अनुसंधान समूहों का प्रकाशन आउटपुट 2. वैज्ञानिक पत्रिकाओं का



शोधार्थी, ग्रंथालय एवं सूचना विज्ञान अध्ययन शाला, पं. रवि शंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.) ई–मेल : <u>shrawanyadav12@gmail.com</u>

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# Does exposure to radiofrequency radiation (RFR) affect the circadian rhythm of rest-activity patterns and behavioral sleep variables in humans?

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#### **ORIGINAL REPORT**



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# Does exposure to radiofrequency radiation (RFR) affect the circadian rhythm of rest-activity patterns and behavioral sleep variables in humans?

Margaret Messiah Singh<sup>a</sup>, Priyanka Chandel<sup>a</sup>, Atanu Pati D<sup>a,b,c</sup> and Arti Parganiha D<sup>a,b</sup>

<sup>a</sup>School of Studies in Life Science, Pandit Ravishankar Shukla University, Raipur, India; <sup>b</sup>Center for Translational Chronobiology, Pandit Ravishankar Shukla University, Raipur, India; <sup>c</sup>Department of Zoology, Gangadhar Meher University, Sambalpur, India

#### ABSTRACT

We evaluated the effects of the exposure to radio-frequency radiation emanating from the base transceiver station (BTS) on the characteristics of circadian rest-activity rhythm and behavioral sleep variables in humans. We performed this exploratory field study in a sample of 89 healthy subjects randomly chosen out of 1434 individuals surveyed for the purpose. We divided 89 subjects into five groups, including the control, as a function of distance from the BTS. The E-field strength was higher in the groups of the inter-tower region and between 0 and 150 m away from the BTS. The E-field (distance) did not significantly affect the circadian rhythm parameters and behavioral sleep variables, except a marginal delay in the peak timings of the rest-activity rhythm of subjects in the inter-tower and 300-500 m groups. Notable secondary effects of the factor gender were noticed on circadian amplitude, sleep efficiency, dichotomy index, and wake after sleep onset. We concluded that exposure to radiation from the BTS did not modulate actigraphy-based behavioral sleep variables of people residing around BTS installations. We recommend more extensive field-based studies with rigorous longitudinal designs to validate the effects of radiation from the BTS in humans.

#### **ARTICLE HISTORY**

Received 8 October 2020 Accepted 16 June 2021

#### **KEYWORDS**

BTS; RF-EMR; actigraphy; rest-activity rhythm; behavioral sleep variables; human

#### 1. Introduction

In modern society, we have an intimate association with the telecommunication system comprising mobile phones (MPs) and their base transceiver stations (BTSs). Each BTS operates in the radiofrequency range. According to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), the non-ionizing radio-frequency electromagnetic field (RF-EMF) ranges from 3 kilohertz (kHz) to 300 gigahertz (GHz). The number of BTS installations is rapidly rising over the last decade to meet the increasing use of smart-phones for social media, online services, and internet access (Barrile et al. 2009; Kaushal et al. 2012; Haryono and Gunawan 2020). Deployment of BTS in residential areas makes humans exposed to radiofrequency radiation (RFR) persistently. People living in BTS

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#### **ORIGINAL REPORT**



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**ORIGINAL ARTICLE** 



# Screening of Obstructive Sleep Apnea (OSA) Risk and Study of Its Predictors in a Population of Adult Indians

Noorshama Parveen<sup>1</sup> · Babita Pande<sup>2</sup> · Atanu Kumar Pati<sup>1,3,4</sup> · Arti Parganiha<sup>1,4</sup>

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#### Abstract

**Purpose** The current study is the first attempt to screen obstructive sleep apnea (OSA) risk in adult populations of Chhattisgarh, India. A few predictors of OSA, such as socio-demographic variables, excessive daytime sleepiness (EDS), behavioral sleep variables, and chronotype were also investigated.

**Methods** Five hundred eleven (167 males and 344 females) randomly chosen healthy subjects participated in the study. The STOP-BANG and Modified Berlin Questionnaires (MBQ) were used for the screening of OSA. The Epworth Sleepiness Scale was used to determine excessive daytime sleepiness. The Morningness–Eveningness Questionnaire (MEQ) and Munich Chronotype Questionnaire (MCTQ) were used to determine the chronotype and behavioral sleep variables of each subject. **Results** It was observed that 11% of the studied population was at risk of OSA obtained through MBQ. The STOP-BANG score significantly differed as a function of gender, family type, habitat, and chronotype. The Principal Component Analysis revealed behavioral sleep variables, demographic variables, EDS, and chronotype as the important correlates of OSA. The variables namely sleep latency and sleep inertia on both workdays and free days contributed to 22% variability in the dataset; whereas age, BMI and BSA together explained 19% variability. The ESS score and other associated factors explained the 20% variability in the dataset.

**Conclusions** The study delivers an early warning and underscores that about 11% of young adults from Chhattisgarh have a higher OSA risk. Sleep latency and sleep inertia could be associated with OSA risk more prominently followed by BMI and BSA.

Keywords Obstructive sleep apnea · Excessive daytime sleepiness · Chronotype · Body surface area · Body mass index

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#### 1 Introduction and Background

Obstructive sleep apnea (OSA) can be defined as an interruption or pause in breathing that occurs more than five times in an hour [1, 2]. It is one of the common sleep-related breathing disorders. OSA reflects cessation in the upper airway of respiration that occurs during sleep, lasting for 10 s or more. A complete cessation is called 'Apnea,' whereas incomplete cessation is called 'Hypopnea.' In Hypopnea, abnormal shallow breathing occurs, which decreases the oxygen saturation by around 4% or more. The severity of OSA has been categorized into three stages based on the 'Apnea-Hypopnea Index (AHI)' [3]. The three stages of OSA are Mild (AHI = 5-15 events/hour), Moderate (AHI = 15-30 events/hour) and Severe (AHI > 30 events/ hour) [3]. Loud snoring and excessive daytime sleepiness (EDS) are among the prominent symptoms of OSA. When OSA accompanies EDS then it is termed 'obstructive sleep

#### **ORIGINAL ARTICLE**



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Noorshama Parveen<sup>1</sup> · Babita Pande<sup>2</sup> · Atanu Kumar Pati<sup>1,3,4</sup> · Arti Parganiha<sup>1,4</sup>

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Keywords Obstructive sleep apnea · Excessive daytime sleepiness · Chronotype · Body surface area · Body mass index

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# Consequences and factors associated with OSA: a brief review

Noorshama Parveen & Arti Parganiha

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# ABSTRACT

Obstructive sleep apnea (OSA) is a sleep-related breathing disorder. It occurs due to obstruction on the upper airway of respiration. This disorder can be either complete (apnea) or partial (hypopnea). Interruption in breathing results in the production PDF snoring sound, which is one of the prominent symptoms of OSA. Excessive day Help sleepiness (EDS), hypertension, diabetes, etc. are some of the commonly occurring comorbidities of OSA. OSA is common in the population of middle-aged and elderly people, but pediatric OSA is also eminent. The occurrence of the disease is higher in



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# Consequences and factors associated with OSA: a brief review

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# ABSTRACT

Obstructive sleep apnea (OSA) is a sleep-related breathing disorder. It occurs due to obstruction on the upper airway of respiration. This disorder can be either complete (apnea) or partial (hypopnea). Interruption in breathing results in the production PDF snoring sound, which is one of the prominent symptoms of OSA. Excessive day Help sleepiness (EDS), hypertension, diabetes, etc. are some of the commonly occurring comorbidities of OSA. OSA is common in the population of middle-aged and elderly people, but pediatric OSA is also eminent. The occurrence of the disease is higher in



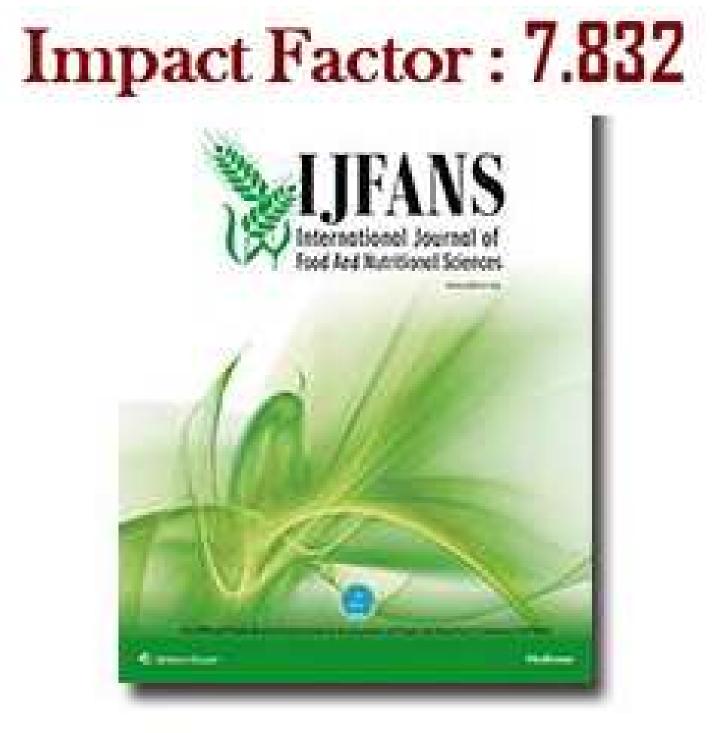
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Volume 14 Issue 4

A Comprehensive Review Of Beta-Glucan: Health Benefits, Mechanisms, And Industrial Applications (Https://ljfans.Org/lssue-Content/A-Comprehensive-Review-Of-Beta-Glucan-Health-Benefits-Mechanisms-And-Industrial-Applications-13583)

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IMAGE CLASSIFICATION FOR MEDICAL DIAGNOSIS USING CONVOLUTIONAL NEURAL NETWORKS (Https://ljfans.Org/lssue-Content/Image-Classification-For-Medical-Diagnosis-Using-Convolutional-Neural-

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NUTRITIONAL AND FUNCTIONAL APPLICATIONS OF SUGARCANE BY-PRODUCTS IN FOOD PROCESSING: A SUSTAINABLE PERSPECTIVE (Https://ljfans.Org/lssue-Content/Nutritional-And-Functional-Applications-Of-Sugarcane-By-Products-In-Food-Processing-A-Sustainable-Perspective-13528) Volume 14 | Issue 4

RELATIONSHIP BETWEEN MATERNAL, INFANT AND NEONATAL MORTALITY RATES OF HEALTH SERVICES EXPENDITURE IN RAJASTHAN: A STATISTICAL ANALYSIS (Https://ljfans.Org/lssue-Content/Relationship-Between-Maternal-Infant-And-Neonatal-Mortality-Rates-Of-Health-Services-Expenditure-In-Rajasthan-A-Statistical-Analysis-13495)

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AN INTEGRATED STREET LIGHT FAULT DETECTION AND LOCATION TRACKING SYSTEM BASED ON IOT (Https://ljfans.Org/lssue-Content/An-Integrated-Street-Light-Fault-Detection-And-Location-Tracking-System-Based-On-lot-13491)

Volume 14 | Issue 4

#### Heavy Metal Detection using AAS (Atomic Absorption Spectroscopy) in Leafy Vegetables: Part II

PDF (https://ijfans.org/uploads/paper/433d65d7b5b861de50632683ed6d3042.pdf)

#### Keywords:

Edible, leafy vegetable, bioaccumulation, consumption, Atomic absorption Spectroscopy, high, low, health

#### Labya Prabhas, Megha Agrawal, Kamal Nayan Mishra

#### Abstract

Earlier we have found that all plants are capable of absorbing and bioaccumulation of heavy metals in their own part in various concentrations, confirmed by using Atomic Absorption Spectroscopy (AAS). Rate of absorption and percentage of bioaccumulation varies among the species. In earlier study we have selected Corchorus olitorious, Cassea tora, Raphanus Sativus, Marsilea quadrifolia and Amaranthus viridis (Prabhas et al., 2018). This study is the follow up experiment of Part I and targeting some other leafy vegetable species, on the basis of their consumption and popularity among the people of central India. In this experiment we have selected Moringa oleifera, Ipomea batatas, Brassica oleracea var. botrytis, Colocasia esculenta, Murraya koenigii, Bahunia verigeta. Plant species were grown in the agriculture field up to optimum growth. Leaf and edible parts were collected from the plants and air dried. Dry matter were used for acid digestion after that quantity of heavy metals can be analyzed using Atomic Absorption Spectroscopy (AAS). Total six metal ions including Lead (Pb), Cadmium (Cd), Chromium (Cr), Zinc (Zn), Iron (Fe) and Copper (Cu) was targeted in this study. Lowest concentration of Pb was found in M. Oleifera (0.041 mg/L) and highest in I. batatas and B. Oleracea var. botrytis, Cr was low in M. Oleifera and higher in I. batatas, Zn was low in B. Oleracea var. botrytis and higher in C. Esculenta, Fe was lowest in M. Oleifera and high in B. Verigeta and Cu was low in B. Oleracea var. botrytis and higher in I. batatas. More or less all these metal ions are necessary for growth of plant. On the other hand bioaccumulation of these metals may also cause hazardous effect on human health after consumption as food source or medicinal source.

#### Issue

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# Journal of Coastal Life Medicine

# A Review on Hydroponics: A Sustainable Approach for Plant Cultivation

Received: 22 August 2022, Revised: 28 September 2022, Accepted: 24 October 2022

#### Mr. Labya Prabhas and Prof. Amia Ekka

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#### Keywords

Sustainable development, threshold limit, resources, challenge, plant cultivation, land area, water consumption, compatible, morphology.

#### Abstract

Sustainable development is really a matter of concern now days. Many natural events prove that Earth is reaching nearby its threshold limit in terms of natural resources. Saving is natural resources with maintaining rate of development for any country is a major challenge. Especially in case of agriculture, rate of utilization of land area and water consumption is really high. Some effort towards modification in traditional methods of plant cultivation is essential but with rise in total plant productivity or without affecting previous rate of productivity is required. Hydroponics, a novel or non popular plant cultivation technique is showing some assurance towards sustainable development. Hydroponics is a method of plant cultivation without soil. Amount of water requirement is really very less as compared to soil based technique. Some of the plant species is very much compatible for hydroponic cultivation. They include mostly herbaceous or plants with small morphology. An earlier report proves that the existence of hydroponic for plant cultivation in all the seven continents of the world map. Which indicates that world is ready to adopt modification and novel approaches over traditional method of plant cultivation.

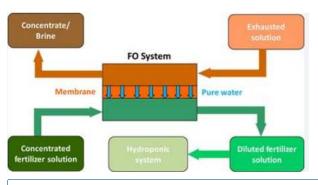
#### 1. Introduction

Water is souvenir from the nature to us. Existence of all life kind depends upon water prosperity of the Earth. Consumption level may vary from species to species among all living organism but this cannot elucidate importance water in their life. All life forms including unicellular to multicellular organisms is composed of water as a major part in their total cadaver. Life cycle of higher organism like humans and plants are extensively affected by availability of water type for their use. A well known fact that everyday rise in human population is directly compelling us to thing about food scarcity and food security. We are well aware that food resources are the major concern for the existence of mass population. Existence of human population also affects almost all other living species directly and indirectly in food web, but without continuous supply of useable water

resources and food, there is a threat of mass destruction. Now, there is a need to find out some new ideas and creative work out that can help to ensure existence of living beings for longer time with available and limited resources, specially water and food.

Agriculture provides us a major part of food and energy resources. This is followed by dairy and animal farming in well support. But question is "what are the basic needs in agriculture?" Yes, the answer is Sunlight, Water and Nutrition. Apart from sunlight, water also helps in transportation of various mineral and ions from soil to plant body. It means supply of nutrition also depends upon water flow from outside plant cell to inside. If, importance of water is significant and only limited resources are available with us then it's certainly a matter of discussion. Because limited water resources and rate of consumption and pollution in water body is hospitable for upcoming troubles. Home (https://www.jclmm.com/index.php/journal/index) / Archives (https://www.jclmm.com/index.php/journal/issue/archive) / Vol. 10: Number 3, 2022 (https://www.jclmm.com/index.php/journal/issue/view/19) / Articles

# A Review on Hydroponics: A Sustainable Approach for Plant Cultivat



PDF (https://www.jclmm.com/index.php/journal/article/view/270/241)

#### Keywords:

Sustainable development threshold limit resources challenge plant cultivation land area water consumption compatible morphology

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# Abstract

Sustainable development is really a matter of concern now days. Many natural events prove that Earth is reaching nearby its threshold limit in terms of natural resource resources with maintaining rate of development for any country is a major challenge. Especially in case of agriculture, rate of utilization of land area and water consumption effort towards modification in traditional methods of plant cultivation is essential but with rise in total plant productivity or without affecting previous rate of productivity is requirement is really very less as compared to soil based technique. Some of the plant species is very much compatible for hydroponic cultivation. They include mostly herba small morphology. An earlier report proves that the existence of hydroponic for plant cultivation in all the seven continents of the world map. Which indicates that wor modification and novel approaches over traditional method of plant cultivation.

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Section

Articles

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# FLUORIDE AND ARSENIC : BIOACCUMULATORY POTENTIAL AND THEIR COMBINED TOXIC IMPACT ON THE BEHAVIOR OF FRESHWATER CATFISH, *CLARIAS BATRACHUS* LINN. 1758

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#### (Received 12 July 2021, Accepted 13 September 2021)

ABSTRACT : Fluoride and arsenic, upon release into the environment, often accumulate rapidly in aquatic habitats and are taken up by aquatic organisms subsequently entering into the food chain. This study comprises of examining the tissue distribution of arsenic and fluoride in the freshwater catfish, *Clarias batrachus* chronically exposed to them in combination. Fishes were exposed to a range of aqueous arsenic trioxide and sodium fluoride, both individually and in combination, and sampled at 24, 48, 72 and 96 hours. Levels of fluoride and arsenic in the liver, kidney, bone and blood of *Clarias batrachus* demonstrated significantly a direct relationship with the exposure medium. Fluoride level in bone was the highest whereas; the lowest level was observed in the muscle. Arsenic level in the liver was the highest whereas; the lowest level was observed in the muscle. Arsenic level in the liver was the highest whereas; the lowest level was observed in the same concentration and sampling time. Impact on behavior was studied in terms of air gulping, opercular movement, swimming activity, body position and food sensitivity. Control fish remained normal throughout the experimental period (28 d), but treated fishes were very restless, with loss of equilibrium, and a significant increase (P<0.01) in the number of opercular movements and air gulping. Our results suggest that elevated levels of fluoride and arsenic exposure cause bioaccumulation in the fish body, which ultimately may be harmful to humans.

Key words: Bioaccumulation, biotransformation, methylation, biotransformation, TISAB.

How to cite : Gamini Sahu and Aditi Niyogi Poddar (2022) Fluoride and arsenic : Bioaccumulatory potential and their combined toxic impact on the behavior of freshwater catfish, *Clarias batrachus* Linn. 1758. *J. Exp. Zool. India* **25**, 435-441. DocID: https://connectjournals.com/03895.2022.25.435

#### **INTRODUCTION**

Civilization and the rapid spread of industrialization have compelled developing countries to face the crisis of aquatic pollution. A large number of polluted products, especially heavy metals are constantly being drained, untreated into rivers, close at hand. These products readily get dissolved in water and are the major persistent elements in aquatic ecosystems. Chromium, lead, mercury, arsenic and cadmium, rank among the priority metals and are viewed as systemic toxicants inciting numerous organ damages, even at lower levels of exposure (Olsson et al, 1998). They also influence cellular organelles and various enzymes involved in the metabolic process, detoxification, and damage repair (Wang and Shi, 2001). Besides, DNA molecules and nuclear proteins are also damaged, possibly leading to carcinogenesis or apoptosis (Beyersmann and Hartwig, 2008). Obviously, the impact of heavy metals on the aquatic ecosystem is a

global concern (Yousafzai et al, 2008).

In the present scenario, unfortunately, a billion people in the world are drinking unhealthy water regularly (Borah *et al*, 2011). To meet the need for clean drinking water of these thirsty billions, indiscriminate fracturing of rocks to dig bore wells has consequently lead the emergence of two major public-health problems, *viz.*, groundwater contamination with excess fluoride and arsenic. The chief sources of high fluoride in water resources are fluoridebearing minerals existing in rocks and soils (Jha *et al*, 2011).

Aquatic animals are capable of taking up fluoride directly from water or to a lesser extent through food. In fish, fluoride may accumulate from the food chain (Shi *et al*, 2009). Roughly, 80-90% of the total ingested fluoride is absorbed from the gastrointestinal tract by passive diffusion (Whitford, 1996). Fluoride is distributed more rapidly in well-perfused tissues, such as the heart, lung, Biochem. Cell. Arch. Vol. 22, No. 2, pp. 3969-3974, 2022 DocID: https://connectjournals.com/03896.2022.22.3969

#### **RECEIVER OPERATING CURVE (ROC) ANALYSIS FOR FLUOROSIS USING** SIMPLE BLOOD PARAMETER NEUTROPHIL LYMPHOCYTE RATIO

DOI: https://doi.org/10.51470/bca.2022.22.2.3969

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(Received 9 July 2022, Revised 13 September 2022, Accepted 21 September 2022)

ABSTRACT : The study aims to assess the preclinical stage of fluorosis i.e. Non skeletal fluorosis in human populations using a simple blood parameter, Neutrophil Lymphocyte Ratio as a predictive tool and includes different fluorosis categories (Dental, Skeletal & Non skeletal) surveyed out in the endemic villages and compared with the control population of non endemic area. Study Populations belonging to endemic villages Kowataal, Fulsar, Mahuapaani, Korbi and Amatikra within the block Podi uproda, distt. Korba situated in Chhattisgarh state of central India were cross sectionally studied. Segregation was done on the basis of Suspect (non-symptomatic) and Confirmed (Dental and Skeletal) cases of fluorosis and neutrophil to lymphocyte ratio calculated. A total 180 individuals were included in the study, out of which 67.33 % were confirmed cases of fluorosis. A significant decline in neutrophil to lymphocyte ratio was observed upon chronic fluoride ingestion. In the Receiver Operating Characteristic curve analysis of obtained NL ratios, the overall cut off value for fluorosis was obtained as  $\leq$  2.379 in the selected endemic region irrespective of symptoms of fluorosis *i.e.* dental or skeletal. The results concluding that The NL ratio can be used as a simple parameter for preclinical identification of fluorosis in fluoride exposed populations. However, urine and blood fluoride analyses of the subjects are also needed for further confirmation.

Key words : Neutrophil lymphocyte ratio, non skeletal fluorosis, ROC, skeletal fluorosis.

How to cite: S. Gupta, A. N. Poddar, C. Kumar and S. Pervez (2022) Receiver Operating Curve (ROC) analysis for fluorosis using simple blood parameter neutrophil lymphocyte ratio. Biochem. Cell. Arch. 22, 3969-3974. DOI: https://doi.org/10.51470/ bca.2022.22.3969, DocID: https://connectjournals.com/03896.2022.22.3969

#### **INTRODUCTION**

Preceding dental and skeletal fluorosis, some preclinical changes take place in the blood and body due to acute or chronic ingestion of fluoridated drinking water and have been considered under non-skeletal manifestations. Such manifestations are often overlooked due to the misconception that fluoride affects only bones and teeth (Raghuvansi et al, 2010). Fluoride has multiple effects on human health. A few are characterized by mineralization changes in the calcified tissues resulting in dental fluorosis and skeletal deformities. Besides other metabolic effects, visceral organs like liver and kidneys are also susceptible to toxic effects of fluoride and pathological changes in these vital organs can occur even before overt clinical signs of F intoxication (Shashi, 2002). Fluoride exposure is also associated with oxidative damage to RBCs, liver and kidney tissues. Consequent to oral exposure, fluoride is rapidly absorbed to reach systemic circulation. In blood, about 75% of it remains free in plasma and about 5% remains bound to plasma proteins. The rest of the blood F is found mainly inside RBCs or with their membrane (Swarup and Dwivedi, 2002). Neurological manifestations, like headache, insomnia (lack of sleep), lethargy (fatigue), depression, polyuria and polydipsia have been reported in populations with endemic fluoride (Sharma et al, 2009). Besides, skeletal and dental fluorosis, excessive consumption of fluoride may lead to muscle fiber degeneration, low hemoglobin levels, excessive thirst, headache, skin rashes, nervousness, depression, etc (Meenakshi, 2006). Pre skeletal stage of fluorosis is associated with occasional complains of pains in small points of limits and back, which simulate rheumatoid arthritis and ankylosing spondylosis (Krishna and Kiran, 2013).

In earlier studies (Zahorec et al, 2008; Zazula et al, 2008; Papa et al, 2008; Halazun et al, 2008; De Jager et al, 2010; Kaol et al, 2010; Indavarapu and Akinapelli, 2011; Tomita et al, 2011; Proctor et al, 2012; Kim and

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# **Biochemical Alteration Due To Accumulation of Fluoride** in Cat Fish, Claries Batrachus

Shivani Gupta<sup>1</sup>, Aditi (Niyogi) Poddar<sup>2</sup>, Purva Mishra<sup>3</sup>, Chandan Kumar<sup>4</sup>

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#### ABSTRACT

Fluoride is a natural component of the earth's crust and soil. Small amounts of fluorides are present in water, air, plants, and animals, which when enters the food chain causes toxic effects to the ecosystem due to its bioaccumulation. The fluoride ions act as enzymatic poisons, inhibiting enzyme activity and ultimately interrupting metabolic process such as glycolysis and synthesis of proteins. After oral uptake, water-soluble fluorides are rapidly and almost completely absorbed in the gastrointestinal tract. As soon as fluoride is absorbed, blood fluoride levels increase. The study deals with the acute exposure of sodium fluoride to *Clarias batrachus* under laboratory condition. Biological samples were collected after every 24 hours for estimation of biochemical parameters (Total protein, ACP, ALP, GOT, GPT). The percent fluoride accumulation and the bio-concentration factor were studied after 96 hr of exposure. The result indicates significant changes in the biochemical parameters. The statistical analysis was done using five-way ANOVA.

#### Keywords: Bioaccumulation, Biochemical alteration, Bio concentration factor

#### INTRODUCTION

Fluoride is a natural component of the earth's crust and soil. Small amount of fluoride is present in water, air, plants, and animals, which when enters the food chain causes toxic effects to the ecosystem (1). Aquatic life is continuously exposed to fluoride which tends to accumulate in the exoskeleton, bones and tissues of the fishes (2). The fluoride ions act as an enzymatic poison, inhibiting enzyme activity (3) and ultimately interrupting metabolic process such as glycolysis and synthesis of proteins (4). High concentration of fluoride causes fluorosis. After oral uptake, water-soluble fluorides are rapidly and almost completely absorbed in the gastro-intestinal tract. As soon as fluoride is absorbed, blood fluoride levels increase (at 10 minutes), reaching peak levels at 60 minutes. The rate of fluoride absorption from the stomach is directly related to the acidity (pH <3.5) of its contents. Absorbed fluoride is transported via the blood; with prolonged intake of fluoride from drinking-water, concentrations in the blood are the same as those in drinking-water, a relationship that remains valid up to a concentration in drinking-water of  $10 \text{mgL}^{-1}$ . Distribution of fluoride is a rapid process. It is incorporated into exoskeleton and bones; there is virtually no storage in soft tissues. Incorporation into exoskeleton and skeletal tissues is reversible: after cessation of exposure, mobilization from these tissues takes place. Fluoride is excreted via kidneys (5, 6, 7, 8).

#### MATERIALS AND METHODS

#### 1. Exposure of Toxicants

Healthy cat fishes *C. batrachas* were procured live from the local fish market and acclimatized for seven days in glass aquaria under laboratory conditions with continuous oxygen supply and fed daily (twice a day). After acclimatization fishes were subsequently divided into two groups i.e., control and experimental. Fishes of control group were exposed to normal tap water, whereas experimental group were exposed to sodium fluoride in water for short term duration of 96hrs with sub lethal concentration 300 ppm of NaF.

#### 2. Sample Collection

(A) Water- Water is collected from the aquaria in plastic bottle for residual fluoride analysis after 96 hrs of treatment.

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#### **Review** article

## PYRETHROID INDUCED TERATO-GENICITY AND GENOTOXICITY

Ajay Singh Shakya\*, Ajay Kumar and S. K. Prasad

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(Received 3 October 2021, Revised 30 November 2021, Accepted 18 December 2021)

ABSTRACT : Pesticide has become an integral part of modern agriculture. Pyrethroids are biodegradable that is why uses of this pesticide being in large amounts, and due to their not being used properly, they affect harmful insects as well as many beneficial insects and many different types of organisms and humans. Produced effects such as neurotoxic, genotoxic and teratogenic effects. Cypermethrin (CYP), a class-II type of pyrethroid pesticide has been studied in many organisms for its various adverse effects, but its teratogenic and genotoxic effect has not been much studied in birds. So, in this review conclude the genotoxic and teratogenic potential of different type of pyrethroid in various animals.

Key word : Pyrethroid, teratogenicity, genotoxicity.

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#### **INTRODUCTION**

Pesticides are chemical, which is used against pests in agriculture, animal husbandry and public health. Against the targeted species these chemicals are highly effective, thus became the inseparable part of modern agriculture. Pesticides are divided into organophosphate, organochlorines, carbamate and pyrethroid based on their chemical structure. Due to the rapid biodegradable of pyrethroid, it is being used in place of carbamide, organophosphate and organochloride (Kaushik *et al*, 2018).

Pyrethroid is a group of synthetic pesticide, which is similar to the natural pesticide pyrethrum and produced by the flower of pyrethrum plant of chrysanthemum genus of Compositae family native to Asia and northeastern Europe. As an insecticide, these pyrethroids are used in agriculture, disinfection and ectoparasitic disease (Heudorf and Angerer, 2001). Pyrethroid bind to voltage-sensitive Na- channel and convert their gating kinetics. thereby nerve function are disrupted and generate acute neurotoxic effects in insect as well as non-target organism (Choi and Soderlund, 2006). Studied suggest that in non-targeted speciesteratogenicity, reproductive toxicity and genotoxicity could be induced by pyrethroid.

#### Type of pyrethroid

On the basis of chemical structure pyrethroids are classify in two type -

Type I and type II (Kaushik *et al*, 2018).

Type I –Pyrethroid that have without cyano group.

Type II - Pyrethroid that have contained cyano group

Туре І	Type II
Permethrin	Cypermethrin
Bioallethrin	Deltamthrin
Tefluthrin	Fenvalerate
Allethrin	λ-cyhalothrin
Tetrametrin	α-cypermethrin
Ressmethrin	β-cypermethrin
Bioresmethrin	Esfenvalerate
Prallethrin	Cyfluthrin

#### Teratogenicity and genotoxicity

The development of any type of structural and functional defects during fetal development is called teratogenicity. Genotoxicity refers to processes that alter the structure, information content, or segregation of DNA and that are not necessarily associated with mutagenicity (Pellevoisin *et al*, 2018).

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# Total Chlorophyll Determination in Leafy Vegetables Cultivated in Hydroponics and Soil

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## **ABSTRACT:**

There are many factors that can be used to describe the growth outline of the plant. Qualitative and quantitative estimation of phyto-chemical composition of the plant's can directly reflects the growth pattern. These may also reflects the nutraceutical values of the plant for human consumption. Selected plant species are leafy vegetables and popular among the people of central India. Cultivation of selected plant's species is carried out in two different ways. Traditional method of plant cultivation includes soil based cultivation and other is hydroponic technique. In hydroponics, there is no need of soil, liquid media remains in direct contact with the seed and root of the plant. Hydroponically grown S. oleracea L (1.447 mg/g) was recorded with highest amount of chlorophyll, followed by M. arvensis (1.338 mg/g), C. sativum (1.162 mg/g), T. F. graceum L. (1.097 mg/g), C. olitorius L. (1.060 mg/g), A. viridis (0.917 mg/g) and C. arietinum (0.643 mg/g). On the other hand total chlorophyll content in soil cultivated plants was found highest in M. arvensis (1.206) followed by S. oleracea L. (1.085), C. sativum (1.046 mg/g), T. F. graceum L. (0.906), C. olitorius L. (0.859 mg/g), C. arietinum (836 mg/g) and A.viridis (0.794). This study may reveal the compatibility and acceptance of hydroponics for plant cultivation. Chlorophyll content was consistently high in most of the experimental plants cultivated in hydroponic system as compared to soil cultivated plants.

**Keyword:** Phyto-chemical, neutraceutical, hydroponics, total chrolophyll, protein content, carbohydrate, recognize, suitable.

## **INTRODUCTION:**

Plant is composed of various type of light capturing pigment like chrolophyll, carotenoid and much other type of pigments. Chlorophyll is an important fraction of photosynthetic machinery. Amount of chlorophyll directly represent the number of chloroplast in plant cell. Richness in chlorophyll molecules is responsible for capturing sunlight and conversion into sugar compound. Hence, optimum rate of production of sugar inside plant cell mainly depends upon amount chlorophyll molecule. If optimum sugar is produced and stored by plant then this will result imitate optimum growth of plant too. It means chlorophyll is an important tool which is directly associated with growth of the plant. Chlorophyll is found in



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# Total Chlorophyll Determination in Leafy Vegetables Cultivated in Hydroponics and Soil

Labya Prabhas<sup>1</sup>, Dr. Amia Ekka<sup>2</sup>

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## **ABSTRACT:**

There are many factors that can be used to describe the growth outline of the plant. Qualitative and quantitative estimation of phyto-chemical composition of the plant's can directly reflects the growth pattern. These may also reflects the nutraceutical values of the plant for human consumption. Selected plant species are leafy vegetables and popular among the people of central India. Cultivation of selected plant's species is carried out in two different ways. Traditional method of plant cultivation includes soil based cultivation and other is hydroponic technique. In hydroponics, there is no need of soil, liquid media remains in direct contact with the seed and root of the plant. Hydroponically grown S. oleracea L (1.447 mg/g) was recorded with highest amount of chlorophyll, followed by M. arvensis (1.338 mg/g), C. sativum (1.162 mg/g), T. F. graceum L. (1.097 mg/g), C. olitorius L. (1.060 mg/g), A. viridis (0.917 mg/g) and C. arietinum (0.643 mg/g). On the other hand total chlorophyll content in soil cultivated plants was found highest in M. arvensis (1.206) followed by S. oleracea L. (1.085), C. sativum (1.046 mg/g), T. F. graceum L. (0.906), C olitorius L. (0.859 mg/g), C. arietinum (836 mg/g) and A.viridis (0.794). This study may reveal the compatibility and acceptance of hydroponics for plant cultivation. Chlorophyll content was consistently high in most of the experimental plants cultivated in hydroponic system as compared to soil cultivated plants.

**Keyword:** Phyto-chemical, neutraceutical, hydroponics, total chrolophyll, protein content, carbohydrate, recognize, suitable.

#### **INTRODUCTION:**

Plant is composed of various type of light capturing pigment like chrolophyll, carotenoid and much other type of pigments. Chlorophyll is an important fraction of photosynthetic machinery. Amount of chlorophyll directly represent the number of chloroplast in plant cell. Richness in chlorophyll molecules is responsible for capturing sunlight and conversion into sugar compound. Hence, optimum rate of production of sugar inside plant cell mainly depends upon amount chlorophyll molecule. If optimum sugar is produced and stored by plant then this will result imitate optimum growth of plant too. It means chlorophyll is an important tool which is directly associated with growth of the plant. Chlorophyll is found in





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#### Total Protein and Carbohydrate Determination in Leafy Vegetables Cultivated in Hydroponics and Soil

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Keywords: Plant cultivation, phyto-chemicals, hydroponics, soil cultivation, protein, carbohydrate, moisture, optimum.

#### INTRODUCTION

Food is consumed by all living organism to obtain nutritional support, necessary for their growth and survival. A big part of food resources are obtained from the plant by the humans like many other higher animals. Plant consumes energy from sunlight and prepares food for own benefits. Plant uses their stored food material for maintaining their own health and metabolic activities including giving rise to fruits and flower. Food is stored by the plants in form of protein and carbohydrates are also used by other higher organisms called consumers like human beings and animals belong to category of herbivores and omnivores too. Now the important thing is that the neutraceutical value of the food. If food is rich in various type of nutrients and minerals. It will directly reflect to the good health of the organisms who is consuming it as a source of nutrition. Leafy vegetables are one of an important part of nutrition for the people who live in Asia, especially in south Asian country like India. Varieties of leafy vegetables are found and listed in edible resources

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# **Review on Phosphate solubilizing micro-organisms**

# Dr. Pervez Ahmed Khan<sup>1</sup>, Dr. Amia Ekka<sup>2</sup> and Dr. Mehar Afroz Qureshi<sup>3</sup>

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#### Abstract

Biofertilizer can provide an economically viable support to small and marginal farmers for realizing the ultimate goal of increasing productivity. Biofertilizer are low cost, effective and renewable source of plant nutrients to supplement chemical fertilizers. Microorganisms, which can be used as biofertilizer, include bacteria, fungi and blue green algae. These organisms are added to the rhizosphere of the plant to enhance their activity in the soil. Sustainable crop production depends much on good soil health.

#### Introduction

Phosphate solubilizing micro-organisms (PSM) solubilize insoluble forms of inorganic phosphorus and also mineralize organic forms of it and progress the availability of phosphorus to the plants. It is reported that phosphate solubilizing microorganisms of plant rhizosphere are more effective than others from the same soil. High quantity of phosphate solubilizing microorganism is concentrated in rhizosphere and they are metabolically more active than microorganisms from other sources [1]. Phosphate solubilizing organisms dissolve the fixed mineral phosphate and make it available to plants [2,3].

#### **Isolation and Screening**

It should be noted that filamentous fungi are among the most active and studied solubilization agents and a typical process for RP solubilization in submergd (single batch, shake-flask) fermentation conditions involves glucose based media and is performed for 7-20 days [4, 5, 6,7, 8].

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# Characterization of a novel keratinase from Chrysosporium tropicum

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#### Abstract

A keratinophilic fungus Chrysosporium tropicum was isolated from poultry farm soil and screened for extracellular keratinase activity. The fungus was cultured in basal salts medium and keratinase production was assessed. The novel keratinase was purified by Sephadex G-100 column chromatography and characterized. The molecular weight of the enzyme was estimated to be 14.5 KDa by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE). The optimum pH and temperature of the keratinase were found to be 7.5 and 40°C respectively.

The Km for keratin powder from human hair was 6.67 mg and the Vmax of novel keratinase was determined to be 0.33 mg mt<sup>-1</sup> by the Lineweaver-Burk plot. The enzyme activity was almost completely inhibited by phenylmethylsulphonyl fluoride (PMSF) suggesting that the keratinase belongs to the serine protease family.

Keywords: Keratinophilic fungi, Chrysosporium tropicum, extracellular keratinase, purification.

#### Introduction

Keratin, an insoluble fibrous protein, is non-degradable by common proteases such as pepsin, trypsin, papain etc. because of the presence of high degree disulfide crosslinking. The keratinous wastes generally are feathers, hair, nails, horn, hoofs, skin, scales and wool. Globally the most abundant keratinous materials are poultry feathers which are increasing annually with rising global production and consumption<sup>18</sup>. Feathers contain around 90% keratin protein and the traditional methodology to degrade those leads to the destruction of valuable amino acids needed to prepare protein-rich feather meal.

Traditionally feathers are degraded by alkali hydrolysis and steam pressure cooking, consuming a huge amount of energy and producing waste which leads to environmental hazards<sup>8,11</sup>. Numerous microorganisms, actinomycetes, bacteria and fungi, are responsible for keratin utilization in nature and thrive on it. These organisms produce proteolytic enzymes keratinase having keratinolytic ability which naturally degrades keratin wastes<sup>3,20</sup>.

Keratinophilic or keratinolytic fungi are closely related to dermatophytes and have the capability of tissue invasion<sup>21</sup>.

Enzyme keratinase has been purified and characterized, produced by various microorganisms such as fungi<sup>1,9,13,16,17</sup>, bacteria<sup>2,11</sup> and a few Streptomyces species<sup>6</sup>. The keratinase produced by these organisms showed specific activity on insoluble keratin. The production of extracellular keratinase was governed by several factors like temperature, pH, carbon and nitrogen sources and types of keratin substrates.

The characterization of keratinase is warranted for important biotechnological applications in industrial processes<sup>1</sup>. The industrial application of keratinase varies hugely as it has been used for dehairing of skin and hides, preparation of feather meal and nitrogen fertilizers from poultry feathers. The present study deals with the production, purification and characterization of extracellular keratinase from *Chrysosporium tropicum* (NFCCI-3317) isolated from a poultry farm soil.

#### Material and Methods

**Isolation and maintenance of culture:** C. tropicum (NFCCI-3317) was isolated from the poultry farm soil of Raipur, India. The fungus was maintained in Sabouraud's dextrose agar (pH 5.60) at  $26\pm2^{\circ}$ C.

Production of keratinase enzyme: For production of extracellular keratinase enzyme, basal salts medium [KH<sub>2</sub>PO<sub>4</sub> - 1.5g; MgSO<sub>4</sub>.7H<sub>2</sub>O - 0.025g; FeSO<sub>4</sub>.7H<sub>2</sub>O -0.015g; ZnSO<sub>4</sub>.7H<sub>2</sub>O - 0.005g and CaCl<sub>2</sub> - 0.025g in 1 litre, deionized distilled water, pH - 7.0] was used for the fungus. Erlenmeyer flasks (150 ml) containing 50 ml of this medium supplemented with 500 mg of defatted and pre-sterilized human hairs (1 cm length) as a substrate were inoculated and incubated at 27°C for 6 weeks in static condition. Six test flasks and one control set were maintained for observations. Each test flask was inoculated with a 6 mm disc from 7-day old fungal culture. Flasks containing the medium with a disc of agar without the fungus served as control. After the incubation period, culture filtrates from each flask were filtered through Whatmann filter paper no. 42 and centrifuged at 5000 rpm for 5 min. The supernatant was used for the estimation of extracellular keratinase enzyme and protein.

Assay of keratinase activity: To assess the keratinase activity, the method of Yu et  $al^{23}$  was followed with some modifications. 50 mg of human hairs (4-5 mm in length) were suspended in 4.5 ml of 0.028M phosphate buffer to which 0.5 ml of culture filtrate was added as an enzyme source. The reaction mixture was incubated at 37°C for 1 h and then immersed in ice water for 10 min to stop the

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# THE SOCIAL-ECONOMIC IMPACT OF TUBERCULOSIS: A REVIEW

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#### Abstract:

Globally, Tuberculosis has visibly impacted the daily lives of ordinary peoples in almost every country. However, the impact is pre dominant in developing countries, where poverty, social discrimination is rampant. Tuberculosis patients often face difficulty in social as well as personal aspect of life. Worldwide there is an understanding that controlling tuberculosis requires a careful amalgamation of various control programs, treatment regime and different aspects of social determinants. There is a lack of substantial literature addressing the social and economic assessment of tuberculosis patients. In this review we have reviewed the various initiatives taken by World Health Organization and supplemented the information with the steps taken by Indian government towards End TB strategy with special emphasis on social economic aspect of tuberculosis. In present paper tried to understand social- economical impact of tuberculosis in their patients and also sure relationship

Keyword: Tuberculosis, economic, social determinants, cost. Drug resistant TB, Management of culture and society with health.

Humans live in two worlds in the world: as members of the animal kingdom, they live in the animal kingdom, and as social members, they live in the social kingdom. There are lots of dimensions that have major or direct relationships between the social and animal kingdoms, and health is one of them, especially health. Reproductive health, epidemiology, etc. are strangely related to the social and environmental kingdoms. Causes, treatment, prevention, and promotion are the four major dimensions of health .And all four dimensions are directly related to the economic dimension, like If a family has a good economic situation, they are more likely to make good food choices. If they have access to a a good economic similation, and a levels are higher than in other families. AIDS, tuberculosis, variety of nutrients, their nutritional levels are higher than in other families. Typhoid, and other diseases have had a direct and long-term impact on human society throughout

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प्रकाशित सामग्री से संपादकीय सहमति आवश्यक नहीं है। पत्रिका से संबंधित सभी विवाद केवल बिजनौर स्थित न्यायालय के अधीन होंगे। शुल्क की राशि 'शोध दिशा' बिजनौर के नाम भेजें। (सन् 1989 से प्रकाशन-क्षेत्र में सक्रिय)

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# मंगलेश डबराल की कविताओं में विस्थापित जीवन श्रीमती रामेश्वरी दास, शोधार्थी, साहित्य एवं भाषा अध्ययनशाला डॉ॰ मधुलता बारा, शोध-निर्देशक, एसां॰ प्रांफसर (हिंदी) साहित्य एवं भाषा-अध्ययनशाला पं॰ रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छत्तीसगढ़)

हिंदी साहित्य-जगत में एक शब्द है-विस्थापन। यह शब्द जितना सारगर्भित शब्द है, उतना ही दुखद भी है। कैसा होता होगा वह क्षण जब लोग अपने जल, जंगल, जड़ और जमीन से उखड़कर कहीं और रोपित किए जाते हैं। अपना घर-बार अपनी संस्कृति-सभ्यता से दूर हो जाते हैं। उखड़कर कहीं और रोपित किए जाते हैं। अपना घर-बार अपनी संस्कृति-सभ्यता से दूर हो जाते हैं। आब विस्थापन की समस्या हमें लोक-जीवन में दिखाई देता है। यह विस्थापन अपनी पीड़ा को बक्त करती है। कवि मंगलेश डबराल का जीवन इसी घटना से आहत है और उनका विस्थापित बीवन कितना दुखद और संघर्षपूर्ण था, वे अपनी कविताओं के माध्यम से बराबर अभिव्यक्त करते हैं। कवि और कवि सरीखे कितने लोगों का जीवन विस्थापित हुआ है और वे अपनी जड़, जंगल और जमीन को भूल नहीं पाते, सदैव स्मरण करते रहते हैं। कवि मंगलेश डबराल इस विस्थापन को पहड़ से मैदान पर पत्थर की तरह खिसक आना कहते हैं। यह उनकी कविता 'बची हुई जगहें' में सप्ट दिखाई देती है-

चीजें खो जाती हैं लेकिन जगहें बनी रहती हैं हम कहीं और चले जाते हैं अपने घरों, लोगों, अपने पानी और पेड़ों से दूर

मैं जहाँ से एक पत्थर की तरह खिसक कर चला आया

उस पहाड़ में भी एक छोटी-सी जगह बची होगी'

हम जहाँ अपना बचपन जीते हैं, वहाँ की कितनी यादें हमारे जीवन के साथ जुड़ी रहती हैं और हम परिस्थितिवश कहीं और आ जाते हैं, लेकिन उन जगहों पर वे यादें जीवंत रहती हैं और हमारे हृद्य के भीतर वही यादें ज्वालामुखी की तरह दबी रहती हैं। कवि मंगलेश डबराल भी अपने गाँव, अपना जीवन, अपना पहाड़, अपनी कविताओं में उनका ओझल होना दिखाते हुए 'एक पुरानी कहानी' कविता में स्पष्ट करते हैं—

> अब हम आ गए हैं घर से बहुत दूर चट्टानों से फूटकर चट्टानों में जगते पानी की आवाज अब नहीं सुनाई पड़ती नहीं दिखते पुरखों के लाए हुए पत्थर जिस पर हम सुस्ताने बैठते थे यात्राओं की थकान के बाद<sup>2</sup>

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# Are MSME Employer of Choice? - An Empirical Enquiry

Sanskrity Joseph and S. K. Indurkar

Institute of Management, Pt. Ravishankar Shukla University, Raipur (CG), 492010

#### Abstract:

The start-up boons and entrepreneurial insights of young entrepreneurs have brought a renaissance in the Indian MSME sector in India. Small and medium sector industries in India are offering a host of employment opportunities to skilled and unskilled labour along with a vast array of innovative products and service offerings. Ahmed and Sanu (2016) indicated that MSME sector is approximately going to employ 80.52 million people in near future. The advent of a pandemic like covid has shrunk the job markets and job markets have witnessed a steep decline in their job offerings. Tripathi (2020) highlighted that pandemic in India has contracted the earnings of MSME by 20% thus causing huge impacts on employability and generation of employment in this sector. Further lack of manpower planning coupled with a low orientation towards training has increased the problems related to attraction and retention of manpower in MSMEs in India. Ambler and Borrow (1996) have indicated that employer branding is key to retention and acquisition of employees in competitive labour markets. The covid situation in India has necessitated the understanding of employing the right man for the right job to make optimum utilization of scarce resources. Further a huge distress amongst job aspirants as they are unable to connect with their future employers due to strict covid protocols. Social media in various cases has come to the rescue where recruitment advertisements are published by companies through various social media platforms to reach the right talent base. In the current scenario where the job market is shrinking and employability is decreasing the present paper is an attempt to understand whether MSMEs can become an employer of choice.

Key Words: MSME, employer branding, manpower planning, social media

Date of Submission: 02-07-2022	Date of Acceptance: 14-07-2022

#### I. Introduction:

The approach is always guided by the need of Indian Markets. Employer branding practices in the MSME sector are also a leading example of this standard. Purushottam et al (2019) indicated that financial constraints and lack of loyal employees are still the basic problems of MSMEs. He further opined that employees in the MSME sector feel that the practice of employer branding is still in its novice stage in the MSME sector. MSME sector in India faced an unprecedented situation with the advent of the Pandemic. The bottlenecks in meeting the dwindling demand side of its products and services led to an extreme disparity in the sector. The Government of India with its handy financial packages has made a gigantic effort to revive its MSMEs sector. This has forced the MSMEs to come up with a strategic plan to work for their survival. Gudi et. al (2021) underlined the problem of the MSME sector in India by highlighting that the downfall in economic activities reduced productivity leading to a loss in employment opportunities which in turn brought uncertainty with respect to income generation and survival. Further, the process of branding is almost absent in the MSME sector in India as well as abroad. The management of MSME perceives branding as a futile exercise as they feel that trading can be done without branding. Setiawati (2019) highlighted that lack of use of communication channels to promote themselves as a brand has led to the loss of market for MSME. Srinivasan and Kunjangad (2019) further highlighted that the MSME sector is working with various dilemmas. They focus on short-term strategies and ignore efficient demand management practices which can be better handled by innovation and equipped manpower.

The feeling of uncertainty related to job markets is causing huge pressure on individuals who are now termed as Covid batch and are facing problems with their career progressions. The effect of the pandemic had a direct effect on their examination and results which were caused by delays in sessions due to country-wide lockdowns. They are eagerly looking for a career opening in the MSME sector. They are the internet generation and they usually use Social media to enquire about jobs in their relevant fields. Social recruitment is becoming a recommended source for tracing potential employees. Hamdan et. al (2019) used the promotion optimisation model to understand the impact of the promotion mix on prospective clients. Their study concluded that the perception of the receiver of a message with respect to mutual trust and responsibility related to a media determines its success. Grzesiuk and Wawer (2018) conducted a survey of 100 Polish companies to understand

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# Paper Titles- Review on Optimization of the process for phosphate solubilization

Dr. Pervez Ahmed Khan<sup>1</sup>, Dr. Amia Ekka<sup>2</sup>, Dr. Mehar Afroz Qureshi<sup>3</sup>

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#### ABSTRACT

Improving soil fertility is one of the most common practices in agricultural production. Phosphorus (P) is one of the most essential plant nutrients for maximizing crop productivity. This nutrient is limited in soils, which remain as a major challenge to agriculturists and land managers. Phosphorus is one of the major nutrients, second only to nitrogen in requirement for plants. A greater part of soil phosphorus, approximately 95–99% is present in the form of insoluble phosphates and cannot be utilized by the plants. Compared with the other major nutrients, phosphorus is by far the least mobile and available to plants in most soil conditions. Although phosphorus is abundant in soils in both organic and inorganic forms, it is frequently a major or even the prime limiting factor for plant growth.

Keywords: Aspergillus, Penicillium, Phosphate solubilizing fungi & Solubilization

A large number of micro-organism including bacteria, fungi, actinomycetes and algae shows Phosphate solubilization and mineralization capacity. Soil microorganisms improve plant nutrient acquisition. They are involved in a wide range of biological processes including the transformation of insoluble soil nutrients [1]. Among them some are capable of solubilizing and mineralizing insoluble soil phosphorus for the growth of plants. Phosphorous is a major growth limiting nutrient. As like nitrogen, there is no large atmospheric source that can be made biologically available. Phosphorous plays a major role in plant growth and is the key plant growth limiting nutrient despite its abundance in soils in both inorganic and organic forms [2]. [3] explained the effect of incubation periods on phosphate solubilization from phosphate rock. The inoculation of the growth media with the Aspergillus niger resulted in the highest phosphate solubility of the rock phosphate after 9 day of culturing. The effects of different pH and temperatures on the growth of Rhizoctonia solani and solubilization of insoluble calcium phosphate, strontium hydrogen phosphate, zinc phosphate, cobalt phosphate and manganese phosphate by Rhizoctonia solani on solidified media was investigated by Jacobs et al., 2002.



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# Review on Use of Phosphate solubilizing fungi as biofertilizer for Chikpea production

Dr. Pervez Ahmed Khan<sup>1</sup>, Dr. Amia Ekka<sup>2</sup> and Dr. Mehar Afroz Qureshi<sup>3</sup>

 1(School of Studies in Life sciences, Pt. Ravishankar Shukla University, Raipur – 492010, Chhattisgarh, India)
 2(School of Studies in Life sciences, Pt. Ravishankar Shukla University, Raipur – 492010, Chhattisgarh, India)
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# ABSTRACT

Phosphate solubilizing microorganism plays an important role in the plant nutrition through increase in P uptake by the plants and their use as plant growth supporter, is an important contribution to biofertilization of agricultural crops. The use of efficient PSM (phosphate-solubilizing microorganisms), opens up a new option for better crop productivity and for better yield performance without affecting the soil health. Phosphorous is one of the most abundant metallic element found in the earth's crust and present in soils in both organic and inorganic forms. Though it is present in high concentration, only 0.1% of the total P is available to plant because of poor solubility and its fixation in soil with other metallic elements in the soil such as Ca, Al, Fe to form calcium phosphate, aluminum phosphate and ferrous phosphate and thus becomes unavailable to plants. Execusaive use of chemical based P fertilizers has long term impact on the environment in terms of eutrophication, soil and fertility reduction.

Keywords: Aspergillus, Penicillium, Phosphate solubilizing fungi & Solubilization

Many researchers reported the positive effects of phosphate solubilizing fungi on the growth of various plants. [1] was expalin the growth of maize (*Zea mays*) plant were significantly enhanced by *Aspergillus tubingensis* and *A. niger* in nursery condition. [2] was arrangement of pot experiment of soyabean plant. *A.niger* and *P. italicium* significantly improved dry matter, yield of plant, percentage of protein and oil. [3] reported that the dual inoculation of *Aspergillus niger* and *P. notatum* was significantly improved dry matter, yield of groundnut plant, percentage of protein, nitrogen, phosphors and oil content in pot experiment. [4] investigated the enhancement of the growth and mineral nutrition of lettuce plants by *Penicillium albidium*. [5] reported the effect of phosphate solubilizing fungi (*Penicillium bilaji and Penicillium* sp.) and phosphorus levels on growth, yield and nutrient content in maize. They explained significantly influenced plant height, number of leaves per plant, dry matter production, cob length, grain weight per cob, grain yield and tissue nutrient content. Effect of phosphate solubilizing fungi on the soil nutrient status and yield of mungbean (*Vigna radiate* L) crop was reported by [6].

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# NATIONAL PENSION SYSTEM VIS-À-VIS CONTRIBUTORY PROVIDENT FUND: A STATISTICAL STUDY ON TWO SOCIAL SECURITIES IN INDIAN SCENARIO

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#### ABSTRACT

Social Security provides a basis of income on which employees can make a plan for their life after retirement or being disabled before retirement or for various needs of the family during service and financial support to the family in case of death of the employee while in service. There are various social security avenues like healthcare, disability, childcare, provident fund, gratuity, pension, insurance, etc. For organized sector employees the important contributory social security schemes are National Pension System (NPS) and Contributory Provident Fund (CPF). NPS is a defined contribution pension system administered and regulated by the Pension Fund Regulatory and Development Authority (PFRDA) while CPF is administered by the Employees Provident Fund Organization (EPFO). An employee can avail of only one institutional contributory scheme as per the rules laid down by the government. The current study through a literature review trics to highlight various aspects of the NPS and CPF. Further, the research brings forward the differences between NPS and CPF statistically. For this literature review research papers, various thesis/dissertations, websites, etc. have been referred. The findings bring in to light the merits and denerits of both schemes.

Keywords: Social Securities, National Pension System, Contributory Provident Fund.

## 1. INTRODUCTION

As per the Social Security Bulletin, Volume 55, No.1, Spring 1992, pp.63-64, the credit for introducing the term "Social Security"<sup>1</sup> goes to Abraham Epstein, a national leader in the social welfare movement in the first half of the century of the United States of America.

# 1.1 SOCIAL SECURITIES

As per the bulletin, Epstein worked as Research Director at the Pennyslvania Commission on Old Age Pensions from 1918 to 1927. It was due to his efforts that the State adopted the old-age assistance law in the year 1923 and in 1927 he founded the American Association for Old Age Security. In 1933 he changed the name of his organization from the "American Association for Old Age Security" to "American Association for Social Security" which later on became the basis of the Social Security Act of 1935 establishing the Federal Old-Age Benefits Program, the Unemployment Compensation program and the Federal Assistance Program (among other similar social welfare programs).

Webster's Third New International Dictionary defines the term social security as "1. The principle of public provision for the economic security and social welfare of the individual and his family (as through social insurance or assistance)." 2a. A U.S. government program established in 1935, gradually extended since, and including provisions for old age and survivors' insurance. and old age assistance; 2b. a deduction or payment made under the U.S. social security program (deducted three dollars from his check for social security) (hasn't received his social security for this month). According to Emil Frankel, Epstein's friend and colleague security is the term incorporated in various social legislations which became a household word in the United States and spelled assurance to millions of citizens in meeting life's untoward economic problems. Apart from individually purchased family health insurance policies, and the availability of government and charitable hospitals, there are various social security avenues for an employee working in the organized sector such as Employee State Insurance Coverage, organizational level tie-up with various private hospitals, institutional/organizational medical and health care facilities, etc. Social security for employees of the organized sector also includes Provident Fund, Gratuity, Pension, Earned Leave Encashment, etc.



# **RESEARCH ARTICLE**

## EXPLORING DYNAMIC EFFECT OF SALES PROMOTION ON CONSUMERS: A REVIEW

## Dr. Neha Soni and Dr. G.K. Deshmukh

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# Manuscript Info

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Key words:-Consumer, Digital, Purchase, Retailer and Sales Promotion

## Abstract

..... The recent trend in marketing is customers focused which is intended to fulfill diversified needs, wants and satisfying them. The consumer during purchase evaluates various marketing factors which add value to product either by saving money or providing added benefits. Retailers in this digital era adopt promotional strategies (sales promotion) on routine bases, to persuade and stimulate consumers to buy. Since decades large number of studies has been performed by various authors describing significance of sales promotion. This study elaborates the research conducted in recent years in context with sales promotion techniques and its effectiveness among consumers by reviewing 22 research papers. Sales promotion techniques includes coupons, rebates, price packs, premiums, frequency programs, prizes (contests, sweepstakes, games), patronage awards, free trials, product warranties, point-of-purchase (P-O-P) displays and demonstrations etc, which produce quick results as it boosts sales quickly and make customer loyal in long run. It was evident from past researches review that sales promotion had positive and significant influence on consumers towards purchasing similar or differential products of varying quantities from diversified segments of market. Thus, marketer by selecting combination of sales promotion techniques can exaggerating sales and generate profit.

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## **Introduction:-**

A wide number of studies on sales promotion have been reviewed since past decades discussing its significance in the present business scenario. Sales promotion is always fascinating and dynamic field of study both for marketers and retailers understood well through its models and theories. Brassington and Pettitt (2000) explained that sales promotion includes a range of marketing techniques designed within a strategic marketing framework to add extra value to a product or service over and above the 'normal' offering in order to achieve specific sales and marketing objectives, this extra value may be a short-term tactical nature or it may be part of a longer-term franchise-building program. Further, Kotler and Keller (2012) stated sales promotion, as a key ingredient in marketing campaigns, consists of a collection of incentive tools, mostly short term, designed to stimulate quicker or greater purchase of particular products or services by consumers or the trade.

The sales promotion techniques are widely considered by almost all the retailers to promote products to the customers in the market. The customers get stimulated and make decision to purchase based on available sales promotion schemes with products. According to Hawkins et al. (2001) consumer behavior is the study of individuals, groups or organizations and the processes they use to select, secure, use and dispose of products,

# THE EDUCATIONAL CHALLENGES FOR ADOLESCENT FEMALES' IN LOWER SETTLEMENT OF CHHATTISGARH: A QUALITATIVE STUDY

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# Abstract

The qualitative study examined the challenges and supporters to adolescents' girls ability to enrol in and complete secondary education in lower settlements of Raipur and Bilaspur district of Chhattisgarh State. In-depth interviews were conducted with 21 adolescent girls aged 12-19 years with their respective parents/ guardians and 10 female school teachers working in government schools' nearby slums areas. The study revealed various challenges that functioned at individual, family, society and educational levels which were found to prevent disadvantaged caste adolescent girls from enrolling in and continuing their education in this environment. Further, the supporters of education were also identified. The study emphasizes the significance of trying to alter ideas and expectations around gender norms as well as raising the standard of education in this context in order to remove barriers to girls' education. **Key words:** Adolescent girl, Education, Gender, Challenges, Supporters, lower settlement.

# Introduction

It is commonly agreed that increasing females' school attendance benefits both individual and society and is a matter of social equality and development. Girls' education has ramifications beyond the girl herself, since it benefits the whole community and nation. Educating girl's helps in economic development by increasing productivity and reducing the income gap in families (Abu-Ghaida&Klassan, 2004; Birdsall et al., 1993). However, in certain countries, (India) females are still disadvantaged in terms of school access and experiences, and are more likely to school drop-out than boys. The prevalence of child or adolescent marriage and neonatal and maternal mortality increases as the school dropout rate rises (Hill & King, 1995; Jensen, 2012). To begin addressing the problem of education participation, a deeper knowledge of the factors that encourage females from attending and remaining in secondary school is required to achieve a success in gender disparity in India.

"Adolescence" is Latin originated word "Adolescere" means, "to grow, to mature", "to emerge" or "achieve identity". It is a significant phase of transition from childhood to adulthood bringing a change in mental, emotional and psychological development. As per WHO, age of adolescence lies between 10-19 years, but in Indian culture girls are considered to be grown up after the occurrence of menarche, they are no more treated a child (Abraham, Leena, 2001).

Globally, gender parity in OOS (out of school) rates is declining, but regional and national differences continue. Out the 77.7 percent Indian literacy rate in 2022, male literacy rate stands at 84.7 percent and female literacy rate stands at 70.3 percent as compared to global average female literacy rate of 79 percent (as per UNESCO<sup>1</sup>). The net attendance ratio (NAR) declines in secondary school remain illusive for females: according to National Family Health Survey, 2019-21, NAR of female age 6-13 years is 93.9 percent, 11-13 years is 92.6 percent, 14-15 years is 81.6 percent and 16-17 years is 62.6 percent showing a down fall.

Even in 20th century, adolescent girls outlook are often being ignored there are very limited evidence available who talks about these girls (Sylvia, Martina and Jordana,2017). In India, gender norms subordinate women to males in public and private activities in terms of power and wealth. This problem offers a severe barrier to achieving SDG-4 (Sustainable Development Goals) to "provide

<sup>&</sup>lt;sup>1</sup> https://www.unesco.org/en/articles/why-educating-women-more-important-werealize#:~:text=Some%20Important%20Statistics&text=Of%20the%2077.7%25%20Indian%20litera cy,%25%20(as%20per%20UNESCO).



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Picard-Mann hybrid iteration process for nonexpansive semigroup in CAT(0) spaces



# An improved user authentication and key agreement scheme for roaming service in ubiquitous network

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#### Abstract

Up till now, numerous authentication and key agreement schemes have been proposed for ubiquitous networks. Recently, Arshad and Rasoolzadegan also proposed an authentication and key agreement scheme for ubiquitous network with user anonymity. However, we determined that Arshad and Rasoolzadegan's scheme has the following flaws: (1) the login phase is inefficient, which may lead to server resource exhaustion attacks; (2) the password change phase is inefficient and not user-friendly; and (3) the revocation phase arisen when the mobile device is lost and the re-register phase is absent. Therefore, we propose an improved scheme that successfully removes all of the previous mentioned flaws existing in Arshad and Rasoolzadegan's protocol by using the biometric based authentication. Formal analysis of the proposed scheme is conducted using the random oracle model, and heuristic analysis is also conducted to demonstrate that the proposed scheme fulfills all of the security requirements. In addition, the proposed scheme is validated by the Automated Validation of Internet Security Protocols and Applications (AVISPA) tool. Moreover, computational and communication cost comparisons indicate that our improved scheme is more suitable for ubiquitous networks.

Keywords Ubiquitous networks · Mutual authentication · Key agreement · Random oracle · AVISPA

# **1** Introduction

Ubiquitous networks enable any mobile user (MU) to remotely access the data and resources of the foreign

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network (FN) via the home network (HN). A MU registers himself/herself with his/her HN. When the MU moves away from the region in which his/her HN can provide service, he/she should contact the FN to request for the resources. The MU sends a request to the FN; then, the **FN** forwards it to the **HN** for authentication of the **MU**. After authenticating the MU, the HN accordingly sends the result back to the FN. Then, the FN decides to accept or decline the request on the basis of the result received from the HN. Once the HN has authenticated the MU, a session key is established between FN and MU to ensure secure communication in the future. In addition to mutual authentication, the privacy and intractability of the user's identity are also critical issues in ubiquitous networks. Elliptic curve cryptography (ECC), RSA, hash function, chaotic map, XOR, and concatenation operation are some commonly used cryptographic tools to design secure mutual authentication and key agreement schemes. Given its shorter key length, the ECC equipped with 160 bits key length is faster and more efficient than the RSA equipped with 1024 bits key length. Hash functions and chaotic maps are equivalent in terms of security. However, the hash function is more desirable than the chaotic map because of its lower computation cost.

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# NUMERICAL RECKONING OF FIXED POINTS FOR GENERALIZED NONEXPANSIVE MAPPINGS IN CAT(0) SPACES WITH APPLICATIONS

#### Manoj Kumar<sup>1</sup>, Hemant Kumar Pathak<sup>2</sup>

In this paper, we propose an iterative process for the reckoning of a fixed point of a mapping endowed with the (E) property in the setting of CAT(0) spaces. Results on strong and  $\Delta$ -convergence for this algorithm are stated and proved. Numerical examples are provided, regarding the behavior of this method from different point of views. Several relevant theorems in the existing literature have been generalized and improved.

**Keywords:** Iterative algorithm; condition (*E*); fixed points;  $\Delta$ -convergence; strong convergence; CAT(0) space.

**MSC2020:** 47H09, 47H10, 58C3.

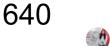
#### 1. Introduction

Various nonlinear equations can be transformed in fixed point problems, a fact which allows determining their solutions by means of iterative processes. After Picard [21] introduced his famous iterative algorithm, Mann [17] developed this idea further. Ishikawa [11] stated a two step algorithm for the determination of a fixed point for a suitable class of operators, by means of two auxiliary sequences of real numbers from [0, 1]. Agrawal et al. [2] introduced another two step method based on two sequences, which satisfy a condition defined by means of a divergent series, for nearly asymptotically nonexpansive mappings. Noor [19] developed a three step iterative scheme in order to solve a class of variational inequalities by means of a fixed point approach. Sintunavarat et al [27] introduced a new three step iteration scheme for approximating fixed points of the nonlinear self mappings on a normed linear spaces satisfying Berinde contractive condition. Sahu et al. [24] developed an S-iteration technique for finding common fixed points for nonself quasi-nonexpansive mappings in the framework of a uniformly convex Banach space. Suzuki [28] proved convergence theorems for an algorithm designed for mappings endowed with the property (C), which is obviously fulfilled by nonexpansive mappings. These results have been developed further by Pant and Shukla [20], to the class of generalized  $\alpha$ -nonexpansive mappings. Extending more, the operators which fulfill the condition (E) were introduced by García-Falset *et al.* [9], and fixed point properties have been proved by means of almost fixed point sequences. Basarir and Sahin [3] performed a study of the S-iteration method in the framework of CAT(0) spaces, for a class of generalized nonexpansive mappings. The same geometric setting has been used by Dhompongsa and Panyanak [8] or by Khan and Abbas [12] in order to develop  $\Delta$ -convergence theorems for various algorithms. Garodia and Uddin [10] stated the counterpart of the Thakur *et al.* [29] scheme in the setting of CAT(0) spaces, for Suzuki generalized nonexpansive mappings. Nanjaras et al. [18] developed a Mann type iterative

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# Picard-Mann hybrid iteration process for nonexpansive semigroup in CAT(0) spaces

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# Nano-constructs targeting the primary cellular energy source of cancer cells for modulating tumor progression

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#### ARTICLE INFO

Keywords: Cancer Tumor microenvironment Glucose metabolism Tumor targeting Nanocarriers Nanoagent

#### ABSTRACT

Cancer cells, like all other cells in the body, require energy to perform basic functions, develop, and survive. Glucose metabolism (GM) is the primary energy source for cancer cells and is necessary for their proliferation, growth, and survival. This suggests that energy deprivation to cancer cells might help to keep the disease under control or eliminate it altogether. To improve the efficiency of cancer therapy, GM must be regulated, and nanomedicines provide a potential and ideal solution by targeting both the cytosol and the nucleus in the cellular domain. This is doable since both nanotechnology and the identification of suitable pharmacological targets are advancing substantially. Here, we reviewed the various mechanisms of GM as the major source of tumors and depicted the ongoing research to manipulate GM to render tumors susceptible to a wide range of chemotherapeutics, thermotherapy, dynamic therapy, and hypoxia. Also, we discussed the pros and cons of creating multifunctional nanomedicines that can boost the efficacy of these therapies by controlling GM as a key element of tumor targeting.

#### 1. Introduction

Cancer is a substantial threat and leading cause of death and disability to global public health. The number of people diagnosed with cancer each year is rising, with an estimated increase of 1.9 million this year. Particularly in developing and middle-income

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*Abbreviations*: ABC transporters, ATP-binding transporters; AMPK, AMP-activated protein kinase; ABC, ATP binding box; ADP, adenosine diphosphate; ATP, adenosine triphosphate; BBB, blood-brain barrier; BCL-2, B-cell lymphoma-2; CXCL1, chemokine ligand; CLSM, Confocal laser scanning microscopy; DLS, Dynamic light scattering; EPR, Enhanced permeability and retention; FACS, fluorescence-activated cell sorting; GLUTs, glucose transporters; Gox, Glucose oxidase; H&E, Hematoxylin and eosin; HPLC, high-performance liquid chromatography; HSPs, Heat shock proteins; ICP-MS, inductively coupled plasma mass spectrometry; MCT1, monocarboxylate transporter 1; MMP, mitochondrial membrane potential; MOMP, mitochondrial outer membrane permeability; MRI, magnetic resonance imaging; MTT, 3-(4,5)-dimethylthiahiazo(-2)-3,5-diphenylte-trazoliumromide; NIR, near-infrared; NPs, nanoparticles; PEP, phosphoenolpyruvate; P-gp, P-glycoprotein; ROS, reactive oxygen species; RT-PCR, real-time quantitative polymerase chain reaction; SEM, scanning electron microscope; TEM, transmission electron microscopy; TME, tumor microenvironment; UPLC, ultra-performance liquid chromatography; 2DG, 2-deoxyglucose; 3-BP, 3-bromopyruvate; ECM, extracellular matrix; PDT, photo-dynamic therapy; RNA, ribonucleic acid; CTD, Chemo-dynamic therapy SOD; PTT, Photo-thermal therapy; ZIF-90, zeolitic imidazolate framework.

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# Nano-constructs targeting the primary cellular energy source of cancer cells for modulating tumor progression

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**REVIEW ARTICLE** 



# Novel archetype in cancer therapeutics: exploring prospective of phytonanocarriers

Nisha Yadav<sup>1</sup> · Deependra Singh<sup>2</sup> · Manju Rawat<sup>2</sup> · Neelam Sangwan<sup>1</sup>

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## Abstract

This paper reports various types of cancer, their incidence, and prevalence all over the globe. Along with the discovery of novel natural drugs for cancer treatment, these present a promising option which are eco-friendly, safe, and provide better acceptability in comparison to synthetic agents that carries multiple side effects. This paper provides an idea about various nanocarriers and phytochemicals, along with how their solubility and bioavailability can be enhanced in nanocarrier system. This report combines the data from various literature available on public domain including PubMed on research articles, reviews, and along with report from various national and international sites. Specialized metabolites (polyphenols, alkaloids, and steroids etc) from medicinal plants are promising alternatives to existing drugs. Studies have suggested that the treatment of cancer using plant products could be an alternative and a safe option. Studies have shown with the several cell lines as well as animal models, that phytomolecules are important in preventing/treating cancer. Phytochemicals often outperform chemical treatments by modulating a diverse array of cellular signaling pathways, promoting cell cycle arrest, apoptosis activation, and metastatic suppression, among others. However, limited water solubility, bioavailability, and cell penetration limit their potential clinical manifestations. The development of plant extract loaded nanostructures, rendering improved specificity and efficacy at lower concentrations could prove effective. Nanocarriers, such as liposomes, nanostructured lipids, polymers, and metal nanoparticles, have been tested for the delivery of plant products with enhanced effects. Recent advances have achieved improvement in the the stability, solubility, bioavailability, circulation time, and target specificity by nanostructure-mediated delivery of phytochemicals. Nanoparticles have been considered and attempted as a novel, targeted, and safe option. Newer approaches such as phyto-nanocarriers with carbohydrates, lignin, and polymers have been considered even more selective and effective modes of drug delivery in biomedical or diagnostic applications.

**Keywords** Cancer · Phytochemical · Phyto-nanocarriers · Nanoparticles · Phytotherapeutics · Polyphenols · Alkaloids · Steroids · Macromolecules · Anticancer

# Introduction

Cancer is a genetic disease that can be characterized by the alteration of genes. Each year, cancer ranks as the second leading cause of fatalities (Jubeen et al. 2019). Uncontrolled development and extension of the cell, due to which cell stop responding on their checkpoints, which in turn leads

to growth of tumor and metastasis is known as cancer (Rai et al. 2014). It is a Non-Communicable Disease (NCD) and is widely recognized as a global threat (Christina et al. 2019). Every fourth person is at risk of their life due to cancer, which is an alarming situation (Jemal et al. 2011). A person, who is prone to cancer, has weak immunity or suppressed immune system. The factors, such as older age, stress conditions, chronic devitalizing ailments, history of chemotherapy, as well as drug resistance, all these factors may further increase the risk of cancer development (Hanahan and Weinberg 2011).

A load of cancer all over the world in 2020 is raised approximately 19.3 million new cases and about 10 million deaths. There are more than thirty types of cancer that are reported to affect both men and women, for example, breast,



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#### **REVIEW ARTICLE**



# Novel archetype in cancer therapeutics: exploring prospective of phytonanocarriers

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<sup>2</sup> University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh 492010, India to growth of tumor and metastasis is known as cancer (Rai et al. 2014). It is a Non-Communicable Disease (NCD) and is widely recognized as a global threat (Christina et al. 2019). Every fourth person is at risk of their life due to cancer, which is an alarming situation (Jemal et al. 2011). A person, who is prone to cancer, has weak immunity or suppressed immune system. The factors, such as older age, stress conditions, chronic devitalizing ailments, history of chemotherapy, as well as drug resistance, all these factors may further increase the risk of cancer development (Hanahan and Weinberg 2011).

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# Insight and Perspective on Omicron's Development, Behaviour, and Vaccine Breakthrough: Next Sequelae of COVID-19

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## ABSTRACT

**Background:** The Severe Acute Respiratory Coronavirus (SARS-CoV-2) has emerged in a variety of forms since its first appearance in early December 2019. The Omicron variation (B.1.1.529) was recently confirmed as a relatively new Variant of Concern (VOC). There are several mutations in this S-protein, making it an exclusively lethal version of the protein. Omicron variants feature multiple mutations clustered in a region of S protein that is the principal target of antibodies, and these mutations may have an impact on the binding affinities of antibodies to the S protein, as demonstrated by structural analysis. **Materials and Methods:** Google, Sciencedirect, Web of science, and ResearchGate databases have been explored for potentially existing research to obtain the most emerging trends and up-todate metadata on various perspectives of Omicron variants. **Conclusion:** There is evidence that the Omicron variant's mutations may interfere with antibody binding in people who have been exposed to the SARS-CoV-2 virus in the past. At the moment, there is very little information on the Omicron version. Therefore, mutation dispersion evaluations, evolutionary links to previous variants, and putative structural effects on antibody binding effects are all explored in this work. **Results:** In the current state of pandemic crises, the comprehension of Omicron will pave a path for healthcare professionals to treat infectious conditions very well.

Keywords: SARS-CoV-2 virus, Mutations, Omicron, Vaccines, Antibody.

#### Correspondence

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# INTRODUCTION

There is still a lot of disquiet about the regional and multilateral effects of the SARS-CoV-2 pandemic. In some places, vaccinations for the SARS-CoV-2 virus are promising to ease this anxiety, but it is still a recurrent and low-key global public health crisis.<sup>1</sup> People who don't get enough vaccines; people who aren't sure about getting vaccines; and people who spread misinformation on social media all play a role in this outcome.<sup>2</sup>

COVID-19 has killed over 5 million population since the pandemic began, nearly two years ago. The world is still on high alert for COVID-19. People from the World Health Organization (WHO) have been meticulously watching and analyzing the development of SARS-CoV-2 since the beginning of 2020.<sup>3</sup> The WHO has been working worldwide with governments, public health organizations, and researchers to do this. Since January 2020, many countries have seen many different types of the virus emerge and become the most common. The Alpha, Beta, Gamma, and Delta variants have been the utmost common so far. However, the Delta (B.1.617.2) variant of SARS-CoV-2 has been the most important in terms of how it can be transmitted and scattered.<sup>4-5</sup>

When COVID-19 was first reported, it was 23 months old and there were an estimated 260 million cases and 5.2 million deaths worldwide. On Nov 24, 2021, a different and improved SARS-CoV-2 variant of concern (VOC), omicron, was found.<sup>6</sup> There is still no proof that Omicron is more spread quickly from person - to - person than other variants of the virus, like Delta, so it isn't clear yet whether this is the case. This variant has caused more people in South Africa to test positive, but epidemiological data are underway to find out if it's because of Omicron or something else.<sup>7</sup>

In addition, it isn't yet clear if Omicron infections cause more severe illnesses than infectious diseases with other variants, such as Delta. Initial data suggests that more people are getting sick in South Africa, but this could be because more people, in general, are getting sick, not because they are getting sick with Omicron. There is no evidence that Omicron has any symptoms that are distinctive from other variants. Early infections were reported by university students, who are younger and more likely to have milder illnesses.5,8 It will further take several days to several weeks to figure out how bad the Omicron variant is. Covid-19 can come in many different forms, such as the Delta variant that is most common. All of them can cause serious illness or death, particularly for vulnerable people, so prevention is always important.9 Is to provide a comprehensive overview of various facts that highlight the structure and transmission of omicron, as well as the severity of the disease, the impact on diagnostics, and the development of vaccines, which are all covered in this review.

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**Original** Article



# Formulation of Topical Itraconazole Nanostructured Lipid Carriers (Nlc) Gel for Onychomycosis

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# Abstract:

Itraconazole is a triazole antifungal agent that is synthesised. Itraconazole has been manufactured into a variety of pharmacological formulations and administered by a variety of ways. Itraconazole pills are used to treat pulmonary fungal infections that can spread throughout the body. Because Itraconazole is not yet officially listed in any pharmacopoeia, only a few procedures for quality control and stability testing in pharmaceutical formulations have been published. The development of itraconazole-loaded nanostructured lipid carriers (ITZ-NLC). Itraconazole NLC have been successfully developed. Itraconazole topical NLC developed for the treatment of onychomycosis does not exist, according to my survey. The development and evaluation of stable itraconazole topical gel formulations proved successful. Itraconazole NLC was produced utilising the microemulsion method, indicating the viability of adopting this method as a continuous manufacturing tool for NLC formulation. Further, the ITZ- NLC was incorporated in the gelling agent and we evaluated it under specific parameters.

Keywords: Nanostructured lipid carriers, Itraconazole, Nail delivery, Onychomycosis.

# Introduction

Common fungal nail infections include onychomycosis (OM) (Olbrich et al.,2022). Dermatophytes typically cause onychomycosis, a nail fungal infection. However, infections that cause nail disease include yeasts and non-dermatophyte moulds (NDM). (Haghani et al., 2022). Tinea unguium is the term used to describe onychomycosis brought on by dermatophytes. The word "onychomycosis" includes diseases caused by yeasts, saprophytic moulds, and dermatophytes in addition to dermatophytes. One kind of dystrophic nail is an aberrant nail that is not brought on by a fungal infection. Both fingernails and toenails can have onychomycosis, but the toenail infection is significantly more common. We'll talk about the prevalence of the condition, clinical subtypes, staging, diagnosis, and treatment options for toenail onychomycosis (Bodman., 2022). About half of all nail illnesses are onychomycosis, which is brought on by non-dermatophyte moulds (NDMs), a dermatophyte species. New epidemiologic studies could aid in the treatment and prevention of onychomycosis as the disease becomes more prevalent. (Razavyoon et al., 2022; Navarro-Bielsa., 2022).

The most typical fungus infection of the nail, onychomycosis, affects the area beneath the fingertips and toes. Onychomycosis can currently be treated with oral and topical medications, either separately or in combination. Poor drug bioavailability and potential gastrointestinal and systemic side effects have been linked to oral antifungal medication. (Dehari et al., 2022).



# **UV Spectroscopy Analysis for Itraconazole**

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# Abstract:

Itraconazole is a triazole antifungal agent that is synthesised. Itraconazole has been manufactured into a variety of pharmacological formulations and administered in a variety of ways. Itraconazole pills are used to treat pulmonary fungi that can cause fungal infection and spread throughout the body. Because Itraconazole is not yet officially listed in any pharmacopoeia, only a few procedures for quality control and stability testing in pharmaceutical formulations have been published. The goal of this study is to develop a more precise, easy, and cost-effective spectrophotometric approach for analysing Itraconazole in bulk and capsule dosage forms with improved precision, accuracy, and sensitivity. The UV spectroscopic determination was performed with Chloroform as the solvent at an absorption maximum of 267 nm. Linearity over the concentration range in the UV spectroscopic approach. The linearity of Itraconazole over the concentration range was found to be 1-10 g/ml using the UV spectroscopic technique, with a correlation coefficient of 0.999. The findings of the analyses were statistically and the recovery studies have confirmed this.

Keywords: Itraconazole, pharmacopoeia, UV spectroscopic technique, Quality control.

## Introduction

Itraconazole is a triazole antifungal agent that is synthesised. Itraconazole is a racemic combination of four diastereomers (two enantiomeric pairs), each with three chiral centres, in a ratio of 1:1:1:1. The following nomenclature can be used to denote it: 4-[4-[4-[4-[2. (2, 4dichlorophenyl) - two (1H-1, 2, 4- triazole- 1-ylmethyl) - 1,3- dioxolan-4-yl] methoxy]phenyl] piperazine-1- yl]phenyl] piperazine-1- yl]phenyl] piperazine-1- yl]phenyl] piperazine-1yl]phenyl] piperazine-1- -2-(1-methyl propyl) -2, 4-dihydro-1, 2-dihydro-1, 2-dihydro-1, 2dihydro-1, 2-dihydro-1, 2-dihydro (Fig 1).

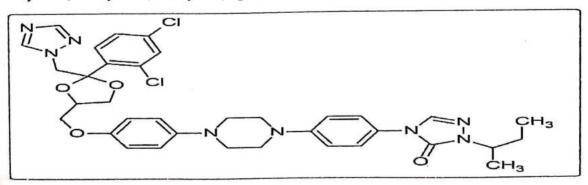


Figure1: Itraconazole's structure

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# **Cosmetic Testing Equipment: Device and Types of Equipment for**

# Dermatological Evaluation for Women's Skin

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# Abstract:

There are many different equipment and techniques for an aesthetic skin evaluation, efficacy testing, claim support, and objective measurements of women's skin parameters for all applications. Women have softer skin than men. Nothing commercially available in terms of moisture, oiliness, color, texture, etc existed over 20 years ago. Fortunately, several cost-effective ways are available to quantify these characteristics and compare them before and after a treatment or application. Before distributing the finished product to outside testing facilities for the final validation, the cosmetic business conducts these tests at different stages of product development to determine the product's direction. In this review, we have summarized the C+K devices that are acknowledged as industry-standard tools for assessing efficacy in the fields of cosmetics and the types of equipment used for the cosmetic evaluation of the skin.

Keywords: Cosmetic equipment, types of equipment, evaluation, skin parameters, dermatology.

# Introduction

Cosmetics must be examined during production to ensure that they meet product specifications, are safe, and are made economically. Sensory approaches have been used from the earliest to establish sensory evaluation methods for objectively understanding users' impressions. Although the only instrumental method cited was a spectrometer to detect sunscreen chemicals, an article on dermatologically efficacy testing was published in the Society of Cosmetic Chemists' first publication, which was published in 1947. 1956 was the year that the first instrumental method of measuring the static charge on human hair was published. The in-vitro method using radioisotopes to measure absorption by hair was also published in the same journal. The development of the means of measuring cosmetic effects is driven by increasing pressure on cosmetic companies to provide solid evidence to support claims made for products. The development of the means of measuring cosmetic effects is driven by increasing pressure on cosmetic companies to provide solid evidence to support claims associated with several of the signs of aging such as reduced facial wrinkling are often subjected to intense scrutiny. Other claims include increased moisture level in the skin, improvements in skin texture, elasticity, and, smoothness, and of regulation of sebum. (Ctplus 2022)

The C+K devices are recognized as industry-standard methods for evaluating efficacy in the sectors of food, nutritional supplements, personal care products, raw materials, medications, and cosmetics. The devices are easy and quick to use, thus perfectly suitable to study the product properties on the skin in each phase of the development process. The C+K equipment





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Medicine, Integrative & Complementary Medicine

# Ethnopharmacological Insights on Therapeutic Potential of *Gloriosa superba*

Rakesh Tirkey 1, Swarnlata Saraf 1 😤 , Shailendra Saraf 1

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In this modern era, medicinal plants and their phytoconstituents have received keen attention from researchers due to the various therapeutic implication found in different pharmacological investigations. Among millions of medicinal plants, *Gloriosa superba* is one of the therapeutically important ornamental climbers that has been traditionally used to cure several diseases such as intestinal worms, skin ailments, and joint pain. Researched data also indicated that the active principle of *Gloriosa superba* can produce significant therapeutic action by affecting specific pathophysiological targets of various ailments. In the last few years, its Crude extract, isolated active principles, and novel formulations have been claimed for several pharmacological activities such as antidiabetic, hepatoprotective, anticancer, antimicrobial, anthelmintic, antivenom, analgesic, antiarthritic, *etc.* The outcome of pharmacological research confirmed that this herb might be a source of precious phytochemicals to combat Enigmatic diseases such as cancers, and autoimmune diseases. The present article gathered the detailed pharmacological explorations on *Gloriosa superba* to contribute to the development of strategies for effective delivery of its Phytoconstituents to cure critical diseases.

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# Keywords

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# Assessment of risks and interactions of pollutants in the environment

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# Swarnlata Saraf

Pandit Ravishankar Shukla University Institute of Pharmacy

# Research Article

**Keywords:** Pollutants, water pollutant, air pollutant, anthropogenic contaminants, emerging contaminants, environment

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# Oxidative stress: Insights into the pathogenensis and treatment of

# alopecia

# Shweta Ramkar, Hemendra Kumar Sahu, Narayan Hemnavi, Ravi Parashar, Preeti K. Suresh\*

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# Abstract:

Hairs are exposed to a host of endogenous and environmental stress by pollutants, microbial assaults, UV radiation, oxidized scalp lipids, grooming practices and cosmetic treatments which have diverse range of adverse consequences. The exposure to these environmental and cosmetic substances, leads to generation of free radicals, reactive oxygen species in particular, leading to 'oxidative stress. Oxidative stress generates inflammation, and/or psycho-emotional stress, and also influences the ageing process, including the hair follicle. The term alopecia signifies loss of hair owing to several factors, ultimately resulting in decreased hair density. Cell death on hair follicle (keratinocytes and its distinctive mesenchyme of dermal papilla) have been attributed to mechanisms of oxidative stress; including H2O2, nitric oxide and derivatives, ultraviolet rays, ionising radiations, endotoxininduced inflammation, photodynamic therapy and cigarette smoke. Persistent oxidative activities in the body, may generate antioxidant defense systems, which can prevent the attack of biological molecules. In case of androgenic alopecia, copper and zinc was discovered in the disrupted metabolism form in serum, urine and hair of the patients, data suggests rise in oxidative stress. This review is focused on the effects of the reactive oxygenated species in disturbing the redox balance and inducing oxidative injury that leads to androgenic alopecia.

Keywords: hair follicle, oxidative stress, antioxidants, reactive oxygen species. redox balance.

# 1. INTRODUCTION

Oxidative stress is caused by the imbalance between the production of free radicals and ability of the body to counteract or detoxify their harmful effects through neutralization by antioxidants, leading to tissue damage (Stacge et al. 2016). Free radicals are the atom or the group of atoms that contain unpaired electron and are formed during a number of biochemical reactions (Suresh et al., 2013). They are highly reactive and may cause damage to macromolecules like DNA, protein, lipid. enzymes, etc. They are also known as reactive oxygen species (ROS). Antioxidants are one of the defensive strategies that assist in controlling the level of free radical and prevent the oxidation of biomolecules. Oxidative stress have been implicated in a number of human pathologies including neuro-degenerative disorders, chronic kidney disease, skin aging and common dermatoses such as psoriasis (Richter et al. 2015; Wagener, Carels, and Lundvig 2013; Staege et al. 2016, Suresh et al., 2014). Oxidative stress is reported to be one of the key influences leading to hair loss as it is linked with a number of factors that increase cellular oxidative stress. including smoking,

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# Finasteride-loaded nanolipidic carriers for follicular drug delivery: preformulation screening and Box-Behnken experimental design for optimization of variables

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Shweta Ramkar, Preeti K. Suresh

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NeuroQuantology|July2022|Volume20|Issue8|Page 9199-9227|dol:10.14704/nq.2022.20.8.NQ44941 Adeep Kujur et al/ Optimization of Zinc Oxide Nanoparticles Biosynthesis from Morin Hydrate Using Box–Behnken Design for Enhanced Antioxidant and Antimicrobial Activity

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Optimization of Zinc Oxide Nanoparticles Biosynthesis from Morin Hydrate Using Box– Behnken Design for Enhanced Antioxidant and Antimicrobial Activity

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Abstract:

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In the present study, synthesis of zinc oxide nanoparticles (ZnONPs) through Morin Hydrate by a novel eco-friendly, rapid and easy biological method was investigated. Morin Hydrate is recognized as a major constituent of many herbs and fruits like *Psidium Guajava* (Indian guava), almond (*Prunusdulcis*), fig (*Chlorophora Tinctoria*). The methanolic stock solution of Morin Hydrate was prepared and employed as a reducing and capping agent to synthesize stable zinc oxide nanoparticles via biological reduction approach. The method was systematically optimized using response surface methodology based Box-Behnken design (BBD), considering the effect of various independent variables (factors) such as zinc

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**Original Article** 

# Quantification of Punicalagin in Pomegranate Peels From High-performance Thin-layer Chromatography

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# Abstract

**Background:** Punicalagin is the main phenolic compound present in pomegranate (*Punica granatum*), it possesses various kinds of activities which is very essential as a dietary supplement, herbal supplements, or nutraceuticals are widely available in the market and are used clinically for various therapeutic activities, in the recent years, especially in the pandemic period of COVID-19. Hence, it is necessary to standardize herbal medicines for quality control, quantitative analysis for purity, and routine analysis. The punicalagin shows potential antiviral activity against the SARS-COV-2 virus, the literature review reveals that punicalagin is the area of interest during the recent research studies, and the present work deals with the quantitative analysis of punicalagin from high-performance thin-layer chromatography (HPTLC) in marketed herbal preparation and the in-house preparation. **Methods:** The method development and quantitative analysis of punicalagin in pomegranate are developed using the solvent system chloroform: ethyl acetate: formic acid (4:3:3 v/v/v), and the method is successfully developed. **Results:** The punicalagin is quantified at 257 nm, acid (4:3:3). The content found in the various samples in PGGO is 3.207 mg, in PGBB is 1.257 mg, in PGNV is 1.743 mg, in PGWE is 807.6µg, in PGDF is 835.2 µg, and in in-house is 867.2 µg of punicalagin, from 1 g of each sample. **Conclusion:** The method can be used for routine analysis.

Keywords: Developed, method, phenolic, quantitative, solvent

## INTRODUCTION

Fruits are nature's amazing gift given to society, they are packed with essential nutrients, Phyto-vitamins, minerals, and fibers, there are many essential uses of fruits, they are the absolute feast in our daily life and are considered to be a unique profile for fighting against different kinds of diseases.<sup>[11]</sup> The fruit pomegranate (*Punica granatum*) is a fruit-bearing deciduous shrub that belongs to the family – Lythraceae subfamily – Punicoideae native from the areas of the Himalayas in Northern India and cultivated all over the Mediterranean region from ancient times.<sup>[2]</sup>

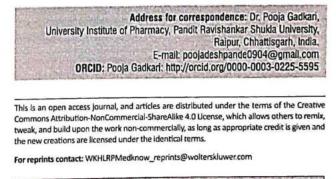
Pomegranate is a known source for its nutritional source consists of hydrolyzable tannins. Phenolic acids, anthocyanins, and organic acids, and capable for various health benefits against diseases.<sup>121</sup>As there is an increase in the demand for nutraceuticals, nutrition and infectious disease are interrelated to each other, the nutrition affects the human body's development.<sup>131</sup> The herbal nutraceuticals play an important role in the market, herbal products play a crucial

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part in nutrition and provide numerous health benefits for overall nutrition.<sup>[4]</sup>

#### Punicalagin

Punicalagin is a polyphenol with the highest molecular weight, it is hydrolyzed in ellagic acid and has the highest antioxidant capacity in pomegranate.<sup>[5]</sup> Punicalagin is a polyphenolic ingredient isolated from pomegranate *P. granatum*. It is a reversible and noncompetitive 3CL inhibitor and inhibits SARS-COV-2 replication *in vitro*. It is an antihepatitis B virus agent and has antioxidant, anti-inflammatory, and anticancer activity.<sup>[6]</sup>



punicalagin in pomegrana	Gadkari P, Daharwal SJ. Quantification of the peels from high-performance thin-layer intechnol Res J 2022;6:586-90.
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# RESEARCH ARTICLE

# Box-Behnken Design Based Optimization of Process Variables for the Green Synthesis of 18-Beta-Glycyrrhetinic Acid Silver Nanoparticles and Evaluation of its Antioxidant, Antimicrobial Activity

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# ABSTRACT

Using 18-beta-glycyrrhetinic acid, a well-known component of licorice (Glycyrrhiza glabra Lin.), the current study offers a unique rapid ecological & simple approach of biologically synthesizing of silver nanoparticles (AgNPs). To synthesise stable silver nanoparticles via a biological reduction technique, a methanolic stock solution of 18-β-glycyrrhetinic acid was produced and used as capping and reducing agent. The approach was methodically optimized using response surface analysis (RSA) based Box-Behnken design (BBD), taking into account influence of parameters like as silver nitrate (AgNO3) concentration, incubation time and temperature on response. RSA was utilized to determine the association among factors and the responses by mathematical modelling with a quadratic polynomial model. AgNO3 (1mM), 55°C, and 5 hours incubation were optimal. 18-β-glycyrrhetinic acid methanolic stock solution can convert silver ions (Ag+) into silver nanoparticles (AgNPs) in 5 hours at 55°C. Biosynthesized and optimized AgNPs have an SPR absorption peak at 419 nm in their UV spectra. 18-β-glycyrrhetinic acid reduced and capped silver ions according to FTIR spectroscopy. XRD showed AgNPs' crystallinity. SEM revealed spherical elemental silver with particle size of 100 nm. Average particle size, PDI & Zeta were 83.36 nm, 0.462 and -35.4mV, respectively, at 100% intensity. Silver nanoparticles (GAAgNPs) are stable. DPPH experiment showed substantial antioxidant activity in GAAgNPs compared to ascorbic acid. At 10 µg/mL, AgNPs showed utmost region of inhibition of 15 and 14 mm against Staphylococcus aureus and Pseudomonas aeruginosa, respectively. Finally, the synthesized AgNPs and their quality components have strong antioxidant and antibacterial activity, indicating that this research can be used to formulate useful biomedical goods.

Keywords: Silver Nanoparticles, Green synthesis, Response surface methodology, Box-Behnken Design, Antimicrobial, and Antioxidant.

International Journal of Drug Delivery Technology (2023); DOI: 10.25258/ijddt.13.2.08

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Source of support: Nil.

Conflict of interest: None

# INTRODUCTION

Nanotechnology has been more important in the field of modern bology.<sup>1.3</sup> The last few decades have seen a rise in interest in be pharmaceutical and environmental cleaning applications of green-mediated production of metal nanoparticles since it <sup>a most</sup> economical, non-toxic, and ecologically acceptable chnology.<sup>4,5</sup> Synthesised nanoparticles derived from diverse kan parts, including seeds, stems, flowers, leaves, and fruit ins, Green nanoparticles synthesized from plant extract the been discovered to be applicable in medication delivery <sup>ad</sup> cosmetics.<sup>6</sup> Due to their nano range particle sizes and the surface/volume ratio, metal nanoparticles produced <sup>hom plant</sup> sources exhibit remarkable antibacterial action.<sup>7,8</sup> <sup>hiver, copper, and zinc nanoparticles synthesized using</sup>

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environmentally friendly methods are frequently used as antibacterial agents in medicine because of their effectiveness and safety.9,10

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Cosmetics, purified water, medical diagnostics, textiles, electronics, and even domestic appliances can all benefit from silver nanoparticles' antibacterial properties.<sup>11</sup> Silver nanoparticles are well suited for biological sensing and imaging applications<sup>12</sup> due to their antibacterial characteristics 1. and powerful optical features. Nanoparticles of silver are employed in a wide variety of electrical devices due to the metal's high conductivity.<sup>13</sup> Styrene oxidation is facilitated by its employment as a catalyst in a number of chemical processes.<sup>14,15</sup> Silver nanoparticles are currently having several uses, including management of burn wounds, dentistry,

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Cosmetics, purified water, medical diagnostics, textiles, electronics, and even domestic appliances can all benefit from silver nanoparticles' antibacterial properties.<sup>11</sup> Silver nanoparticles are well suited for biological sensing and imaging applications<sup>12</sup> due to their antibacterial characteristics and powerful optical features. Nanoparticles of silver are employed in a wide variety of electrical devices due to the metal's high conductivity.<sup>13</sup> Styrene oxidation is facilitated by its employment as a catalyst in a number of chemical processes.<sup>14,15</sup> Silver nanoparticles are currently having several uses, including management of burn wounds, dentistry,

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**Review** article

Non-viral nucleic acid delivery approach: A boon for state-of-the-art gene delivery

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#### ARTICLE INFO

Keywords

Gene

DNA

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Targeting

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# ABSTRACT

An increasing number of gene therapy applications necessitate the use of delivery methods that are risk-free, highly effective, highly targeted, and do not cause any threat to the recipient. Due to their modifiable nature with a variety of physicochemical characteristics, nanostructures for nucleic acid (NA) delivery provide an unparalleled possibility to overcome conventional delivery disadvantages. Because nanomaterials are easy to work with, they can be easily designed to interact with any biomolecules or moiety for selective targeting. The expression of DNA and RNA can be altered using NA therapeutic methods like DNA, mRNA, and siRNA, and this area of study has received a significant amount of research attention. Combining gene therapies with nanoscale delivery technologies has greatly increased the number of ways these molecules can be used in medicine and biology, such as for bioanalysis, vaccinations, replacing proteins, and turning genes off. This article provides an overview of NA delivery methods and technologies for molecular diagnostics and treatment for various disorders that urge gene-based therapy. It also describes the design concerns of NA nanodelivery, their amazing attributes, and the significance of these nanomaterials in biological systems and diseased cells and tissues. Further, it explains the limitations that NA nanodelivery poses along with the clinical and technical challenges that it has to overcome to extend this state-of-the-art delivery technology.

# 1. Introduction

Gene therapy is a specialized field of medicine that focuses on changing the genes of cells to have therapeutic benefits or to treat a disorder by repairing or improving damaged genes [1]. It has the ability to treat and even cure a range of medical conditions, including cancer, HIV/AIDS, diabetes, heart disease, cystic fibrosis, hemophilia, and so forth [2,3]. NAs have been garnering a growing amount of interest as a

result of recent findings such as RNAi and CRISPR-based genetic modification [4]. In addition, current worldwide efforts to elucidate the human genome have also contributed to this trend. Gene therapy is the manipulation of the expression of a specific gene or the modification of the biological features of live cells in order to treat a patient's condition. In recent years, numerous regulatory organizations have given their efforts to multiple gene treatment modalities so that they can be utilized for a variety of purposes. The approval of mRNA vaccines as a means of

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Abbreviations: AFM, atomic force microscope; AIDS, Acquired immune deficiency syndrome; ASOs, antisense oligonucleotides; COVID-19, Coronavirus Disease 2019; CRISPR-Cas9, short for clustered regularly interspaced short palindromic repeats & CRISPR-associated protein 9; CTLA4, cytotoxic T-lymphocyte associated protein 4: prote Protein 4; DNA, Deoxyribonucleic acid; DOPE, zwitterionic 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine; DOTAP, and 1,2-dioleoyl-3-trimethylammonium pro-Pane, DOTMA, N-[1-(2,3-dioleoyloxy)propyl]-N N N-trimethylammonium chloride; GalNAc, N-Acetylgalactosamine; HIV, Human immunodeficiency viruses; IL, Interleukin warm. Interleukin; mcDNA, minicircle DNA; miRNA, microRNA; mRNA, messenger RNA; MTT, (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) tetrazolium; PDL1, program PDL1, programmed death-1 ligand 1; pDNA, DNA plasmid; PTEN, phosphatase and tensin homolog lost on chromosome 10; RNA, Ribonucleic acid; RISC, RNA Induced silencian Induced silencing complex; RNAi, RNA interference; saRNA, self-amplifying RNA; SARS-CoV-2, Severe Acute Respiratory Syndrome Coronavirus-2; SEM, scanning electron microscope; sgRNA, single guide RNA; shRNA, short hairpin RNA; siRNA, Small interfering RNA; STING, stimulator of interferon genes; syn-mRNA, synthetic mRNA; TEM, transmission to the synthesis of the synthesynthesis o mRNA; TEM, transmission electron microscopy.

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Original article

Tanshinone-I for the treatment of uterine fibroids: Molecular docking, simulation, and density functional theory investigations



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## ABSTRACT

Uterine fibroids (UF), most prevalent gynecological disorder, require surgery when symptomatic. It is estimated that between 25 and 35 percent of women wait until the symptoms have worsened like extended heavy menstrual bleeding and severe pelvic pain. These UF may be reduced in size through various methods such as medical or surgical intervention. Progesterone (prog) is a crucial hormone that restores the endometrium and controls uterine function. In the current study, 28 plant-based molecules are identified from previous literature and docked onto the prog receptors with 1E3K and 20VH. Tanshinone-I has shown the best docking score against both proteins. The synthetic prog inhibitor Norethindrone Acetate is used as a standard to evaluate the docking outcomes. The best compound, tanshinone-I, was analyzed using molecular modeling and DFT. The RMSD for the 1E3K protein-ligand complex ranged from 0.10 to 0.42 Å, with an average of 0.21 Å and a standard deviation (SD) of 0.06, while the RMSD for the 20VH protein-ligand complex ranged from 0.08 to 0.42 Å, with an average of 0.20 Å and a SD of 0.06 showing stable interaction. In principal component analysis, the observed eigen values of HPR-Tanshinone-I fluctuate between -1.11 to 1.48 and -1.07 to 1.25 for PC1 and PC2, respectively (1E3K), and the prog-tanshinone-I complex shows eigen values of -38.88 to -31.32 and -31.32 to 35.87 for PC1 and PC2, respectively (20VH), which shows Tanshinone-I forms a stable protein-ligand complex with 1E3K in comparison to 20VH. The Free Energy Landscape (FEL) analysis shows the Gibbs free energy in the range of 0 to 8 kJ/mol for Tanshinone-I with 1E3K and 0 to 14 kJ/mol for Tanshinone-I with the 20VH complex. The DFT calculation reveals  $\Delta E$  value of 2.8070 eV shows tanshinone-I as a stable compound. 1E3K modulates the prog pathway, it may have either an agonistic or antagonistic effect on hPRs. Tanshinone-I can cause ROS, apoptosis, autophagy (p62 accumulation), up-regulation of inositol requiring protein-1, enhancer-binding protein homologous protein, p-c-Jun Nterminal kinase (p-JNK), and suppression of MMPs. Bcl-2 expression can change LC3I to LC3II and cause apoptosis through Beclin-1 expression.

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Original article

Tanshinone-I for the treatment of uterine fibroids: Molecular docking, simulation, and density functional theory investigations



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Keywords: Uterine fibroids Molecular modelling Tanshinone-I Progesterone blocker Docking

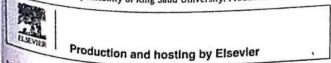
## ABSTRACT

Uterine fibroids (UF), most prevalent gynecological disorder, require surgery when symptomatic. It is estimated that between 25 and 35 percent of women wait until the symptoms have worsened like extended heavy menstrual bleeding and severe pelvic pain. These UF may be reduced in size through various methods such as medical or surgical intervention. Progesterone (prog) is a crucial hormone that restores the endometrium and controls uterine function. In the current study, 28 plant-based molecules are identified from previous literature and docked onto the prog receptors with 1E3K and 20VH. Tanshinone-I has shown the best docking score against both proteins. The synthetic prog inhibitor Norethindrone Acetate is used as a standard to evaluate the docking outcomes. The best compound. tanshinone-I, was analyzed using molecular modeling and DFT. The RMSD for the 1E3K protein-ligand complex ranged from 0.10 to 0.42 Å, with an average of 0.21 Å and a standard deviation (SD) of 0.06. while the RMSD for the 20VH protein-ligand complex ranged from 0.08 to 0.42 Å, with an average of 0.20 Å and a SD of 0.06 showing stable interaction. In principal component analysis, the observed eigen values of HPR-Tanshinone-I fluctuate between -1.11 to 1.48 and -1.07 to 1.25 for PC1 and PC2, respectively (1E3K), and the prog-tanshinone-I complex shows eigen values of -38.88 to -31.32 and -31.32 to 35.87 for PC1 and PC2, respectively (20VH), which shows Tanshinone-I forms a stable protein-ligand complex with 1E3K in comparison to 20VH. The Free Energy Landscape (FEL) analysis shows the Gibbs free energy in the range of 0 to 8 kJ/mol for Tanshinone-I with 1E3K and 0 to 14 kJ/mol for Tanshinone-I with the 20VH complex. The DFT calculation reveals  $\Delta E$  value of 2.8070 eV shows tanshinone-I as a stable compound. 1E3K modulates the prog pathway, it may have either an agonistic or antagonistic effect on hPRs. Tanshinone-I can cause ROS, apoptosis, autophagy (p62 accumulation), up-regulation of inositol requiring protein-1, enhancer-binding protein homologous protein, p-c-Jun Nterminal kinase (p-JNK), and suppression of MMPs. Bcl-2 expression can change LC3I to LC3II and cause apoptosis through Beclin-1 expression.

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Journal of Drug Delivery & Therapeutics, 2023; 13(4):113-120 Mirietal Available online on 15,04,2023 at http://jddtonline.info Journal of Drug Delivery and Therapeutics Open Access to Pharmaceutical and Medical Research Copyright © 2023 The Author(s): This is an open-access article distributed under the terms of the CC UY-NC 4.0 which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited  $\odot \odot \odot$ Access Full Text Article **Review Article** 

# Lipid-Polymer Hybrid Nanoparticles for Topical Drug Delivery System

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# Abstract

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# Introduction

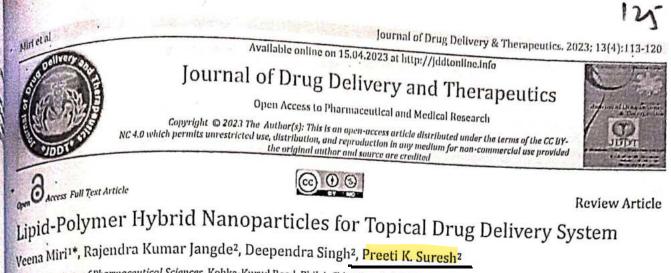
Nanotechnology is a compelling medicinal platform with the potential to greatly impact the delivery of a plethora of therapeutics, encompassing small molecule therapeutics, Benes, RNAs, peptides, and diagnostic imaging agents, as well as holding great promise for improving the therapeutic index and pharmacokinetics of several drugs under systemic settings14 In general, these payloads are encapsulated within or covalently grafted on the surface of the nanocarriers, and after being systemically incorporated, their release is monitored by factors such as formulation of the matrix, pH of the microenvironment, and temperature of the surroundings 5-The Inherent potential of nanoparticles (NPs) for therapeutic cargo delivery is primarily attributable to few key Parameters, including average nanometric size, homogeneity, Surface potential, and drug loading, among others<sup>0,9</sup> Surfacecoated immuno-inert NPs can also skillfully bypass the reticuloendothelial system yielding increased bioavailability of enconsulated encapsulated drugs<sup>10</sup>. The plausible advantages of nanocarrier nanocarriers are summarized as follows: 1) improvement to a drug's procession of the summarized as follows: 1) improvement to a drug's overall pharmacokinetic and pharmacodynamic Properties and pharmacokinetic and pharmacodynamic 2) Properties without alteration of its molecular structure; 2) enhanced affect enhanced effective tissue targeting, cellular targeting, and molecular targeting; 3) the ability to circumvent many Therent biological impediments; 4) targeted and nontargeted drug delivery drug delivery to their respective site of action (cytosol, nucleus, etc) to their respective site of the drug; 5) aucleus, etc) and enhanced therapeutic index of the drug; 5) delivery of multiple drugs with differing chemical Properties 11,12, The barrier function of skin can be attributed ISSN: 2250-1177

Human skin not only functions as a permeation barrier (mainly due to the stratum corneum layer), but also provides a unique delivery pathway for therapeutic and other active agents. These compounds penetrate via intercellular, intracellular and transappendageal routes, resulting in topical delivery (into skin strata) and transdermal delivery (to subcutaneous tissues and into the systemic circulation). Lipidpolymer hybrid nanoparticles (LPHNPs) are next-generation core-shell nanostructures, conceptually derived from both liposome and polymeric nanoparticles (NPs), where a polymer core remains enveloped by a lipid layer. Although they have garnered significant interest, they remain not yet widely exploited or ubiquitous. Recently, a fundamental transformation has occurred in the preparation of LPHNPs, characterized by a transition from a two-step to a one-step strategy, involving synchronous self-assembly of polymers and lipids. Owing to its two-in-one structure, this approach is of particular interest as a combinatorial drug delivery platform in oncology. In particular, the outer surface can be decorated in multifarious ways for active targeting of anticancer therapy, delivery of DNA or RNA materials, and use as a diagnostic imaging agent.

Keywords: Lipid-polymer hybrid nanoparticle, Topical delivery, Drug delivery, Gene delivery.

mostly to the stratum corneum layer of the epidermis, and this skin barrier also regulates the transport of compounds into the skin. Approaches that deliver drugs/active compounds through the skin barrier are referred to the topical route of administration (as opposed to the enteral and parenteral routes of administration). Passive and active skin penetration enhancement methods have been successfully used to improve the efficiency of either the topical delivery (the drugs/active compounds are delivered into skin strata), or transdermal delivery (drugs/active compounds are delivered into subcutaneous tissues and are taken up systemically into the body). Topically applied therapies are promising for the treatment of skin diseases such as psoriasis, contact dermatitis, and skin cancers, since the drugs are delivered directly into skin stratum<sup>10</sup>. Nano-sized drug carriers have attracted much attention in the past decade as options in formulations for topical therapy. Nanoparticles (including nanospheres, solid lipid nanoparticles, micelles, and micellarlike nanoparticles), liposomes, and nanoemulsions are among the most studied systems. Inorganic and metal nanoparticles such as quantum dots and gold nanoparticles are widely used for diagnosis, and are not in the scope of this review. Rather, this paper focuses on topically applied, polymeric nanoparticle-based drug delivery systems. Nanoparticles made of natural polymers (e.g. chitosan) and synthetic biodegradable polymers (e.g. poly(lactide-co-glycolide) and poly(e-caprolactone)) as well as non-degradable polymers (e.g. polyacrylates) are discussed. Special emphasis is given to the tyrosine-derived nanospheres since they consist of natural occurring metabolites and have been utilized in several

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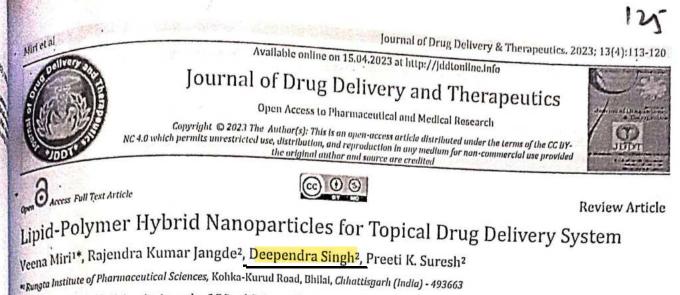
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# preclinical study models of psoriasis: State-of-the-art techniques for testing pharmaceutical products in animal and nonanimal models

Krishna Yadav<sup>a, b</sup>, Deependra Singh<sup>a</sup>, Manju Rawat Singh<sup>a</sup>, Sunita Minz<sup>c</sup>,

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#### ABSTRACT

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1. Introduction

observed in diseases unrelated to PsR [10] (Table 1). Second, no known animal disorder meets all the criteria for PsR (erythema, overproliferation of epidermis, angiogenesis, and infiltration of neutrophils) and responds to antipsoriatic therapy. PsR research has been greatly impeded by the nonexistence of diseased conditions in animals that adequately and particularly mimics the complicated diseased pathophysiology in humans [6,11].

Many papers (Fig. 1) have addressed animal models of PsR in recent

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esential to identify promising therapeutic targets for PsR to bridge the

molecular divides between the disease and its comorbidities [4,5]. PsR

research and the development of effective therapies have been impeded

by the absence of typical PsR laboratory animal models that replicate the

treatly from the use of animal models that mimic complex human

complicated phenotype and pathogenesis of human disease [6,7]. Research into and development of treatments for PsR would benefit

diseases [8]. This issue can be seen from at least two perspectives, neither of which is exclusive to the other. The first perspective is that merely there is no feature that is accurately PsR-specific when we look Psoriasis (PsR) affects humans and is a chronic autoimmune disease for exclusive unique characteristics in an animal model under investiwith serious cutaneous and systemic symptoms. Its incidence differs gation [9]. For instance, similar biochemical and metabolic variations widely across cultural and geographical boundaries [1]. This condition, have occurred in PsR and other inflammatory skin diseases, and malat both the cellular and humoral levels, is thought to involve compofunctioning of any particular inflammatory biochemical may also be nents of both inherent and acquired immunity. Nonetheless, the precise chemical pathways are still up for discussion [2,3]. Therefore, it is still

Local and systemic treatments exist for psoriasis, but none can do more than control its symptoms because of its numerous unknown mechanisms. The lack of validated testing models or a defined psoriatic phenotypic profile

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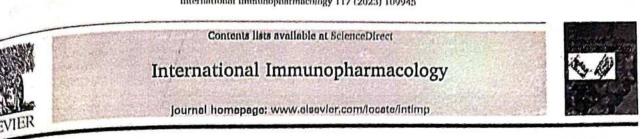
proliferative skin illnesses using animal models. Their findings confirmed that a psoriasis animal model could

mimic a few disease conditions. However, their ethical approval concerns and inability to resemble human

psoriasis rightly offer to look for more alternatives. Hence, in this article, we have reported various cutting-edge

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preclinical study models of psoriasis: State-of-the-art techniques for testing



pharmaceutical products in animal and nonanimal models

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Local and systemic treatments exist for psoriasis, but none can do more than control its symptoms because of its numerous unknown mechanisms. The lack of validated testing models or a defined psoriatic phenotypic profile hinders antipsoriatic drug development. Despite their intricacy, immune-mediated diseases have no improved and precise treatment. The treatment actions may now be predicted for psoriasis and other chronic hyperproliferative skin illnesses using animal models. Their findings confirmed that a psoriasis animal model could mimic a few disease conditions. However, their ethical approval concerns and inability to resemble human psoriasis rightly offer to look for more alternatives. Hence, in this article, we have reported various cutting-edge techniques for the preclinical testing of pharmaceutical products for the treatment of psoriasis.

#### 1. Introduction

Psoriasis (PsR) affects humans and is a chronic autoimmune disease with serious cutaneous and systemic symptoms. Its incidence differs widely across cultural and geographical boundaries [1]. This condition, at both the cellular and humoral levels, is thought to involve components of both inherent and acquired immunity. Nonetheless, the precise chemical pathways are still up for discussion [2,3]. Therefore, it is still tesential to identify promising therapeutic targets for PsR to bridge the molecular divides between the disease and its comorbidities [4,5]. PsR research and the development of effective therapies have been impeded by the absence of typical PsR laboratory animal models that replicate the complicated phenotype and pathogenesis of human disease [6,7].

Research into and development of treatments for PsR would benefit treatly from the use of animal models that mimic complex human diseases [8]. This issue can be seen from at least two perspectives, neither of which is exclusive to the other. The first perspective is that merely there is no feature that is accurately PsR-specific when we look for exclusive unique characteristics in an animal model under investigation [9]. For instance, similar biochemical and metabolic variations have occurred in PsR and other inflammatory skin diseases, and malfunctioning of any particular inflammatory biochemical may also be observed in diseases unrelated to PsR [10] (Table 1). Second, no known animal disorder meets all the criteria for PsR (erythema, overproliferation of epidermis, angiogenesis, and infiltration of neutrophils) and responds to antipsoriatic therapy. PsR research has been greatly impeded by the nonexistence of diseased conditions in animals that adequately and particularly mimics the complicated diseased pathophysiology in humans [6,11].

Many papers (Fig. 1) have addressed animal models of PsR in recent

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# **Novel Biotherapeutics Targeting Biomolecular and Cellular Approaches in Diabetic Wound Healing**

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**Abstract:** Wound healing responses play a major role in chronic inflammation, which affects millions of people around the world. One of the daunting tasks of creating a wound-healing drug is finding equilibrium in the inflammatory cascade. In this study, the molecular and cellular mechanisms to regulate wound healing are explained, and recent research is addressed that demonstrates the molecular and cellular events during diabetic wound healing. Moreover, a range of factors or agents that facilitate wound healing have also been investigated as possible targets for successful treatment. It also summarises the various advances in research findings that have revealed promising molecular targets in the fields of therapy and diagnosis of cellular physiology and pathology of wound healing, such as neuropeptides, substance P, T cell immune response cDNA 7, miRNA, and treprostinil growth factors such as fibroblast growth factor, including thymosin beta 4, and immunomodulators as major therapeutic targets.

Keywords: wound healing; molecular events; mRNA; therapeutic targets

## 1. Introduction

A wound is a loss of continuity in tissues due to injury or abrasion. A wound can result from direct tissue incision through a surgical knife or from broad tissue damage (such as trauma and burns). A wound arises from a bruise, hematoma, abrasion, or laceration. Wounds also result in a fracture of epithelial tissue that alters the function and structure of the skin. The integrity of the skin must be restored, as it has a vital role in the management of homeostasis. Disruption of the integrity of the skin, mucosal layer, or organ tissue causes a domino effect in wound development [1]. Considering the complicated nature of the healing cascade, it is incredible how often it functions devoid of any problems. This mechanism can be hampered by many factors, resulting in delayed wound healing. In acute wound healing, a well-planned sequence of events was followed. A healed wound is characterised by complete connective tissue repair and regeneration into normal function and anatomical structure. All these activities have occurred in a cascade that is associated with the different phases of wound healing [2]. In response to the tissue injuries, four main overlapping stages have been induced, which are hemostasis, the inflammatory stage, the proliferative phase, remodelling, and scar maturation. As many studies have already detailed the mechanism of wound healing in a proper descriptive way, in this review, we have focused on distinct molecular and cellular events and their applicability as impending treatment targets in the management of diabetic wound healing.



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Review



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# Therapeutic potential and novel formulations of ursolic acid and its derivatives: an updated review

Priya Namdeo,<sup>a</sup> Bina Gidwani,<sup>b</sup> Sakshi Tiwari,<sup>a</sup> Vishal Jain,<sup>a</sup> Veenu Joshi,<sup>c</sup> Shiv Shankar Shukla,<sup>b</sup> Ravindra Kumar Pandey<sup>b</sup> and Amber Vyas<sup>a\*</sup>

# Abstract

plants produce biologically active metabolites that have been utilised to cure a variety of severe and persistent illnesses. There plans provide the second secon ments for diseases including malignancy, cardiac disease and neurological disorders. A triterpene called ursolic acid (UA) is a pentacyclic prevalent triterpenoid found in fruits, leaves, herbs and blooms. The biological and chemical aspects of UA, as well as their presence, plant sources and biosynthesis, and traditional and newer technologies of extraction, are discussed in this review. Because of its biological function in the creation of new therapeutic techniques, UA is a feasible option for the evolution and medical management of a wide range of medical conditions, including cancer and other life threatening diseases. Despite this, the substance's poor solubility in aquatic environments makes it unsuitable for medicinal purposes. This hurdle was resolved in many different ways. The inclusion of UA into various pharmaceutical delivery approaches was found to be quite effective in this respect. This review also describes the properties of UA and its pharmacokinetics, as well as therapeutic applications of UA for cancer, inflammatory and cardiovascular diseases, in addition to its anti-diabetic, immunomodulatory, hepatoprotective and anti-microbial properties. Some of the recent findings related to novel nano-sized carriers as a delivery system for UA and the patents related to the applications of UA and its various derivatives are covered in this review. The analytical study of UA, oleanolic acid and other phytoconstituents by UV, HPLC, high-performance thin-layer chromatography and gas chromatography is also discussed. In the future, UA could be explored in vivo using various animal models and, in addition, the regulatory status regarding UA needs to be explored.

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Keywords: ursolic acid; triterpenoids; biological effects; derivatives; drug delivery system

# INTRODUCTION

Plants are essential environmental regulators and can influence many biological functions. Secondary metabolites are a diverse set of natural metabolic products that often regulate plantenvironment interactions. Because of their importance in medicine, agriculture and industry, these plant derived secondary metabohes have received much attention. Approximately 40%-45% of drugs are obtained from natural sources. Triterpenoids are abundant and widely distributed in plants. Three terpene units make up this group of chemical compounds, which have the molecular  $f_{ormula}C_{29}H_{44}O_5$ . Depending on the number of isoprene units that they they contain, terpenes are categorised as hemiterpenes (C5), Monotonia monoterpenes (C10), sesquiterpenes (C15), diterpenes (C20), ses-terterpenes (C10), lt has tenerpenes (C10), sesquiterpenes (C15), diterpenes (C40). It has been etimes (C25), triterpenes (C30) and tetraterpenes (C40). It has been estimated that over 20 000 secondary metabolites as ter-Penes exist in nature with variety of biological functions.<sup>1</sup> The iden-lical Canlical C30-terpene molecule is frequently referred to by the labels Interpenes and triterpenoids. Triterpenes were first produced by plants as metabolites and are widely distributed, being found as ree acids or aglycones. Comprising the biggest class of phyto-themicals the phytophysical phytophys chemicals, they are metabolites of isopentenyl pyrophosphate olgomers.<sup>2</sup> Triterpenoids are classified into two main groups: © 2023 Society of Chami

tetracyclic and pentacyclic. Dammarane, prostane, cicloartane, triucallane, cucurbitane, apotirucallane, euphane and lanostane are tetracyclic triterpenoids. Pentacyclic triterpenoids (PTs) comprise the largest class of natural products, with several biological activities. More than 20 years of research into PTs has yielded considerable health benefits, such as liver protection and wound healing, as well as antibacterial, anti-inflammatory and anti-tumor/antiviral capabilities, in addition to their low toxicity. PTs have been shown to be safe and effective. From a variety of plants. PTs have been isolated and clarified. The three most prevalent triterpenoids found in plants are oleanolic acid (OA), betulinic acid and ursolic acid (UA).<sup>3,4</sup>

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# Therapeutic potential and novel formulations of ursolic acid and its derivatives: an updated review

priya Namdeo, a Bina Gidwani, Sakshi Tiwari, Vishal Jain, Veenu Joshi, shiv Shankar Shukla,<sup>b</sup> Ravindra Kumar Pandey<sup>b</sup> and Amber Vyas<sup>a\*</sup>

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# RESEARCH ARTICLE

# Development of Fingerprinting Method for Estimation Glycyrrhizinic acid in Ayurvedic formulation Eladi Gutika: A HPTLC approach

Tripti Jain<sup>1</sup>, Amber Vyas<sup>2</sup>, Darshan Dubey<sup>3</sup>, Kamlesh Dashora<sup>3</sup>, Vishal Jain<sup>2</sup>\*

<sup>1</sup>Chhattisgarh Food and Drug Administration. Mahasamund (CG). <sup>2</sup>University Institute of Pharmacy. Pt. Ravishankar Shukla University. Raipur (C.G.). <sup>3</sup>Institute of Pharmacy. Vikram University. Ujjain (MP). \*Corresponding Author E-mail: vishaljain123@gmail.com

## ABSTRACT:

Eladi gutika is official in Ayurvedic formulary of India and used as a remedy for Kasa (Cough), Svasa (Asthma), Bhrama (Vertigo), Raktapitta (Bleeding disorders), Jvara (Fever), Amvata (Rheumatism) etc. The present paper is an effort to develop the routine fingerprinting method for quality control parameter of Eladi gutika by high performance thin layer chromatography using glycyrrhizinic acid as an internal standard. The HPTLC estimation was carried out with three laboratory batches and one marketed formulation Eladi gutika and crude drug containing glycyrrhizinic acid. The concentration of glycyrrhizinic acid present in raw material was found to be  $8.2201\pm0.497$ w/w in *G. glabra* and in three identical laboratory batch of Eladi gutika EG-1, EG -II and EG -III, was found to be  $1.4945 \pm 0.293$ ,  $1.4963 \pm 0.763$ %,  $1.4944\pm 0.864$ w/w respectively. The glycyrrhizinic acid content in all the three different batches is found to be in close proximities with each other. The results were comparable to marketed formulations. Hence the present method is simple, sensitive, precise and accurate and can be adopted for routine fingerprinting method for quality control of Eladi gutika.

**KEYWORDS:** Eladi gutika. Glycyrrhizinic acid. Ayurvedue formulation. HPTLC. Standardization. Fingerprinting.

# INTRODUCTION:

Medicinal plants are one of the best resources from nature and their utilization for the benefits of humankind. According to the world health organization. approximately 80% of the world population still depends on traditional medicine, as an important source of medicine.<sup>1</sup> India is a land where various traditional systems of medicine are existed together and based on natural sources.<sup>2</sup> The most of the Traditional formulation are lacking in their defined quality control parameters and method of its evaluation.<sup>3</sup>

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The World Health Organization (WHO) in its resolution WIIA 31.33 (1978). WHA 40.33 (1987). WHA 42.43 (1989) has emphasized the need to ensure the quality of medicinal plant products by using modern controlled technique and applying suitable standards.4.5.6 Marker compound means chemical constituents within a medicinal that can be used to verify its potency or identity. For sometimes, the marker compounds may be described as active ingredients or chemicals that confirm the correct botanical identity of the starting material. It is very difficult to identify correct marker compounds for all traditional medicine, because some medicine have unknown active constituents and others have multiple active constituents.<sup>7-12</sup> Fingerprints play an important role in quality control of traditonal medicine. It can be used for authentication of raw material or detection of confounded material/ substitutes. Herbal Fingerprinting is the technique used for the qualitative and quantitative drugs. components herbal in analysis of

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<sup>1</sup>Chhattisgarh Food and Drug Administration. Mahasamund (CG). <sup>2</sup>University Institute of Pharmacy. Pt. Ravishankar Shukla University. Raipur (C.G.). <sup>3</sup>Institute of Pharmacy. Vikram University. Ujjain (MP). \*Corresponding Author E-mail: vishaljain123@gmail.com

# **ABSTRACT:**

Eladi gutika is official in Ayurvedic formulary of India and used as a remedy for Kasa (Cough), Svasa (Asthma), Bhrama (Vertigo), Raktapitta (Bleeding disorders), Jvara (Fever), Amvata (Rheumatism) etc. The present paper is an effort to develop the routine fingerprinting method for quality control parameter of Eladi gutika by high performance thin layer chromatography using glycyrrhizinic acid as an internal standard. The HPTLC estimation was carried out with three laboratory batches and one marketed formulation Eladi gutika and crude drug containing glycyrrhizinic acid. The concentration of glycyrrhizinic acid present in raw material was found to be  $8.2201\pm0.497$ w/w in *G. glabra* and in three identical laboratory batch of Eladi gutika EG-1, EG -II and EG -III, was found to be  $1.4945 \pm 0.293$ ,  $1.4963 \pm 0.763$ %,  $1.4944\pm 0.864$ w/w respectively. The glycyrrhizinic acid content in all the three different batches is found to be in close proximities with each other. The results were comparable to marketed formulations. Hence the present method is simple, sensitive, precise and accurate and can be adopted for routine fingerprinting method for quality control of Eladi gutika.

**KEYWORDS:** Eladi gutika, Glycyrrhizinic acid, Ayurveduc formulation, HPTLC, Standardization, Fingerprinting,

# INTRODUCTION:

Medicinal plants are one of the best resources from nature and their utilization for the benefits of humankind. According to the world health organization. approximately 80% of the world population still depends on traditional medicine, as an important source of medicine.<sup>1</sup> India is a land where various traditional systems of medicine are existed together and based on natural sources.<sup>2</sup> The most of the Traditional formulation are lacking in their defined quality control parameters and method of its evaluation.<sup>3</sup>

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The World Health Organization (WHO) in its resolution WIIA 31.33 (1978). WHA 40.33 (1987). WHA 42.43 (1989) has emphasized the need to ensure the quality of medicinal plant products by using modern controlled technique and applying suitable standards.4.5.6 Marker compound means chemical constituents within a medicinal that can be used to verify its potency or identity. For sometimes, the marker compounds may be described as active ingredients or chemicals that confirm the correct botanical identity of the starting material. It is very difficult to identify correct marker compounds for all traditional medicine, because some medicine have unknown active constituents and others have multiple active constituents.7-12 Fingerprints play an important role in quality control of traditonal medicine. It can be used for authentication of raw material or detection of confounded material/ substitutes. Herbal Fingerprinting is the technique used for the qualitative and quantitative herbal components in drugs. of analysis

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# RESEARCH ARTICLE

# Development of HPLC Fingerprinting Method via Estimation of Piperine for Unani Formulation Hab-e-Azarakhi

# Tripti Jain<sup>1</sup>, Amber Vyas<sup>2</sup>, Darshan Dubey<sup>3</sup>, Kamlesh Dashora<sup>3</sup>, Vishal Jain<sup>2</sup>\*

<sup>1</sup>Chhattisgarh Food and Drug Administration, Mahasamund (CG). <sup>2</sup>University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur (C.G.). <sup>3</sup>Institute of Pharmacy, Vikram University, Ujjain (MP). \*Corresponding Author E-mail: vishaljain123@gmail.com

# **ABSTRACT:**

Hab-e-Azarakhi is an important Unani formulation, is official in Unani Pharmacopoeia. The formulation is dispensed for the tone up the nervous system and liver. It is also useful for increase the appetite. Fingerprinting of active principles through modern analytical tools is essential for establishing the authenticity, creditability, prescription and usage of Traditional medicines/herbal formulations. Selective and efficient analytical methods are required not only for quality assurance but also for authentication of herbal formulations. The present study is an attempt to develop Fingerprint method for Hab-e-Azarakhi with High Performance Liquid chromatography (HPLC) using piperine as a standard was developed. The estimation was carried out with three laboratory batches and one marketed formulation of Hab-e-Azarakhi. The concentration of piperine content of Hab-e-Azarakhi (three laboratory batches) and powdered *Piper nigrum* and *Piper longum* was carried out separately. The concentration of piperine present in raw material was found to be 2.9876+0.837%/w/w in *Piper nigrum and* 0.9363±0.167% w/w in *Piper longum* and in three identical laboratory batches of Hab-e-Azarakhi HA-II 1.8121±0.739%, 1.8806±0.439%, 1.8901±0.779% w/w respectively, while in M-I it was 1.2108 ± 0.182%. The developed HPLC method is simple, rapid, precise and accurate for routine estimation piperine in Hab-e-Azarakhi.

KEYWORDS: Hab-e-Azarakhi, Piperine, Standardization, HPLC, Unani formulation.

# INTRODUCTION:

Hab-e-Azarakhi is an important Unani formulation. is official in Unani Pharmacopoeia (formulary of Unani Medicine) is combination of four reputed herbs, comprised of the fruits *Piper nigrum (Filfil e Siyah)*, *Piper longum (Filfil e Daraz)*, *Trichyspermum ammi* (Arkh e Ajwain) and seeds of Strychnos nuxvomica (Kuchla mudabbar). The formulation is dispensed for the tone up the nervous system and liver. It is also useful for increase the appetite.<sup>1,2</sup>

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The most of the Traditional formulation are lacking in their defined quality control parameters and method of its evaluation.<sup>3,4</sup> The World Health Organization (WHO) in its resolution WHA 31.33 (1978), WHA 40.33 (1987). W11A 42.43 (1989) has emphasized the need to ensure the quality of medicinal plant products by using modern controlled technique and applying suitable standards<sup>14,50</sup>. Chromatography is a powerful analytical method suitable for the separation and quantitative determination of a considerable number of compounds, even from a complex matrix. These include chromatography, thin-layer chromatography paper (II.C), gas chromatography (GC), high performance capillary (HPLC), and chromatography liquid electrophoresis?. The present paper is an effort to

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# RESEARCH ARTICLE

# Development of HPLC Fingerprinting Method via Estimation of Piperine for Unani Formulation Hab-e-Azarakhi

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KEYWORDS: Hab-e-Azarakhi, Piperine, Standardization, HPLC, Unani formulation.

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Review Curr Pharm Des. 2023;29(2):79-94. doi: 10.2174/1381612829666221220115649.

# Experimental Animal Models: Tools to Investigate Antidiabetic Activity

Rashmi Madhariya<sup>1</sup>, Bhupendra Dixena<sup>1</sup>, Alpana Ram<sup>1</sup>, Amber Vyas<sup>2</sup>, Akhlesh Kumar Jain<sup>1</sup>

Affiliations PMID: 36545714 DOI: 10.2174/1381612829666221220115649

# Abstract

About 2.8% of the global population are being suffered from Diabetes mellitus. Diabetes mellitus is a group of metabolic disorders that is characterized by an absolute lack of insulin and resulting in hyperglycemia. To overcome the challenges, many antidiabetic drugs are being used, and research is being carried out in search of more effective anti-diabetic drugs. To study the effectiveness of antidiabetic drugs, many diabetic models, chemicals, and diabetogenic hormones were used at the research level. In this review, we summarised various animal models used, chemicals that induce diabetes, their properties, and the mechanism of action of these models. Further, diabetes mellitus is generally induced in laboratory animals by several methods that include: chemical, surgical and genetic manipulations. To better understand both the pathogenesis and potential therapeutic agents, appropriate animal models of type 1 & type 2 diabetes mellitus are needed. However, for an animal model to have relevance to the study of diabetes, either the characteristics of the animal model should mirror the pathophysiology and natural history of diabetes or the model should develop complications of diabetes with an etiology similar to that of the human condition. There appears to be no single animal model that encompasses all of these characteristics, but there are many that provide very similar characteristics in one or more aspects of diabetes in humans. The use of the appropriate animal model based on these similarities can provide much-needed data on pathophysiological mechanisms operative in human diabetes.

**Keywords:** Animal model; alloxan; diabetes mellitus; genetic models; hormones; hyperglycemia; non-rodent model; rodent model; streptozotocin.

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RESEARCH ARTICLE

# Picroside-1-Phytovesicle: A novel approach for Antihepatotoxic activity

<u>Amber Vyas</u><sup>1</sup>, Nagendra Singh Chauhan<sup>2</sup>, Tripti Jain<sup>4</sup>, A.K. Singhai<sup>3</sup>, Vishal Jain<sup>1</sup>\* <sup>1</sup>University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur (C.G.) India. <sup>2</sup>Drugs Testing Laboratory Avam Anusandhan Kendra, Raipur (CG).India <sup>3</sup>Department of Pharmaceutical Sciences, Dr. H. S. Gour Vishwavidyalaya, Sagar (MP).India <sup>4</sup>Chhattisgarh FDA, Mahasamund (CG).India \*Corresponding Author E-mail: vishaljain123@gmail.com

## ABSTRACT:

Picroside-I, the irridoid glycoside component obtained from *Picrorhiza kurroa* Royal Ex. Benth. extract was stoichiometrically complexed with phospholipids to form Phytosome. These complexes were characterized by IR and <sup>1</sup>H-NMR spectroscopy. The efficacy of phytosome formulation was determined by *in vitro* GIT absorption study which indicates greater absorption from gastrointestinal tract, resulted in higher plasma levels. The hepatic protection offered by phytosomes was studied against  $CCI_4$  induced hepatotoxicity and compared with picroside-I, by measuring bio-chemical parameters in terms of SGOT and SGPT enzyme levels. Phytosomes exhibited appreciable greater hepatoprotection than that of picroside-I alone. Therefore, phytosome can advantageously be used in acute and chronic liver disease of varying origin.

KEYWORDS: Picrorhiza kurroa. Antihepatotoxicity. Phytovesicle. Irridoid glycoside.

# **INTRODUCTION:**

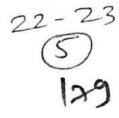
*Picrorhiza kurroa* Royal Ex. Benth. has been used in several Indian herbal preparations to cure malfunctioning of liver (1). The ethanolic extract of *Picrorhiza kurroa* Benth. Exhibits hepatoprotective activity against CCl<sub>4</sub> and galactosamine induced liver damage by *Plasmodium berghei* infection in mastomys. This activity is located only in kutkin rich fraction of the extract. Kutkin is a stable mixed crystal of two glycosides, glucoside-A and kutkoside in the ratio of 1:2. Chemically glucoside-A is 6'O-cinnamoyl catalpol (V) designated as picroside-1<sup>1</sup>.

Picroside-I normally exhibits considerable hepatoprotective effect when administered orally or experimented *in vitro*. But certain approaches must be made to increase the absorption and to render the compound more bioavailable.

Received on 25.12.2022 Modified on 15.02.2023 Accepted on 15.04.2023 © RJPT All right reserved DOI: In present study the hepatoprotective action of picroside-I was improved by complexing irridoid glycoside with natural or synthetic phospholipids (Phytosome term patented by Indena). One of the constituent of complex picroside-I is employed in the treatment of liver diseases of various origin, while the other i.e. phospholipids (particularly phosphatidylcholine) are essential for the normal structure and function of the liver cells, intervening in the regulation of the fluidity and permeability of cell walls and phospholipids as hepatoprotectants<sup>3</sup>.

The phytosome are cell or vesicle like structures resulted from chemical interaction between the choline head of phosphatidylcholine molecules and terpenoid or flavonoid component of herbal extract <sup>4</sup>.

These structures contain the active ingredient of herb surrounded and bound with phospholipids. These are lipophilic substances with a definite melting point different from that of the individual components, freely soluble in aprotic solvents, moderately soluble in fats and insoluble in water. On treatment with water they assume a miscellar shape forming structures, which might resemble liposomes, but is conceptually, practically and fundamentally different <sup>4</sup>.



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# RESEARCH ARTICLE

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Amber Vyas<sup>1</sup>, Nagendra Singh Chauhan<sup>2</sup>, Tripti Jain<sup>4</sup>, A.K. Singhai<sup>3</sup>, Vishal Jain<sup>4</sup>
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Picroside-I, the irridoid glycoside component obtained from *Picrorhiza kurroa* Royal Ex. Benth. extract was stoichiometrically complexed with phospholipids to form Phytosome. These complexes were characterized by IR and <sup>1</sup>H-NMR spectroscopy. The efficacy of phytosome formulation was determined by *in vitro* GIT absorption study which indicates greater absorption from gastrointestinal tract, resulted in higher plasma levels. The hepatic protection offered by phytosomes was studied against  $CCI_4$  induced hepatotoxicity and compared with picroside-I, by measuring bio-chemical parameters in terms of SGOT and SGPT enzyme levels. Phytosomes exhibited appreciable greater hepatoprotection than that of picroside-I alone. Therefore, phytosome can advantageously be used in acute and chronic liver disease of varying origin.

KEYWORDS: Picrorhiza kurroa. Antihepatotoxicity. Phytovesicle. Irridoid glycoside.

# **INTRODUCTION:**

Picrorhiza kurroa Royal Ex. Benth. has been used in several Indian herbal preparations to cure malfunctioning of liver (1). The ethanolic extract of Picrorhiza kurroa Benth. Exhibits hepatoprotective activity against CCl4 and galactosamine induced liver damage by Plasmodium berghei infection in mastomys. This activity is located only in kutkin rich fraction of the extract. Kutkin is a stable mixed crystal of two glycosides, glucoside-A and kutkoside in the ratio of 1:2. Chemically glucoside-A is 6'O-cinnamoyl catalpol (V) designated as picroside-1 '.

Picroside-I normally exhibits considerable hepatoprotective effect when administered orally or experimented *in vitro*. But certain approaches must be made to increase the absorption and to render the compound more bioavailable.

 In present study the hepatoprotective action of picroside-I was improved by complexing irridoid glycoside with natural or synthetic phospholipids (Phytosome term patented by Indena). One of the constituent of complex picroside-I is employed in the treatment of liver diseases of various origin, while the other i.e. phospholipids (particularly phosphatidylcholine) are essential for the normal structure and function of the liver cells, intervening in the regulation of the fluidity and permeability of cell walls and phospholipids as hepatoprotectants<sup>3</sup>.

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These structures contain the active ingredient of herb surrounded and bound with phospholipids. These are lipophilic substances with a definite melting point different from that of the individual components, freely soluble in aprotic solvents, moderately soluble in fats and insoluble in water. On treatment with water they assume a miscellar shape forming structures, which might resemble liposomes, but is conceptually, practically and fundamentally different <sup>4</sup>. An official website of the United States government <u>Here's how you know</u>

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Review Curr Pharm Des. 2022;28(20):1621-1631. doi: 10.2174/1381612828666220412103552.

# Recent Advancement of Polymersomes as Drug Delivery Carrier

Kuldeep Singh <sup>1</sup>, Avadh Biharee <sup>1</sup><sup>2</sup>, Amber Vyas <sup>3</sup>, Suresh Thareja <sup>2</sup>, Akhlesh Kumar Jain <sup>1</sup>

Affiliations PMID: 35418282 DOI: 10.2174/1381612828666220412103552

# Abstract

**Background:** Biomedical applications of polymersomes have been explored, including drug and gene delivery, insulin delivery, hemoglobin delivery, the delivery of anticancer agents, and various diagnostic purposes.

**Objectives:** Polymersomes, which are self-assembled amphiphilic block copolymers, have received a lot of attention in drug delivery approaches. This review represents the methods of preparation of polymersomes, including thin-film rehydration, electroformation, double emulsion, gel-assisted rehydration, PAPYRUS method, and solvent injection methods, including various therapeutic applications of polymersomes.

**Methods:** Data was searched from PubMed, Google Scholar, and Science Direct through searching of the following keywords: Polymersomes, methods of preparation, amphiphilic block copolymers, anticancer drug delivery.

**Results:** Polymersomes provide both hydrophilic and hydrophobic drug delivery to a targeted site, increasing the formulation's stability and reducing the cytotoxic side effects of drugs.

**Conclusion:** Polymersomes have the potential to be used in a variety of biological applications, including drug and gene delivery, insulin delivery, hemoglobin delivery, delivery of anticancer agents, as well as in various diagnostic purposes. Recently, polymersomes have been used more frequently because of their stability, reducing the encapsulated drug's leakage, site-specific drug delivery, and increasing the bioavailability of the drugs and different diagnostic purposes. The liposomes encapsulate only hydrophilic drugs, but polymersomes encapsulate both hydrophilic and hydrophobic drugs in their cores.

**Keywords:** PAPYRUS; Polymersomes; anticancer; block copolymer; double emulsion; drug delivery; electroformation; method of preparation; solvent injection; thin-film rehydration.

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# *N*-doped, silver, and cerium co-doped carbon quantum dots based sensor for detection of $Hg^{2+}$ and captopril

Lakshita Dewangan<sup>a</sup>, Yogyata Chawre<sup>a</sup>, Jyoti Korram<sup>a</sup>, Indrapal Karbhal<sup>a</sup>, Rekha Nagwanshi<sup>b</sup>, Vishal Jain<sup>c</sup>, Manmohan L. Satnami<sup>a,\*</sup>

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ARTICLE INFO	A B S T R A C T
Keywords: N-CQDs N/Ag-CQDs N/Ce-CQDs Fluorescence quenching Fluorescence recovery	A stable carbon quantum dots doped with nitrogen ( <i>N</i> -CQDs), co-doped with silver (N/Ag-CQDs), and co-doped with cerium N/Ce-CQDs were synthesized using hydrothermal method. As-synthesized N/Ag-CQDs and N/Ce-CQDs showed high quantum yield compared to <i>N</i> -CQDs. These carbon quantum dots were used as a probe for the detection of mercury and captopril. The fluorescence quenching (turn-off) of <i>N</i> -CQDs, N/Ag-CQDs and N/Ce-CQDs was occured with the addition of $Hg^{2+}$ ion. On the other hand, captopril showed fluorescence recovery (turn-on) of <i>N</i> -CQDs, N/Ag-CQDs and N/Ce-CQDs which are quenched by $Hg^{2+}$ ion. The fluorescence recovery of CQDs is due to the high affinity of thiol group of captopril towards $Hg^{2+}$ ion to form Hg-S bonds. On the basis of fluorescence quenching (turn-off), $Hg^{2+}$ was determined with low limit of detection of 1.43 nM, 0.93 nM and 1.38 nM using <i>N</i> -CQDs, N/Ag-CQDs and N/Ce-CQDs, respectively as fluorescence nanoprobes. The fluorescence turn-on of the CQDs has been applied for the detection of captopril with low limit of detection of 1.65 $\mu$ M, 0.46 $\mu$ M and 1.22 $\mu$ M using <i>N</i> -CQDs, N/Ag-CQDs, and N/Ce-CQDs respectively. The developed sensing probe showed

good sensitivity and high fluorescence efficiencies.

#### 1. Introduction

In recent years, carbon quantum dots (CQDs) luminescence efficiency was evaluated in a useful way like heteroatom doping [1-3]. Compared with undoped CQDs, non-metallic atom like nitrogen doping on CQDs decreases some surface defects, increases their optical properties and quantum yields. CQDs doped with non-metallic atom (N) in combination with either co-doping with metal (Ag<sup>+</sup>) and rare earth element (Ce<sup>3+</sup>) could provide very bright fluorescence with good surface passivation, resistance to photobleaching and ultra-high photoluminescence quantum yields because of excitation energy traps [4-7]. The photoluminescence mechanism of heteroatom CQDs or co-doped CQDs depends on energy traps and conjugated electronic structure. The co-dopant silver (Ag<sup>+</sup>) is used as biocompatible element with nitrogen passivated surface of CQDs, which enables the participation of lone pair electron of nitrogen for effectively enhancement of quantum yields [6,8–9]. On the other hand silver act as a strong lewis acid which has high affinity for nitrogen donor atom, that could result in formation

of a stable complex between Ag-N by electron transfer mechanism and the outcome was successfully synthesized N/Ag-CQDs. In the N/Ce-CQDs, carboxyl group of CQDs can coordinate with Ce<sup>3+</sup> in the interstitial state and provide more electrons for the CQDs. Cerium shows high stability in Ce<sup>3+</sup> state, which protects the 4f energy level from the crystalline field and external chemical environment, and is used as an antioxidant for biomedical applications [10–14]. The applications of single heteroatom doped and co-doped CQDs have been reported for detection of drugs like daunorubicin [15], methimazole [16], gemcitabine [17], levodopa [18], cisplatin [19], and heavy metal ions like iron [20], arsenic [21], mercury [22], lead [23], organic pollutants [24], peroxides [25] and copper [26].

Mercury  $(Hg^{2+})$  is a toxic heavy metal pollutant and has become a serious problem worldwide because of its endanger impact on human health [27]. For the sake of human health, it causes serious damage to kidney, brain, endocrine system and central nervous system even at very low concentration. [28–29] Numerous analytical techniques such as colorimetric [30], fluoremetric [31], electrochemical [32] and surface

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# *N*-doped, silver, and cerium co-doped carbon quantum dots based sensor for detection of $Hg^{2+}$ and captopril



Lakshita Dewangan<sup>a</sup>, Yogyata Chawre<sup>a</sup>, Jyoti Korram<sup>a</sup>, Indrapal Karbhal<sup>a</sup>, Rekha Nagwanshi<sup>b</sup>, Vishal Jain<sup>c</sup>, <mark>Manmohan L. Satnami<sup>a,\*</sup></mark>

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#### ARTICLE INFO

Keywords: N-CQDs N/Ag-CQDs N/Ce-CQDs Fluorescence quenching Fluorescence recovery

#### ABSTRACT

A stable carbon quantum dots doped with nitrogen (*N*-CQDs), co-doped with silver (N/Ag-CQDs), and co-doped with cerium N/Ce-CQDs were synthesized using hydrothermal method. As-synthesized N/Ag-CQDs and N/Ce-CQDs showed high quantum yield compared to *N*-CQDs. These carbon quantum dots were used as a probe for the detection of mercury and captopril. The fluorescence quenching (turn-off) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs was occured with the addition of  $Hg^{2+}$  ion. On the other hand, captopril showed fluorescence recovery (turn-on) of *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs which are quenched by  $Hg^{2+}$  ion. The fluorescence recovery of CQDs is due to the high affinity of thiol group of captopril towards  $Hg^{2+}$  ion to form Hg-S bonds. On the basis of fluorescence quenching (turn-off),  $Hg^{2+}$  was determined with low limit of detection of 1.43 nM, 0.93 nM and 1.38 nM using *N*-CQDs, N/Ag-CQDs and N/Ce-CQDs, respectively as fluorescence nanoprobes. The fluorescence turn-on of the CQDs has been applied for the detection of captopril with low limit of detection of 1.65  $\mu$ M, 0.46  $\mu$ M and 1.22  $\mu$ M using *N*-CQDs, N/Ag-CQDs, and N/Ce-CQDs respectively. The developed sensing probe showed good sensitivity and high fluorescence efficiencies.

#### 1. Introduction

In recent years, carbon quantum dots (CQDs) luminescence efficiency was evaluated in a useful way like heteroatom doping [1-3]. Compared with undoped CQDs, non-metallic atom like nitrogen doping on CQDs decreases some surface defects, increases their optical properties and quantum yields. CQDs doped with non-metallic atom (N) in combination with either co-doping with metal (Ag<sup>+</sup>) and rare earth element (Ce<sup>3+</sup>) could provide very bright fluorescence with good surface passivation, resistance to photobleaching and ultra-high photoluminescence quantum yields because of excitation energy traps [4–7]. The photoluminescence mechanism of heteroatom CQDs or co-doped CQDs depends on energy traps and conjugated electronic structure. The co-dopant silver (Ag<sup>+</sup>) is used as biocompatible element with nitrogen passivated surface of CQDs, which enables the participation of lone pair electron of nitrogen for effectively enhancement of quantum yields [6,8-9]. On the other hand silver act as a strong lewis acid which has high affinity for nitrogen donor atom, that could result in formation

of a stable complex between Ag-N by electron transfer mechanism and the outcome was successfully synthesized N/Ag-CQDs. In the N/Ce-CQDs, carboxyl group of CQDs can coordinate with  $Ce^{3+}$  in the interstitial state and provide more electrons for the CQDs. Cerium shows high stability in  $Ce^{3+}$  state, which protects the 4f energy level from the crystalline field and external chemical environment, and is used as an antioxidant for biomedical applications [10–14]. The applications of single heteroatom doped and co-doped CQDs have been reported for detection of drugs like daunorubicin [15], methimazole [16], gemcitabine [17], levodopa [18], cisplatin [19], and heavy metal ions like iron [20], arsenic [21], mercury [22], lead [23], organic pollutants [24], peroxides [25] and copper [26].

Mercury  $(Hg^{2+})$  is a toxic heavy metal pollutant and has become a serious problem worldwide because of its endanger impact on human health [27]. For the sake of human health, it causes serious damage to kidney, brain, endocrine system and central nervous system even at very low concentration. [28–29] Numerous analytical techniques such as colorimetric [30], fluoremetric [31], electrochemical [32] and surface

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<u>REVIEW ARTICLE</u>

# Herbal, Safe and effective Mosquito repellents: Recent Development and Opportunity

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## **ABSTRACT:**

Most of today's rapidly spreading infectious diseases are arthropod-borne, and vaccinations are powerless to prevent them. Because insect repellents are effective topical barriers to the spread of arthropod-borne infectious illnesses. Plant-based (natural) and chemical-based products are both used (synthetic) as a mosquito repellents, which come in a variety of forms such as mosquito repeller coils, mosquito repeller oil, and so on, are becoming more popular around the world as vector-borne viral diseases such as Dengue, Chikungunya, and Malaria become more prevalent. The best alternative to the optimal formulation is determined by a number of elements, including the type of repellent (natural or synthetic), medicinal forms (spray, lotion, cream, gel), duration of action (short or long), exposure environment, and user (adult, pregnant women, children, newborn). DEET, IPicaridin, and essential oils are the most commonly utilised repellents, each with its own set of benefits and drawbacks. DEET is not suggested for children under the age of six months or pregnant women because of its toxicity. The current tendency is to employ pant-based repellent active compounds like essential oils, which have minimal toxicity, are environmentally friendly, but have a shorter repellent action period due to quick evaporation after skin contact. Repellents could be a visible option for people to reduce the risk of interaction with rare mosquito-borne diseases for mosquito borne diseases. The review highlights a summary of mosquito repellents, its novel discoveries, and areaof technicalstudies such as the novel and unique repellent formulations and their potential future.

KEYWORDS: Mosquito repellent, Herbal, Ecofriendly, Safe, Insecticides.

## **INTRODUCTION:**

Infectious diseases spread by insects continue to be a major source of illness and mortality globally. Therefore, the impact of their removal is a major worry. With diseases like malaria (Anopheles), filariasis (Culex), and dengue (Aedes) causing millions of fatalities each year, primarily in Indian and African countries, mosquitoes are the most significant single group of insects in terms of disease transmission.<sup>1</sup> In recent years, reports of disease-causing insect-borne diseases have raised concerns for a variety of scientific fields.

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Mosquitoes spread viruses and protozoan parasites that cause encephalitis, dengue fever, filariasis, chikungunya, and other infections in addition to the malaria-causing disease.<sup>2</sup> In addition to sucking blood and interfering with daily activities, mosquitoes are a nuisance in tropical and subtropical areas because they spread illnesses and viruses like malaria, filariasis, dengue fever, and encephalitis that are fatal and cause disease all over the world.<sup>3</sup> The present death toll from all mosquito-borne infections is projected at between four hundred thousand and one million people, while in 2016 216 million people were infected and 445 000 deaths from malaria worldwide<sup>4</sup>. Pesticides are a wide range of substances which broadly include insecticides and repellents for insects. In the mosquito control programmers both the insecticides and the insect repellents were used simultaneously. Nevertheless, these traditional pesticide groups' continuous and extended access to the mosquito population has limited their

# Neuroquantology

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# Development and Evaluation of Pantoprazole Sodium Gastro Retentive Floating Tablet

Girish Sahu, Akansha Thakur, Deepika Sahu, Kushagra Nagori, Ayushmann Roy, Kulvinder Kaur,Ruchi Khare Shrivastava, Derhu, Anjali Patel, Afshan Niyazi, Mukesh Sharma,<mark>Vishal Jain</mark> DOI: 10.14704/nq.2022.20.13.NQ88206

# Abstract

Drugs can stay in the stomach for several hours, extending the gastric residence period. It can be used to deliver local drugs to the stomach and proximal small intestine. Prolonged stomach retention improves bioavailability, decreases drug waste, and increases solubility. Gastroesophageal reflux disease, also known as acid reflux or GERD is a chronic ailment. 10mg of medication has been dissolved in 20ml of methanol. The wavelength from maximum absorption was 276.5nm when a standard solution of pantoprazole (10mg/ml) was scanned. The polymers HPMCK15M and PVP prolonged medication release from floating tablets. Pantoprazole was chosen for this study as it has a shorter biological half-life and better bioavailability. This issue can be remedied by developing a gastro-retentive drug delivery device. Finally, it was determined that among all formulations (F1-F12), formulation F4 demonstrated better buoyancy and dissolution profile prepared with HPMCK4M, HPMCK15M, and PVP slowed high regression values of 0.992 for zero order on the basis of observed and predicted value (Box bhenken design) with drug release in 6 hr, making it (F4) to be selected as optimised formulation when compared to other formulations. based on observed and anticipated value The polymers HPMCK15M and PVP aided in the

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# REVIEW ARTICLE

# Conspectus on Tephrosia purpurea: An Introduction

Roman Kumar Aneshwari, Amber Vyas, Vishal Jain\* University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur (C.G.) \*Corresponding Author E-mail: vishaljain123@gmail.com

# **ABSTRACT:**

Tephrosia purpurea, which is also termed as sharpunkha in Ayurveda, is a wild herb of family Fabaceae. Geographically it is found at an altitude between 400 m to 1300 m in countries like India, Sri Lanka, China and Australia. Natural habitat of *Tephrosia purpurea* is in dry, sandy or rocky soil. It is seen growing along the roadside and places where waste are dump. Phytochemical investigations on *Tephrosia purpurea* shows the presence of constituents such as carbohydrates, protein, amino acid, tannins, saponins, terpenes, flavanones, rotenoids, chalcones, isoflavones, glycosides, alkaloids, flavanols, and sterols. It has also shown the presence of lupeol, lanceolatins A and B semiglabrin, rutin, sitosterol and pongamole. Flavonoids such as (+)-tephrosin A and B, (+)-tephrosone, isoflavone, 7, 4' dihydroxy-3', 5'-dimethoxyflavone and a chalcone, (+)-tephropurpurin were present in the whole plant and that was isolated from it. Different parts of the whole plant has shown variety of pharmacological actions ranging from anti-inflammatory to antitumor along with activities such as antiulcer , hepatoprotective, antioxidant, antimicrobial and antiallergic. Moreover it has also shown insect of *Tephrosia purpurea* (L.) Pers. till August 2012. *Tephrosia purpurea* is regarded as folk medicine due to several therapeutic properties like anti-daibetic, anticancer, antipyretic. It also has pharmacological importance

# KEYWORDS: Tephrosia purpurea, Cracca purpurea, Sharpunkha, Meghapatti.

# INTRODUCTION:

Tephrosia purpurea, which is also known as "Sarapunkha", "Purple tephrosia" in Sanskrit and English respectively. It belongs to the family of Fabaceae. This plant shows variety of therapeutic activity and impart medical values of great potential. There are around 400 species of Tephrosia genus comprising both annual and perennial herbs that are found in tropical and subtropical area around the globe.<sup>1</sup>. In India it has abundance in western region of Himalayas and upper region of Gangetic plain. In india it is grown in fields of paddy like green manure whereas in other countries instead of

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paddy field it is grown in tobacco and rubber field. All kind of soil ranging from loamy to sandy is suitable for the cultivation of this herb. In countries like India and South Africa it is utilized as fodder in flowering whereas in Australia it is known to cause livestock poisoning. It is also used as fuel in northern India. Laxatives and tonic properties are seen in every part of the plant. This traditional medicine is great source of antioxidant and it is also found widely that might make it a good candidate for novel drug development.<sup>2</sup> There is no mention of T. . purpurea in Indian Vedic literature and not even in ayurvedic text like Caraka Samhita. Though three references were found in Susruta Samhita and a text of third century Vagbhata's Astanga Hridaya. Moreover, between 8 to10 A.D T. purpurea was named as Nighantus and was used in treatment of splenomegaly. It was also referred as Pliha-Asatru (enemy of the enlarged

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# REVIEW ARTICLE

# Conspectus on Tephrosia purpurea: An Introduction

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Tephrosia purpurea, which is also termed as sharpunkha in Ayurveda, is a wild herb of family Fabaceae. Geographically it is found at an altitude between 400 m to 1300 m in countries like India, Sri Lanka, China and Australia. Natural habitat of *Tephrosia purpurea* is in dry, sandy or rocky soil. It is seen growing along the roadside and places where waste are dump. Phytochemical investigations on *Tephrosia purpurea* shows the presence of constituents such as carbohydrates, protein, amino acid, tannins, saponins, terpenes, flavanones, rotenoids, chalcones, isoflavones, glycosides, alkaloids, flavanols, and sterols. It has also shown the presence of lupeol, lanceolatins A and B semiglabrin, rutin, sitosterol and pongamole. Flavonoids such as (+)-tephrosin A and B, (+)-tephrosone, isoflavone, 7, 4' dihydroxy-3', 5'-dimethoxyflavone and a chalcone, (+)-tephropurpurin were present in the whole plant and that was isolated from it. Different parts of the whole plant has shown variety of pharmacological actions ranging from anti-inflammatory to antitumor along with activities such as antiulcer , hepatoprotective, antioxidant, antimicrobial and antiallergic. Moreover it has also shown insect repellent activity. This review has summarized the literature related to phytochemical and pharmacological study of *Tephrosia purpurea* (L.) Pers. till August 2012. *Tephrosia purpurea* is regarded as folk medicine due to several therapeutic properties like anti-daibetic, anticancer, antipyretic. It also has pharmacological importance

KEYWORDS: Tephrosia purpurea, Cracca purpurea, Sharpunkha, Meghapatti.

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paddy field it is grown in tobacco and rubber field. All kind of soil ranging from loamy to sandy is suitable for the cultivation of this herb. In countries like India and South Africa it is utilized as fodder in flowering whereas in Australia it is known to cause livestock poisoning. It is also used as fuel in northern India. Laxatives and tonic properties are seen in every part of the plant. This traditional medicine is great source of antioxidant and it is also found widely that might make it a good candidate for novel drug development.<sup>2</sup> There is no mention of T. purpurea in Indian Vedic literature and not even in ayurvedic text like Caraka Samhita. Though three references were found in Susruta Samhita and a text of third century Vagbhata's Astanga Hridaya. Moreover, between 8 to10 A.D T. purpurea was named as Nighantus and was used in treatment of splenomegaly. It was also referred as Pliha-Asatru (enemy of the enlarged

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#### Standardization and comparative evaluation of phytochemical content and antioxidant activity of Alocasia indica and Tephrosia purpurea

#### **Roman Kumar Aneshwari**

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Abstract—Extracts of leaves of Tephrosia purpurea and tuber of Alocasia indica were used as a traditional medicine in India for the management of various diseases, including rheumatic arthritis, hepatoprotective activity and antifungal properties. The objective of the work is to standardize the phytochemical constituent and comparatively analyze the anti-oxidant activity of Alocasia indica and Tephrosia purpurea. Leaves ethanolic extract of Tephrosia purpurea and tuber ethanolic extract of Alocesia indicia Schott, were evaluated for antioxidant activity using 1, -diphenyl-2-piroyl hydrazy (DPPH) assay. Phenolic content was estimated by using Folin-Ciocalteu's

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reagent. Total flavonoid content was measured for Alocasia indica and Tephrosia purpurea by the aluminum chloride colorimetric assay. Furthermore, Albino mice were used to test the acute toxicity of the plant extracts. The standardization of plant extracts demonstrated lesser amount of oil-soluble contents is present in both the plants. The total flavonoid contents were 76.93±1.41 and 107.44±1.89 mg QE/g while the total phenolic contents were 512.33±1.52 and 595.66±2.51 mg GAE/g for A. Indica and T. Perpurea, respectively. The antioxidant assay illustrated, significant DPPH radical scavenging potency of plant extracts. No sign of toxicity or mortality was observed at a dose of 1000 mg/kg and 2000 mg/kg for A. Indica and T. Perpurea, respectively. The results indicated that Tephrosia purpurea thas significantly higher flavonoid content and so, higher antioxidant effect as compared to Alocasia indica thus, it can be used in management of various oxidative stress induced diseases.

Keywords----alocasia indica schott, tephrosia purpurea, antioxidant, standardization, phytochemical evaluation.

#### Introduction

Medicinal plants are used for the improvement of various disorders since the primeval era as traditional medicine. Medicinal plants are primary sources of bioactive compounds and used for discovery of new drug [1-4]. They play a significant role in development of modern medicine. With the advancement and invention in the area of drug development of human civilization and knowledge, therapeutic uses of the herbals have been increased. Researchers always took an attempt to perform pharmacological tests to identify and isolate the actives which are beneficial for the human begins for treatment of various diseases [5-7].

Alocasia indica Schott belongs to family Araceae, commonly famous as Elephant Ear Taro or Gaint Taro. The plant is a vigorous green herb of height up to 1.8 m and widely distributed in Asia and the Pacific islands [6,8]. The leaves are previously reported as hepatoprotective, digestive, laxative, diuretic, antifungal, astringent, and useful in rheumatic arthritis. The plant has mainly flavonoids, cyanogenetic glycosides, ascorbic acid, galic acid, malic acid, oxalic acid, alocasin, amino acids, succinic acid β-lectins [5,9].

Tephrosia purpurea (L.) Pers. belongs to family Fabaceae [10], its common name is Sarapunkha. This plant is vastly branched, sub-erect, herbaceous perennial [11,12]. In Ayurveda, it is known as 'wranvishapaka' means property of healing the entire wounds. It is the most important part of ayurvedic preparations Tephroli and Yakrifit used to treat liver disorders. This plant is also used for asthma, impotence, diarrhea. rheumatism, gonorrhea, ulcers, urinary and heart diseases [13,14]. The dried herb is effective as a tonic laxative, diuretic, and deobstruent. The plant has mainly glycosides, rotenoids, isoflavones, flavanones, chalcones, flavanols, and sterols [15,16].

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# Quantum Dots and Nanohybrids and their Various Applications: A Review

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# Abstract:

Organic/inorganic nanohybrids and quantum dots have attracted widespread interest due to their favorable properties and promising applications. Great efforts have been made to design and fabricate versatile nanohybrids. Processing structure-properties-performance relationships are reviewed for compound quantum dots. In this review, various methods for synthesizing quantum dots as well as their resulting properties are discussed. This review focuses on the design, properties, sensing as well as energy applications of organic/inorganic nanohybrids as well as quantum dots. In this article, strategies for the fabrication, properties, functions, characterization techniques, various synthesis strategies and application of nanohybrids and quantum dots are briefly deliberated.

Keywords: nanohybrids; quantum dots; properties; sensing; energy applications.

# 1. Introduction

Since time immemorial, nanomaterials are widely used for various purposes as they are the bridging materials between bulk and the molecular or atomic level. The major concern of the 21<sup>st</sup> century is the growing pollution levels as well as to secure sustainability of energy that meets the global energy demands. In order to tackle these problems researchers all over the world have developed sensors in order to detect the toxicants and pollutants present in their immediate environment. Moreover, researchers are emphasizing on development of new catalytic and energy materials as well as investigating a clean and sustainable way to balance our long term dependence on fossil fuels and control the pollution levels. In this context, nanomaterials especially nanohybrids and quantum dots have emerged as a promising material because of their unique optical and electronic properties and the most important being tuning of their band gap.

Quantum dots have emerged as promising materials for nanosensors<sup>1,2</sup>, bioimaging <sup>3</sup>, catalytic degradation of organic pollutants<sup>4</sup> photocatalysis<sup>5</sup> and photovoltaics <sup>6</sup> Many scientists and research groups have already reported the use of QDs as sensors and for energy purposes. Zhang et al.<sup>7</sup> have developed N-doped CQD for optical detection of Hg<sup>2+</sup> ions. Zhang et al.<sup>8</sup> have synthesized Graphene QDs which were used as dual fluorescent and electrochemical biosensors for glucose and H<sub>2</sub>O<sub>2</sub> detection. A FRET between CQD and gold nanoparticle has been explored for the detection of organophosphorus and carbamate

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# Article

# Quantum Dots and Nanohybrids and their Various Applications: A Review

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Abstract				

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# COVID-19: Current landscape on global incidence of neurologic features and their restorative strategies

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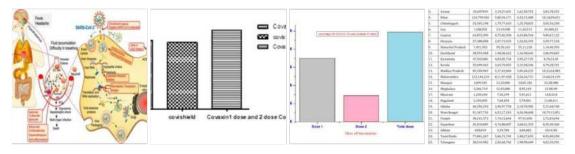
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## Abstract and figures

According to WHO, he SARS-CoV-2 Coronavirus malady to begin with showed up in Wuhan, China in December 2019 and rapidly spread to more than 200 nations, coming about in a worldwide wellbeing widespread. There are over 3.5 million affirmed cases and between 165,000 and 243,000 fatalities. The essential signs are respiratory and cardiac, but neurological highlights have too been detailed in case reports and case arrangement with in the writing. Headache and tipsiness are the ore most detailed side effects, taken after by encephalopathy and daze cerebrovascular mischance, Guillian barre disorder, intense transverse myelitis, and intense encephalitis are among the complications famous. Hyposmia was the foremost common fringe appearance. It ought to moreover be famous that neurological appearances can in some cases go before normal highlights such as fever and hack, and those normal signs create afterward in these patients. Our objective is to advise neurologists and doctors who are treating suspected COVID19cases around the conceivable neurological introductions, plausible neurological complications, and the different treatment options available, to consider the long run of this worldwide widespread, and to distinguish a few potential alternatives that may revolutionize the treatment of this novel infection disease. We provide an outline of the current information concerning neurological appearances related with COVID-19, to the extent that literature is already available as the pandemic is still progressing.



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# COMPARATIVE EVALUATION OF PHARMACOKINETIC PROFILE OF HERBAL AND SYNTHETIC POLYMER BASED DELIVERY SYSTEM

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\*Corresponding Author: Dr. Rajendra Jangde; E Mail: rjangdepy@gmail.com Received 18th Jan. 2022; Revised 25th March. 2022; Accepted 18th April. 2022; Available online 1# Oct. 2022

https://doi.org/10.31032/IJBPAS/2022/11.10.6510

# ABSTRACT

The formulation and evaluation of herbal and synthetic polymer-based microspheres for a targeted drug delivery, herbal polymer arrowroot is effectiveness, biodegradable, polysaccharide, and natural polymers chitosan is used in preparation and comparison as a (standard natural polymer) polymer-based microspheres and establishment of arrowroot microspheres. Several drugs delivery system for targeting the organ and tissue, the drug release provides a therapeutic effect of drugs and desired concentration in the body. Naturally polymers-based microspheres are used as a carrier system for a targeted tissue, organs and used to effective manner. These are consisting of protein, natural and synthetic which are biodegradable floras, particle size having less than 200 µm. It is prepared by solvent evaporation methods and cross-linking methods. Arrowroot-based ethyl cellulose microsphere is prepared by solvent evaporation technique using ethyl cellulose and poly vinyl <sup>alcohol</sup> (stabilizer). The prepared microspheres are tested for particle size, percentage thtrapment efficacy, zeta potential, and in vitro drug release. Controlled /sustained drug delivery system provides, minimize the side effect of conventional drug delivery, and increase the therapeutic efficacy of drug. The various applications of this microsphere, such <sup>As</sup> cancer cell and colon targeted drug delivery system, are critical for the safe and effective in-vivo drug delivery. The goals of this study are to highlight some key aspects of herbal

<sup>17BPAS, October, 2022, 11(10)</sup>

4845

# **Review Article**

It Medical Team https://www.itmedicalteam.pl/

International Journal of Drug Development and Research 0975-9344 2022

Vol. 14 No. 12: 984

# Development of Nanoformulations for Targeted Transport of CNS Drugs with Greater Pharmacological Activity via the Nose in to the Brain

# Abstract

The purpose of the paper is actively exploring the feasibility of using nanocarriers in the brain to treat various neurological disorders. These include Parkinson's disease, schizophrenia, epilepsy, Alzheimer's disease, brain cancer, multiple sclerosis, depression, cerebral ischemia, and cerebral malaria. Among the various approaches available, nose-to-brain drug targeting remains the most acceptable but difficult challenge due to the complex structure and multiple barriers presented by the CNS. The various nanoformulations including microemulsions, nanoemulsions, polymeric nanoparticles, micelles, solid lipid nanoparticles (SLNs), liposomes, and transferosomes are currently used for their advanced delivery approaches. The nanoformulations are capable of performing the desired functions of the advanced delivery and targeting approaches, i.e., enhancing nasalto-brain delivery and penetration of the drug across the blood-brain barrier (BBB). These formulations are safe, stable, and capable of improving bioavailability and biocompatibility. These nanocarriers offer numerous advantages over conventional drug delivery systems, such as improved targeting and high drug loading capacity. Researchers and scientists worldwide are working tirelessly in various areas of CNS disorders with or without nanoformulations, and it is still an area that needs to be explored. This review focuses on the major approaches of brain targeting, including efficient delivery of the drug across the blood-brain barrier as well as navigation of the nanoformulations to the desired brain site in conjunction with the global prevalence of certain neurological diseases in the current situation.

Keywords: Nanocarriers; BBB; CNS Targeting; Intranasal drug delivery; Neurological disorders

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# Introduction

The brain is a command center and one of the most important organs in humans, controlling all functions, both voluntary and involuntary [1]. The relevant information is also stored and transmitted to various organs. The brain is mainly protected by shielding a. the blood-brain barrier (BBB) and b. the endothelial cell. These shielding mechanisms protect the brain from harmful influences and maintain homeostasis [2]. According to 2015 statistics, Alzheimer's disease and other brain diseases are the top 10 causes of death worldwide [3].

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The blood-brain barrier (BBB) is a unique shield against harmful substances that involves the tissues of neurons and blood vessels, allowing tissue function, regulation of transport, and protection [4]. It is made up of a variety of cells, including perivascular macrophages, pericytes, astrocytes, and capillary endothelial cells. Tight junctions (TJs) between endothelial cells, which include occludins, claudins, and junctional adhesion molecules, cause the BBB to be impermeable to many molecules. In addition to endothelial cells, the controlled permeability of the BBB is also influenced by specialized extracellular matrix and the basement membrane, which is made up of collagen type IV, laminin, fibronectin, tenascin, and proteoglycans [5].



# Anthropogenic fine aerosol and black carbon distribution over urban environment

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Real-time black carbon (BC) and fine particulate matter (PM) were collected from January to December 2017 with a portable Aethalometer and air sampler in the urban environment of Jamshedpur, India. In the present study, the diurnal and seasonal variations of BC and meteorological variables were analysed. The diurnal variation of BC ranged from 2.1 to 15.5 gm-3, with the lowest concentration during the monsoon season and the highest during the winter season, because in monsoon most of the BC and PM are settled down. The annual mean BC mass concentration was observed at  $6.22 \pm 3.95 \,\mu\text{gm}^{-3}$ . While, fine PM<sub>2.5</sub> varied from 41.6 to 260.3  $\mu\text{gm}^{-3}$ , with an annual mean of 97.49  $\pm$  63.52  $\mu\text{gm}^{-3}$ . During monsoon, the BC mass concentration shows a value of <sup>5</sup> 3 µgm<sup>-3</sup>. Additionally, the percentage contribution of BC in PM<sub>25</sub> was determined to be around 5.06% (winter), 6.32% (summer), 5.20% (monsoon), and 7.21% (post-monsoon). The change in BC concerning different meteorological parameters was systematically studied, in which an exciting inverse relationship was noticed between BC concentration and temperature. The correlation between BC and wind speed was also established as a negative connection during study periods. It also observed a negative correlation with precipitation. Finally, the air back trajectory was analysed using the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT), which revealed that the essential campaign of aerosol-bounded air parcels was mostly coming from the western part of India, with some marine air masses also joining from the Bay of Bengal during summer and post-monsoon. Overall study shows that highest BC and PM<sub>2.5</sub> was observed in the winter season because of mixed layer height (MLH).

Keywords Black carbon · PM<sub>2.5</sub> · Correlation analysis · Backward trajectory

# 1 Introduction

The impact of Black Carbon (BC) aerosol on global environmental and climatic change is enormous. BC emissions and poor air quality are mostly caused by expand-Ing urbanisation, increasing industrialization, and related anthropogenic activities. The leading pollutant causes global warming which is a major concern at present across the globe [1, 2]. BC collects short-wave solar radiation and global heat vigorously and shows a key role in the heating and rapid melting of glaciers and snowpack by ambushing the heat within the atmosphere of the Planet [1, 3–5]. BC is generated by partial combustion of fossil fuel, (i.e., gasoline, petrol,) and biomass burning (i.e., crops, peat fires, shrubs, forest wildfires, dry leaves) and biofuels (i.e., wood, dung cakes, waste materials) [6-9]. The BC aerosols have absorbent properties, which directly account for reducing arriving short-wave solar radiation, important to warm the

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RJPT

RESEARCH ARTICLE

# Development and Characterization of Nanostructured Lipid Carrier for Topical delivery of Naringenin

## Rajendra Kumar Jangde\*, Tanveer Khan, Harish Bhardwaj

University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur (C.G.) India 492010. \*Corresponding Author E-mail: rjangdepy@gmail.com

#### ABSTRACT:

Wounds are physical injuries that result in an opening or break of the skin, the proper healing of wounds is essential for the restoration of disrupted anatomical continuity and disturbed functional status of the skin. Healing is complex and initiated in response to an injury that restores the function and integrity of damaged tissues. Nanostructured lipid carriers (NLCs) for dermal application can provide enhanced skin permeation. Naringenin belongs to the flavanone class of flavanoids and is abundantly present in citrus fruits. It has therapeutic interventions as antioxidant, anti-inflammatory, antidiabetic, and anticancer agents. But some drawbacks include poor solubility, fast metabolism and inadequate bioavailabilityhinder the application of flavanoids, which can be addressed through increased absorption, solubility and stability. The present study was aimed at formulating naringenin-loaded NLCs for reducing the skin irritation potential, increasing the drug loading capacity and prolonging the duration of action. Naringenin-loaded NLCs were prepared by hot melt microemulsion and hot melt probe sonication methods. The properties of the optimized NLCs such as morphology, size, Zeta potential, stability and Invitro drug release were investigated. Naringenin-loadedNLCs showed a sustained release pattern tested and were found to follow the Higuchi model of drug release. Stability studies indicated that the formulations stored at refrigeration and room temperature showed no noticeable differences in the drug content and release profiles In vitro, after a period of 4 weeks. The results showed that the irritation potential of Naringenin was reduced, the drug loading was increased and the drug release was prolonged by the incorporation of naringenin into the NLCs.

KEYWORDS: Naringenin, Wound healing, Nanostructure lipid carrier,

# INTRODUCTION:

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The most significant alternatives for the topical delivery of drugs are self-assembled colloidal lipid systems such a liposomes, emulsion, solid lipid nanoparticles(SLN), phytosomes and nanostructured lipid carriers (NLCs) [1]. However, the traditional liposomes and emulsions have some disadvantages including, toxicity from organic solvent residue based on the preparation method, physical and chemical instability, having to indergo lengthy, multistep processes, and nonteproducible drug release [2,].

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SLN consists of an aqueous dispersion of solid lipid (0.1 - 30% w/w), they may be further stabilized with the addition of 0.5 - 5% (w/w) surfactant [3]. Although thought the SLN appeared to offer several potential uses in drug delivery and research. There are also major drawbacks to drug release during storage, due to the drug's lower solubility in the solid lipid, and the loading capacity has been frond lower [4]. The developed NLCs are promising nanocarriers that were able to overcome the restrictions, the nanometer-sized particles of NLCs allow them to be in an intimate interface with the skin layers, enhancing the drug penetration of the epidermis [5]. Most of the lipids used as excipients in the development of NLSs have been considered safe and biodegradable providing them less harmful to the skin, solid lipids are responsible for the sustained drug release from the bloodstream. In addition to delivering irritantrontiers Frontiers in Oncology

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the in Oncology

# Malignant mesothelioma tumours: molecular pathogenesis, diagnosis, and therapies accompanying clinical studies

Ram Kumar Sahu<sup>1\*</sup>, Sakina Ruhi<sup>2</sup>, Ashok Kumar Jeppu<sup>2</sup>, Husni Ahmed Al-Goshae<sup>3</sup>, Ayesha Syed<sup>4</sup>, Sanjay Nagdev<sup>5</sup>, Retno Widyowati<sup>6</sup>, Wiwied Ekasari<sup>6</sup>, Jiyauddin Khan<sup>7\*</sup>, Bedanta Bhattacharjee<sup>8\*</sup>, Manoj Goyal<sup>1</sup>, Sankha Bhattacharya<sup>9</sup> and Rajendra K. Jangde<sup>10</sup>

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The pathetic malignant mesothelioma (MM) is a extremely uncommon and confrontational tumor that evolves in the mesothelium layer of the pleural cavities (inner lining- visceral pleura and outer lining- parietal pleura), peritoneum, pericardium, and tunica vaginalis and is highly resistant to standard treatments. In mesothelioma, the predominant pattern of lesions is a loss of genes that limit tumour growth. Despite the worldwide ban on the manufacture and supply of asbestos, the prevalence of mesothelioma continues to increase. Mesothelioma presents and behaves in a variety of ways, making diagnosis challenging. Most treatments available today for MM are ineffective, and the median life expectancy is between 10 and 12 months. However, in recent years, considerable progress has already been made in understanding the genetics and molecular pathophysiology of mesothelioma by addressing hippo signaling pathway. The development and progression of MM are related to many important genetic alterations. This is related to NF2 and/or LATS2 mutations that activate the transcriptional coactivator YAP. The X-rays, CT scans, MRIs, and PET scans are used to diagnose the MM. The MM are treated with surgery, chemotherapy, first-line combination chemotherapy, second-line treatment, radiation therapy, adoptive T-cell treatment, targeted therapy, and cancer vaccines. Recent clinical trials investigating the function of surgery have led to the development of innovative approaches to the treatment of associated pleural effusions as well as the introduction of targeted medications. An interdisciplinary collaborative approach is needed for the effective care of

# **REVIEW ARTICLE**

# Traditional Herbal Medicines As a Complementary Treatment for Monkeypox

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# ABSTRACT

**Background:** Since May 2022, that has been largest-ever spread of monkeypox in countries where it is not normally found. Since India is home to about 36% of the world's population, an MPXV outbreak there might have far-reaching consequences. A fuller understanding of the monkeypox virus and the epidemiology of the disease is urgently needed to help clinicians, public health professionals, and politicians be prepared for any eventuality, especially given the speed with which it has spread to non-endemic nations.

Aim: Review provides an overview of the epidemiology, clinical characteristics, treatments, vaccinations, and herbal resources used in the management of infection for the monkeypox disease. Immune-compromised host & group require to be given additional notice as the illness is known to have significant effects on pregnant women; we have also highlighted relevant formation about such pathophysiological situations in this work.

**Result and conclusion:** The spread of monkeypox virus (2022) in non-endemic nations could provide India with an opportunity to investigate the Krimighna medications mentioned in Brihatrayee, i.e. Charak Samhita, Sushruta Samhita and Ashtanga Hridaya with antiviral activity and to develop novel and useful antiviral agents to combat the monkeypox menace effectively. International Journal 6 Di

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Conflict of interest: None

## INTRODUCTION

Since May 2022, when the first 25,000 cases were reported, the World Health Organisation has classified monkeypox as a global outbreak. This disease (MSM) impacts bisexual, gay, as well as other men who have sex with other men more than other men who have sex with other men.<sup>1</sup> As of July 8, 2022, 9069 laboratory-confirmed cases had been recorded.<sup>2</sup> The vast majority of these cases occurred in people who had not visited endemic locations, such as the UK, US, Spain and Portugal. On August 4, 2022,<sup>1</sup> US government proclaimed a monkeypox pandemic monkey pox virus (MPXV) is a member of the orthopox genus and a close relative of smallpox.<sup>3</sup> Its DNA is made up of two copies of a molecule with two strands. They can attack many different hosts and can finish their life cycles inside the cytoplasm of cells from invertebrates, vertebrates, and humans.<sup>4</sup> The most common types of human

MPXV are the West African (WA) and Congo Basin (CB) kinds.<sup>3,4</sup> The symptoms of monkeypox are like those of small pox but a Resemblance between monkeypox and small pox has facilitated clinicians to find antiviral medications for management of MPXV infection. However, specific medicines for the infection are not available since the smallpox vaccine and a newly derived post-infection vaccine are used against monkeypox infection. Apart from allopathic medicines, clinicians and researchers may look towards the Ayurvedic system of medicines.<sup>5</sup> As per Ayurveda, Vayu (air), Jala (water), Desh (soil & region), and Kala (time) are the four factors that trigger group infection in public. Acharya Charaka also addressed the general idea. The three main Ayurvedic treatments for epidemic ailments are Panchakarma (five purifying processes), Rasayana Chikitsa (immune-modulators therapy), and Sadvritta (positive conduct). Rasayana Chikitsa

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# PHYSICAL ACTIVITY LEVEL AND OBESITY AMONG UNIVERSITY TEACHERS OF CHHATTISGARH

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# **ABSTRACT**

Sedentary life style leads to reduction in energy regulatory ability, resulting in positive energy balance and weight gain. Obesity is a medical condition in which excess body fat is accumulated to the extent that it may have a negative effect on health (WHO, 2015). The objective of the present study was to find out the physical activity levels and obesity among university teachers of Chhattisgarh. A Total sample of 520 (n=254 male & n=266 female) teachers from different colleges & universities of Chhattisgarh was selectedfollowing the purposive sampling method for the study, age range of the subjects was between 30 to 65 years. Physical activity level (PAL) was assessed with the help of self-constructed questionnaire. Anthropometric measurements (weight, height, waist circumference and hip circumference) were taken with standard methods. BMI and Waist, Hip Ratio were calculated to find out prevalence of obesity. The result of the study revealed that 76.35 percent of subjects were involved in mild physical activity, 3.65 percent of subjects in moderate physical activity (PA), and only 0.96 percent of subjects were involved in vigorous physical activity, whereas 19.04 percent subjects were not involved in any kind of physical activity. 41-50 age group of the participants showed higher obesity problems, it seems the 41-50 age groupis at risk for the development of the hypo-kinetic problems, like obesity. More number of female teachers (54.3) were found to have obesity problems as compared to male teachers (45.7). There is effect of age and gender in the physical activity pattern as well as prevalence of obesity. It was interesting to note that 62.9% of science teachers were obese as compared to the other subjects. It is recommended that future study can be conducted with larger population and intervention programs can be planned to change the lifestyle and to increase engagement in physical activity.

# Key Words: Physical activity, obesity, university teachers.

# **INTRODUCTION**

Body composition is important factor in the assessment of health and fitness; hence Obesity was a part of hypo-kinetic disease for the present of study. Obese is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health. People

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Dr.Subuhi Nishad<sup>1</sup> Dr.Reeta Venugopal<sup>2</sup> Dr.Priyamvada Srivastava<sup>3</sup> Dr.Aniksha Varoda<sup>4</sup>

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# **ABSTRACT**

Sedentary life style leads to reduction in energy regulatory ability, resulting in positive energy balance and weight gain. Obesity is a medical condition in which excess body fat is accumulated to the extent that it may have a negative effect on health (WHO, 2015). The objective of the present study was to find out the physical activity levels and obesity among university teachers of Chhattisgarh. A Total sample of 520 (n=254 male & n=266 female) teachers from different colleges & universities of Chhattisgarh was selectedfollowing the purposive sampling method for the study, age range of the subjects was between 30 to 65 years. Physical activity level (PAL) was assessed with the help of self-constructed questionnaire. Anthropometric measurements (weight, height, waist circumference and hip circumference) were taken with standard methods. BMI and Waist, Hip Ratio were calculated to find out prevalence of obesity. The result of the study revealed that 76.35 percent of subjects were involved in mild physical activity, 3.65 percent of subjects in moderate physical activity (PA), and only 0.96 percent of subjects were involved in vigorous physical activity, whereas 19.04 percent subjects were not involved in any kind of physical activity. 41-50 age group of the participants showed higher obesity problems, it seems the 41-50 age groupis at risk for the development of the hypo-kinetic problems, like obesity. More number of female teachers (54.3) were found to have obesity problems as compared to male teachers (45.7). There is effect of age and gender in the physical activity pattern as well as prevalence of obesity. It was interesting to note that 62.9% of science teachers were obese as compared to the other subjects. It is recommended that future study can be conducted with larger population and intervention programs can be planned to change the lifestyle and to increase engagement in physical activity.

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# **INTRODUCTION**

Body composition is important factor in the assessment of health and fitness; hence Obesity was a part of hypo-kinetic disease for the present of study. Obese is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health. People

## Growth and Nutritional Status of the Gond tribe of Chhattisgarh, India

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Abstract- Objective - To assess the growth and nutritional status of the Gond children.

Methods - A cross sectional study of the physical growth was conducted on 409 Gond children (194 boys and 215 girls), aged 12 to 17 years, in the Bastar district of Chhattisgarh. The study aimed to find out the growth pattern of the Gond children, which is considered to be a primitive tribe of Chhattisgarh, India and was compared with other Indian tribe and the official data of NCHS1987, CDC 2007-2010 & all India (ICMR 2010). Anthropometric measurements included height, weight, sitting height, and measurements of the biceps, triceps and subscapula, supraspinale and calf skinfolds.

Results - All anthropometric measurements except skinfold thickenness exhibited uniform increase with age in both sexes. Gond boys showed higher anthropometric values than girls in height, weight and sitting height whereas in all the skinfolds measurements mean values of girls were higher as compared to boys. The Gond children showed lower mean values as compared to NCHS &CDC 2007-2010 where as height & weight were at par with ICMR 2010 and higher than Kamar tribe. Around 47% boys & 72% girls reported to be in various category of malnutrition.

Conclusion - Poor socio-economic status of this primitive tribe may be one of the reasons for this poor nutritional status & growth pattern as compared to NCHS 1987. However, further study can be conducted to get more insight

Key Words – Growth Status and Nutritional Status, Gond Tribe.

#### INTRODUCTION

The nutritional status of growing children in a population indirectly determines the standard of living. Nutritional inadequacy slows down the growth of children and which is observable response. Therefore, determination of nutritional status may prove to be a powerful tool to identify the health status of any population.

Tribal populations are isolated from general population with their own physical, socioeconomic and cultural environment. They are the most backward section of the society, due to various factors like ignorance, poverty, lack of development in the inaccessible areas, illiteracy and exploitation. Several studies have documented a close relationship between tribal ecosystem and their health and nutritional status.<sup>1</sup> The habitat of the tribe has conferred certain advantages. The dietary habits and other related modes of life contributed to their better nutritional and health status in some tribal groups, while in other groups these practices are not conducive to good health.<sup>2</sup>

Many studies based on published data have indicated patterns of anthropometric variation along ethnic, geographic, latitude, longitude and altitude, nutrition and several confounding variables.<sup>3</sup> This work is an attempt to study the growth status through anthropometric measurement of Gond, children a primitive tribe of Bastar district, Chhattisgarh state and to compare their growth & nutritional status with other studies.

The Gonds are one of the most famous and important tribes in India, known for their unique customs and traditions. They are mainly a nomadic tribe and call themselves as Koytoria. The term 'Gond' is derived from the Telugu word 'Konda' which means hill. Gond Tribes are primarily found in Madhya Pradesh, Chhattisgarh, eastern Maharashtra, northern Andhra Pradesh and Western Orissa. With a population of over



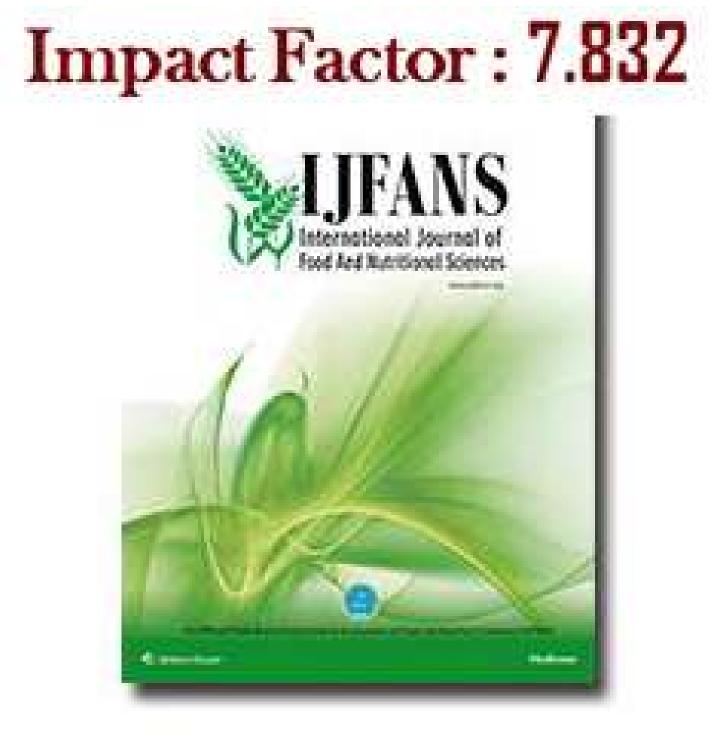
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Anthropometric Indicators Among Adolescent Female Players After Soy Supplement in Chhattisgarh India

PDF (https://www.ijfans.org/uploads/paper/84397019d6afa8a9cf088933221e9d78.pdf)

#### Keywords:

Soy supplement, adolescent girls, anthropometric measurement, Khel Parisar Kanker (KPK), Sports Authority of India (SAI)

Rashmi Singh, Vasu Verma, AnikshaVaroda, Reeta Venugopal

#### Abstract

Adolescence is a transitional phase from childhood to adulthood. It is a period of development as the gain of anthropometric measurements is increased over this period. India is a country with different tribal groups and Bastar district is a tribal belt of Chhattisgarh state in India. The nutritional status is a major concern among adolescent girls, which affects growth and development and forms basis of adulthood, dietary supplements can play an important role to address the concerns. The study aimed to explore the effect of soy supplement on the anthropometric measurement of tribal girls. A total of 120 female players aged 12 to 18 years from a residential school where the female players take part in sports training as well as attend the school Khel Parisar Kanker (KPK) from the tribal area and female players of Sports Authority of India (SAI) of urban area were selected for the study. Female players of KPK and SAI were divided into Experimental Group (EG) (N=30) and Control Group (CG) (N=30). Soy Supplement in form of Soy Ladoo was provided to the experimental group from August'2018 to March'2019. Before and after experimental design with control groups was used in the study. Height, Weight, Mid Upper Arm Circumference (MUAC), Waist Girth (WG) were measured and BMI was calculated. ANCOVA and trend analysis were used to analyse the data. It was found that Anthropometric measurements (MUAC, WG and BMI)increased significantly in EG than CG in KPK and SAI female players. An upward trend was observed and can be concluded that soy supplement was effective in improving anthropometric measurements.

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### Structural, photoluminescence, and thermoluminescence behaviors of Samarium doped CaWO<sub>4</sub> phosphor



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#### ARTICLEINFO

Keywords: Rietveld refinement UV-Visible absorbance spectroscopy Photoluminescence CIE Chromaticity Thermoluminescence spectra

#### ABSTRACT

This manuscript reports the crystal structure, photoluminescence and thermoluminescence behavior of Samarium doped CaWO<sub>4</sub> i.e., Ca<sub>1-x</sub>Sm<sub>2x/3</sub>WO<sub>4</sub> (x: 0.01, 0.02, 0.03, 0.04, 0.05) synthesized by conventional solid state reaction method. The X-ray diffraction data are analyzed using Rietveld refinement method and showed that samples exhibit cento-symmetric tetragonal crystal structure with  $I4_1/a$  (No. 88) space group. The unit cell volumes are increased with rising Sm composition. The energy bandgaps of the phosphors are observed by the UV–Visible absorbance spectroscopy and found to be directly proportional to the cell volume. Photoluminescence properties are considered from the excitation as well as emission spectra. These spectra resulted that the critical quenching concentration occurred at x = 0.02 due to the dipole–dipole interactions with critical energy transfer distance of 20 Å. The color purity and correlated color temperature values of the sample can be measured from the CIE Chromaticity. It is also described the orange-red emission color of the phosphors. Lower UV dosimetry with second order kinetics is obtained from the thermoluminescence spectra of x = 0.02 with 30 min UV radiation.

#### 1. Introduction

Now-a-days phosphors are used as luminescent materials in light emitting diodes due to their significant features like excellent luminescence behavior with various emission colors, less power consumption, good efficiency, extensive operation lifetimes, negligible pollution, and broad applicability in lighting as well as displays than the conventional lighting devices. Hence many researchers are paying attention to prepare these types of phosphors with great luminescence behaviors [1]. In last few years, several investigations are going on to find out the most appropriate phosphors with various emission colors. Among all the phosphors i.e., aluminates, silicates, molybdates, nitrates, tungstates and oxides; scheelite type tungstates are more efficient because of their self-activated nature, broad emission band and applications in LEDs, FEDs, display devices etc. [2-3]. Calcium tungstate as a host lattice attracts much more attention because of its good photoluminescence and thermoluminescence behaviors, low optical loss, broad emission seen in UV-Visible range, high color purity, suitable correlated color

temperature, naturally occurring phenomenon and can be appropriately used in the LEDs [4–5]. Also, the luminescence behaviors can be enhanced by incorporating rare earth elements in to the host material with the formation of various energy transfer paths and decreasing the critical quenching concentration. From the literature it has been observed that different rare earth ions are doped in Calcium Tungstate for the further analysis of the improved luminescence behaviors [6–7].

Europium and Terbium doped CaWO<sub>4</sub> phosphors have been prepared by Zhang et al. and red as well as green emission colors are shown by the material correspondingly [8]. A brief study on optical properties with yellow emission color of Dysprosium doped CaWO<sub>4</sub> is done by Du et al. [9]. Also Kaur et al. are analysed the photoluminescence properties of Samarium doped CaWO<sub>4</sub> [10]. But there is a lack of evidence on the energy transfer mechanism as well as the thermoluminescence behaviors of this material. However, thermoluminescence properties of CaWO<sub>4</sub> with different rare earth ions are also analyzed extensively [11–12]. Trap deepness and order of kinetics of Europium and Dysprosium doped CaWO<sub>4</sub> are discussed by Gayatri Sharma et al. [13] and

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## Investigation of photoluminescence, thermoluminescence, and energy transfer mechanism in Ce/Dy co-doped Sr<sub>2</sub>Al<sub>2</sub>SiO<sub>7</sub>

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#### ARTICLEINFO

Keywords: Photoluminescence Thermoluminescence Energy transfer Dosimetry

#### ABSTRACT

In the present manuscript, we report the luminescence properties and energy transfer mechanism of Ce/Dy codoped Sr<sub>2</sub>Al<sub>2</sub>SiO<sub>7</sub> (SASO) phosphors prepared through the solid-state reaction method. Phase identification was done through a powder X-Ray diffraction tool and the obtained diffractogram confirms the formation of the desired phase. The Photoluminescence excitation and emission spectra of the prepared samples were investigated. Photoluminescence studies revealed that the luminescence intensity rises with increasing Dy concentration and optimized intensity was observed at 1 mol%. The energy transfer in the host has been attained successfully to produce color tunability. The Commission International de l'Eclairage (CIE) chromaticity coordinates and correlated color temperature (CCT) has been calculated. The energy transfer mechanism is further investigated via Thermoluminescence (TL) spectra. Further, the TL properties of synthesized phosphors were analyzed via the glow curve method along with varying UV doses. As compared to the single-doped phosphors, the TL glow curve indicates that very high intensity is observed at very low UV doses and the major TL peak is located in a higher temperature region. The calculated kinetic parameter indicates that Ce/Dy co-doped SASO has both shallow and deeper traps. All these findings suggest the potential applicability of synthesized phosphors as a low UV dosimeter.

#### 1. Introduction

White light-emitting diodes (WLEDs) are the most striking topic of research in the field of solid-state lighting and display technologies. Several attempts had already been made, and many others have been continued by many researchers, to develop an efficient, single-phase white light-emitting phosphor [1]. Until now, three well-known methods are considered the most convenient methods to achieve WLEDs. One of these methods is combining a blue-emitting LED chip with  $Ce^{3+}$ -activated  $Y_3Al_5O_{12}$ . Nevertheless, this method is accompanied by several drawbacks, such as poor thermal stability and chemical durability, a low color rendering index (CRI), and a low correlated color temperature (CCT) [2]. To overcome these drawbacks, another method is employed in substitution of this method by integrating tri-color (Red, Green, and Blue) and UV LED chip. Still, the major issue with this

method is the reabsorption of blue light, which takes place through red and green light. This has a significant impact on luminous efficiency. Another approach is to use blue LED to stimulate single-phase yellow phosphor or mixed-phase red and green phosphor [3,4]. Thus, the task of achieving an efficient single-phase white light-emitting phosphor remains same. Nowadays, phosphor-converted (PC) LEDs get much attention in display technology due to their various advantages over traditional technology. For the development of a single-phase white light emitting diode, currently, the most widely used method is the introduction of a sensitizer and an activator into a single host. The phosphor prepared by this method may be efficiently able to generate white light via energy transfer between the sensitizer and activator [5].

For the choice of dopants, among the 14 rare earth ions, the trivalent cerium ion drew considerable attention. Trivalent cerium shows intense broadband spectra in the visible region due to its parity allowed  $5d \rightarrow 4f$ 

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## Exploration of crystal structure, and luminescence behaviors of Terbium-activated CaWO<sub>4</sub> phosphor

R. Paikaray<sup>a</sup>, T. Badapanda<sup>a,\*</sup>, H. Mohapatra<sup>a</sup>, T. Richhariya<sup>b</sup>, K. Tiwari<sup>c</sup>, Nameeta Brahme<sup>c</sup>, Satya N. Tripathy<sup>d</sup>

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#### ARTICLE INFO

Keywords: Rietveld refinement method UV–Visible absorbance spectra Photoluminescence behavior CIE Chromaticity coordinates Thermoluminescence spectroscopy

#### ABSTRACT

This manuscript includes structural, optical, photoluminescence, and thermoluminescence behaviors of Terbium incorporated CaWO<sub>4</sub> samples with nominal compositions of Ca<sub>1-x</sub>Tb<sub>2x/3</sub>WO<sub>4</sub> (x = 0.01, 0.02, 0.03, 0.04, 0.05) prepared by the traditional solid-state reaction route. Results found from the Rietveld refinements of X-ray diffraction patterns confirmed that all the samples have tetragonal crystal structures with 14<sub>1</sub>/a space group. The variation of unit cell volume with the compositions shows an anomaly at x = 0.03. Band gap energy values of these synthesized samples are found from the UV–Visible absorbance spectra with increasing order. Photoluminescence behaviors, as well as the FWHM values, are analyzed from the excitation along with the emission spectra. Critical quenching concentration at x = 0.03 with a critical energy transfer distance of  $\sim 20$  Å caused by the dipole-dipole interactions is found in these spectra. CIE Chromaticity coordinates are indicated the green emission color of all the prepared samples with high color purity, correlated color temperature, color rendering index, and luminous efficiency of radiation values. Quantum efficiency of the phosphors are carried out and the average lifetime values are calculated. Thermoluminescence spectroscopy of x = 0.03 irradiating by 15 min of UV dose is described as the lower UV dosimetry and second-order kinetics of the material.

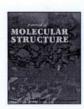
#### 1. Introduction

Over the last few decades, phosphors having luminescent nature are used in the light emitting diodes rather than the conventional lighting devices [1]. They have good luminescence properties, different types of colors of emission, considerable efficiencies, excellent operating conditions, fewer pollutions, low power utilization, wide uses in lighting applications, and many more important features [2–3]. Therefore, several pieces of research are going on by scientists to synthesize phosphors with improved luminescence properties. Material scientists are involved to explore these types of phosphors like nitrates, molybdates, silicates, aluminates, oxides, and tungstates with enhanced photoluminescence behaviors [4]. It has been studied that metal tungstates with scheelite structures have wide emission ranges, good efficiencies, and self-activating behaviors and can be utilized in the lighting devices such as LEDs, FEDs, and display screens [5–6]. Among all the metal tungstates, Calcium tungstates have prominent properties in photoluminescence and thermoluminescence spectroscopy, blue emission color with extensive emission range in UV–Visible region, a great value in color purity & quantum efficiency, less optical loss, appropriately correlated color temperature value [7]. Hence Calcium tungstate acts as a suitable host material for the light emitting diodes [8]. Moreover, past investigations are revealed that doping of different rare earth materials with CaWO<sub>4</sub> can be improved luminescence properties by producing various paths for energy transfer and reducing the critical quenching concentration of the material [9–10].

Photoluminescence behaviors with orange-red emission color of Smdoped CaWO<sub>4</sub> are discussed extensively by Kaur et al. [11]. Du et al. explained the yellow emission color of Dy-doped CaWO<sub>4</sub> and also their optical behaviors [12]. Zhang et al. prepared Eu and Tb-doped CaWO<sub>4</sub> phosphors and investigated that they have red as well as green emission colors respectively [13]. However, the reason the behind energy transfer

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## Luminescence studies of Sm<sup>3+</sup> doped CdB<sub>4</sub>O<sub>7</sub> phosphors

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#### ABSTRACT

Rare earth Sm<sup>3+</sup>-doped cadmium tetra borate (Cd B<sub>4</sub>O<sub>7</sub>) phosphors were synthesized by solid-state reaction method. X- ray diffraction (XRD) technique was used for the structural characterization of the prepared phosphors, whereas EDS was used for elemental composition confirmation. The diffraction pattern of the prepared samples is well matched with the standard XRD (JCPDS file no. 30-0204). Photoluminescence emission and excitation spectra for pure and rare earth (Sm<sup>3+</sup>)-doped Cd B<sub>4</sub>O<sub>7</sub> phosphor were obtained. The emission spectra of Sm<sup>3+</sup>-doped Cd B<sub>4</sub>O<sub>7</sub> showed a characteristic intense emission band at 608 nm along with less intense band at 561 nm and 644 nm under the excitation wavelength of 403 nm. The doping percentage was varied from 1 mol% to 4 mol% of Sm<sup>3+</sup>. The photoluminescence intensity of 2 mol% of Sm<sup>3+</sup>was found to be highest. From the CIE diagram of the Sm3+ doped Cd B4O7 phosphor showed the calculated color coordinates in the orange region. The thermoluminescence studies of pure and Sm3+doped samples were carried out. The results of both the samples showed good TL response. The highest TL intensity was observed for 2 mol% of Sm3+ concentration. The optimized UV exposure time was 25 min. Nearly 66% linear relation was recorded for total TL intensity and UV exposure time. The TL spectra fall in the orange region, similar to the recorded PL emission spectra.

#### 1 Introduction

Many oxides, sulfides, selenides, tellurides, arsenides, phosphides borates, sulfates, fluorides, and silicates are the important luminescence materials that have been developed and used over many decades [1]. The optical properties of CdS/ZnS were studied most in earlier times [2]. The boratebased phosphors were studied extensively due to their use in industries and mineralogy. Borate

2-2

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RESEARCH ARTICLE



## Luminescence investigation of CaY<sub>2</sub>Al<sub>4</sub>SiO<sub>12</sub>:Dy<sup>3+</sup> phosphor synthesized by sol-gel method

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Kamlesh Thakkar <sup>1</sup>	Shalinta Tigga <sup>3</sup>	Priya Chandrakar <sup>4</sup>	

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#### Funding information

No funding was received for conducting this study.

#### Abstract

Dy<sup>3+</sup>-doped CaY<sub>2</sub>Al<sub>4</sub>SiO<sub>12</sub> phosphors were prepared using the sol-gel method. Xray diffraction (XRD), field emission scanning electron microscopy (FESEM), and energy dispersive spectroscopy analyses (EDS) were used to analyse the crystal structure, morphology, and elemental composition of the prepared samples. The luminescence behaviour of the sample was investigated using photoluminescence (PL) and thermoluminescence (TL) techniques. The prepared CaY<sub>2</sub>Al<sub>4</sub>SiO<sub>12</sub>:xDy<sup>3+</sup> phosphor showed a characteristic blue and yellow emission at ~480 and 583 nm, respectively, with an excitation wavelength of 350 nm. The most intense PL emission was found for a 4 mol% doping concentration of Dy<sup>3+</sup> ions. The CIE diagram of the phosphor showed bluish-white colour emission. For TL studies, the prepared phosphors were irradiated with a <sup>60</sup>Co  $\gamma$  (gamma) source and the TL glow curve of the CaY<sub>2</sub>Al<sub>4</sub>SiO<sub>12</sub>:0.04Dy<sup>3+</sup> phosphor showed three overlapped peaks. For the Gaussian peaks, Chen's peak shape method was applied to determine the kinetic parameters of the samples.

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#### KEYWORDS

phosphor, photoluminescence, sol-gel method, thermoluminescence, XRD

#### 1 | INTRODUCTION

In recent decades a marked evolution has been noticed in the field of optical and luminescence applications using phosphor materials [1, 2]. Garnet-based phosphor materials show superb luminescence characteristics, high thermal stability, good chemical, and physical stability, and other energy-efficient properties. Garnet acquires a cubic crystal structure with complicated positioning of different cations in the unit cell. The affability of the garnet structure allows the substitution of ions at the dodecahedral, octahedral, and tetrahedral sites. Garnet phosphor material can be used in different fields such as laser and white light-emitting diodes (WLEDs). For example, the yttrium aluminium garnet (YAG) host with lanthanide ions is a broadly used phosphor material for solid-state lighting applications [1–3].

Garnet-based phosphors have been explored by many research groups. Singh et al. and Katelnikovas et al. investigated the

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In the present study, we synthesized CaY<sub>2</sub>Al<sub>4</sub>SiO<sub>12</sub>:xDy<sup>3+</sup> phosphors using the sol-gel reaction method. The luminescence behaviour of the CaY<sub>2</sub>Al<sub>4</sub>SiO<sub>12</sub>:xDy<sup>3+</sup> phosphors was studied in detail via the combined techniques of XRD, FESEM, EDS, photoluminescence excitation/photoluminescence (PLE/PL) spectroscopy, and thermoluminescence (TL) spectroscopy. Received: 12 December 2022

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#### RESEARCH ARTICLE

LUMINESCENCE WILEY

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## Luminescence investigation of CaY<sub>2</sub>Al<sub>4</sub>SiO<sub>12</sub>:Dy<sup>3+</sup> phosphor synthesized by sol-gel method

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2022-23

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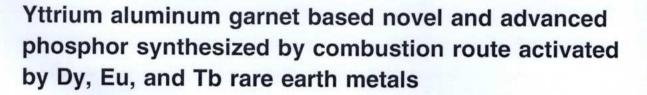
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#### ABSTRACT

In the present studies, rare earth (Dy, Eu, and Tb) activated garnet-based (Y3Al5O12) phosphors were prepared using the combustion method at 550 °C. The formation of the compounds has been checked by powder X-ray diffraction and structural parameters were calculated. The crystallite/particle size has been measured using Scherrer formula as well as by transmission electron microscopy which show that the size of the particles is in the nanorange. In the photoluminescence emission spectra, YAG:Dy<sub>0.05</sub> emits two distinctive colors: blue and yellow, YAG:Eu<sub>0.05</sub> emits red color, whereas YAG:Tb<sub>0.02</sub> emits green phosphor. Thus, the combination of rare earth (Dy<sub>0.05</sub>, Eu<sub>0.05</sub>, Tb<sub>0.02</sub>) with garnet gives BYRG (blue-yellow-red-green) emissions can produce white light. These discussed phosphors exhibit a strong absorption between 340 and 400 nm. The energy transfer mechanism was also discussed. The higher luminescence color purity (95.68%), Color Rendering Index (95), Correlated Color Temperature (5287 K), and Quantum efficiency (93.7%) are calculated, therefore, synthesized Y<sub>3</sub>Al<sub>5</sub>O<sub>12</sub>Dy<sub>0.05</sub>Eu<sub>0.05</sub>Tb<sub>0.02</sub> phosphor material can be used as a WLED phosphor materials in solid-state lighting system.

#### 1 Introduction

There are diverse field of Luminescence, luminescent materials and applications. Modern lighting system totally depends on advanced and novel materials for great efforts for enhancing display quality and visibility [1–3]. In the present scenario, the need and requirement of novel phosphor is one of the most important and urgent challenges to synthesize luminescent material for white light emitting diodes (WLED) for solid lighting devices [4–6]. Other requirement should be fulfillment by modern technology like that maximum quantum efficiency, high

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## Yttrium aluminum garnet based novel and advanced phosphor synthesized by combustion route activated by Dy, Eu, and Tb rare earth metals

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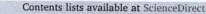
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#### New Astronomy

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### Tale of GRB 171010A/SN 2017htp and GRB 171205A/SN 2017iuk: Magnetar origin?

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#### ABSTRACT

Keywords: GRB--SNe connection: Magnetar Individual: GRB 171010A/SN 2017htp GRB 171205A/SN 2017iuk GRB 111209A/SLSN 2011kl

We present late-time optical follow-up observations of GRB 171010A/SN 2017htp (z = 0.33) and lowluminosity GRB 171205A/SN 2017iuk (z = 0.037) acquired using the 4K×4K CCD Imager mounted at the 3.6 m Devasthal Optical Telescope (3.6 m DOT) along with the prompt emission data analysis of these two interesting bursts. The prompt characteristics (other than brightness) such as spectral hardness,  $T_{00}$ , and minimum variability time-scale are comparable for both the bursts. The isotropic X-ray and kinetic energies of the plateau phase of GRB 171205A are found to be less than the maximum energy budget of magnetars, supporting magnetar as a central engine powering source. The new optical data of SN 2017htp and SN 2017iuk presented here, along with published ones, indicate that SN 2017htp is one of the brightest and SN 21017iuk is among the faintest GRB associated SNe (GRB-SNe). Semi-analytical light-curve modelling of SN 2017htp, SN 2017iuk and only known GRB associated superluminous supernova (SLSN 2011kl) are performed using the MINIM code. The model with a spin-down millisecond magnetar as a central engine powering source nicely reproduced the bolometric light curves of all three GRB-SNe mentioned above. The magnetar central engines for SN 2017htp, SN 2017iuk, and SLSN 2011kl exhibit values of initial spin periods higher and magnetic fields closer to those observed for long GRBs and H-deficient SLSNe. Detection of these rare events at such late epochs also demonstrates the capabilities of the 3.6 m DOT for deep imaging considering longitudinal advantage in the era of time-domain astronomy.

#### 1. Introduction

Gamma-Ray Bursts (GRBs) are short and highly energetic flashes of radiation occurring at cosmological distances and exhibit non-thermal spectra peaking in the  $\gamma$ -ray band (Meegan et al., 1992; Band et al., 1993; Kumar and Zhang, 2015; Pe'er, 2015). Due to their high intrinsic luminosities, GRBs are observable up to very high redshifts (z ~8-10). Thus, these are among the potential candidates for increasing our understanding of high-energy physical mechanisms (Mészáros, 2013), probing the properties of the primordial universe (Fiore, 2001; Fynbo et al., 2007) and measuring the cosmological parameters (Amati and Della Valle, 2013; Moresco et al., 2022). Along with many observed prompt emission properties, bursts with  $T_{90}$  duration<sup>1</sup> less than 2 s are termed as short/hard GRBs (sGRBs), while those last for more than 2 s are designated as long/soft GRBs (lGRBs), see Kouveliotou et al. (1993) and Zhang et al. (2012). Recently, a few ultra-long GRBs (ulGRBs) have also been detected, lasting much longer (a few hundred seconds to hours) in  $\gamma$ -rays (Boër et al., 2015; Perna et al., 2018; Dagoneau et al., 2020), e.g., ulGRB 111209A was active for around ~25000 s (Levan et al., 2014).

Some of the IGRBs, including ultra-long and low-luminosity GRBs (llGRBs,  $L_{\gamma,iso} < 10^{48.5}$  erg s<sup>-1</sup>; Cano et al., 2017), have exhibited correlations with H-deficient stripped-envelope supernovae (SESNe; Wang and Wheeler, 1998; Nomoto et al., 2006; Woosley and Bloom, 2006; Modjaz, 2011; Hjorth and Bloom, 2012), mostly with Ic broad-line SNe (Ic-BL, see Cano et al., 2017, for a review). SESNe comprise a small fraction of the known population of SNe. Li et al. (2011) proposed the rate of SESNe ≈16% w.r.t. population of all known SNe, estimated by examining a set of 726 SNe observed utilising the Lick Observatory Supernova Search (LOSS; Filippenko et al., 2001). In addition, via investigating 117 known SNe followed by the Supernova

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<sup>&</sup>lt;sup>1</sup> The period over which 90% of the entire background-subtracted counts are observed.

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#### ARTICLE INFO

#### ABSTRACT

Keywords: GRB-SNe connection: Magnetar Individual: GRB 171010A/SN 2017htp GRB 171205A/SN 2017iuk GRB 111209A/SLSN 2011kl

We present late-time optical follow-up observations of GRB 171010A/SN 2017htp (z = 0.33) and lowluminosity GRB 171205A/SN 2017iuk (z = 0.037) acquired using the 4K×4K CCD Imager mounted at the 3.6 m Devasthal Optical Telescope (3.6 m DOT) along with the prompt emission data analysis of these two interesting bursts. The prompt characteristics (other than brightness) such as spectral hardness,  $T_{00}$ , and minimum variability time-scale are comparable for both the bursts. The isotropic X-ray and kinetic energies of the plateau phase of GRB 171205A are found to be less than the maximum energy budget of magnetars, supporting magnetar as a central engine powering source. The new optical data of SN 2017htp and SN 2017iuk presented here, along with published ones, indicate that SN 2017htp is one of the brightest and SN 21017iuk is among the faintest GRB associated SNe (GRB-SNe). Semi-analytical light-curve modelling of SN 2017htp, SN 2017iuk and only known GRB associated superluminous supernova (SLSN 2011kl) are performed using the MINIM code. The model with a spin-down millisecond magnetar as a central engine powering source nicely reproduced the bolometric light curves of all three GRB-SNe mentioned above. The magnetar central engines for SN 2017htp, SN 2017iuk, and SLSN 2011kl exhibit values of initial spin periods higher and magnetic fields closer to those observed for long GRBs and H-deficient SLSNe. Detection of these rare events at such late epochs also demonstrates the capabilities of the 3.6 m DOT for deep imaging considering longitudinal advantage in the era of time-domain astronomy.

#### 1. Introduction

Gamma-Ray Bursts (GRBs) are short and highly energetic flashes of radiation occurring at cosmological distances and exhibit non-thermal spectra peaking in the  $\gamma$ -ray band (Meegan et al., 1992; Band et al., 1993; Kumar and Zhang, 2015; Pe'er, 2015). Due to their high intrinsic luminosities, GRBs are observable up to very high redshifts (z ~8-10). Thus, these are among the potential candidates for increasing our understanding of high-energy physical mechanisms (Mészáros, 2013), probing the properties of the primordial universe (Fiore, 2001; Fynbo et al., 2007) and measuring the cosmological parameters (Amati and Della Valle, 2013; Moresco et al., 2022). Along with many observed prompt emission properties, bursts with  $T_{90}$  duration<sup>1</sup> less than 2 s are termed as short/hard GRBs (sGRBs), while those last for more than 2 s are designated as long/soft GRBs (IGRBs), see Kouveliotou et al. (1993) and Zhang et al. (2012). Recently, a few ultra-long GRBs (ulGRBs) have also been detected, lasting much longer (a few hundred seconds to hours) in  $\gamma$ -rays (Boër et al., 2015; Perna et al., 2018; Dagoneau et al., 2020), e.g., ulGRB 111209A was active for around ~25000 s (Levan et al., 2014).

Some of the IGRBs, including ultra-long and low-luminosity GRBs (lIGRBs,  $L_{\gamma,iso} < 10^{48.5}$  erg s<sup>-1</sup>; Cano et al., 2017), have exhibited correlations with H-deficient stripped-envelope supernovae (SESNe; Wang and Wheeler, 1998; Nomoto et al., 2006; Woosley and Bloom, 2006; Modjaz, 2011; Hjorth and Bloom, 2012), mostly with Ic broad-line SNe (Ic-BL, see Cano et al., 2017, for a review). SESNe comprise a small fraction of the known population of SNe. Li et al. (2011) proposed the rate of SESNe  $\approx 16\%$  w.r.t. population of all known SNe, estimated by examining a set of 726 SNe observed utilising the Lick Observatory Supernova Search (LOSS; Filippenko et al., 2001). In addition, via investigating 117 known SNe followed by the Supernova

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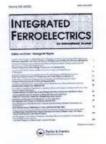
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<sup>&</sup>lt;sup>1</sup> The period over which 90% of the entire background-subtracted counts are observed.

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Integrated Ferroelectrics

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## **Photoluminescence Property of Erbium-Doped Yttrium Oxide: Doping Concentration and Its Effect**

Prabhjot Singh, Manmeet Kaur, <mark>Na<u>meeta Brahme</u>, D. P. Bisen, Rofiqul</mark> Umam, V. R. Panse, Ahmad Said, Irzaman & Antomi Saregar

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Analysis of thermoluminescence glow curve and evaluation of trapping parameters of cerium activated M<sub>2</sub>Al<sub>2</sub>SiO<sub>7</sub> (M= Ca and Sr) phosphor for **TLD** application

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#### HIGHLIGHTS

· Cerium doped Calcium and Strontium aluminosilicate phosphors was prepared by solid -state reaction method.

Structural and morphological studies were carried out using X-Ray Powder diffraction and SEM analysis.

• Thermoluminescence spectra were analyzed using the glow curve E-T<sub>stop</sub> method.

Thermoluminescence spectra and fading were studied to find the applicability the phosphors in dosimetry.

#### ARTICLE INFO

Keywords: Dosimetry Trap distribution Fading

#### ABSTRACT

A Series of Cerium activated aluminosilicate phosphors  $M_2Al_2SiO_7$  (M = Ca and Sr) were synthesized and their thermoluminescence (TL) characterization was carried out to investigate the dosimetry properties. A conventional high-temperature solid-state reaction method was adopted for the synthesis of phosphors. The structural characterization was done by powder X-ray diffraction (PXRD) tool, which confirms the phase formation of prepared samples. Concentration-dependent TL studies reveal that maximum intensity was obtained at 2 mol% and 0.5 mol% in Cerium doped Ca2Al2SiO7 (CASO) and Sr2Al2SiO7 (SASO) respectively. The analysis of the TL glow curve was carried out at this optimized concentration using E-T<sub>stop</sub>, which represents that the glow curve is composed of six glow peaks superimposed on each other. The best-fit glow curve was carried out using the Glow Curve Deconvolution (GCD) methods and the best fit is observed with six superimposing peaks for both phosphors, which resemble with E-T<sub>stop</sub>. TL curves in the E-T<sub>stop</sub> method indicated that observed peaks are due to the existence of quasi-continuous distribution of traps. The trapping parameters were calculated and it reveals the presence of both shallow and deeper traps. Thermoluminescence responses vary linearly with dose rate and a very low fading was observed with storage time which suggests the application of the phosphors for low UV dosimetry.

#### 1. Introduction

Thermoluminescence (TL) belongs to a stimulated type of luminescence in which the liberation of previously absorbed energy takes place in the visible region as a result of thermal excitation. It has been playing a vital role in various biological fields, radiation protection, and archeological dating. One of the major applications of TL is in the field of radiation dosimetry, for personal and environmental monitoring [1,2]. On the other hand, it also plays a significant role to study the defects structure, impurities level (also known as trapping centers), and their

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## Investigation of structural, luminescence, and antibacterial properties of novel Zn<sub>1-x</sub>Eu<sub>x</sub>Al<sub>2-y</sub>O<sub>4</sub>Sr<sub>y</sub> phosphor

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#### ABSTRACT

In this research work, we synthesized novel zinc aluminate (Zn1\_xEuxAl2\_yO4 Sry) sky bluish phosphors at 500 °C via the combustion route method, and for better crystallinity, we were annealed in condensing envelope with 85% of N<sub>2</sub> and 15% of H2 at 1200 °C. The spinel cubic phase, elemental mapping elements, surface morphology, and vibrational properties were observed by powder X-ray diffraction, scanning electron microscopy, transmission electron microscopy, Fourier Transform Infrared), and Raman spectroscopic techniques, respectively. The photoluminescence (PL) spectra were monitored by  $\lambda_{ex}$  = 490 nm (excitation wavelength) and  $\lambda_{em} = 392$  (emission wavelength). Due to Eu<sup>2+</sup> ions at 490 nm, intense photoluminescence spectra have been found. The PL efficiency has been found for synthesized Zn<sub>0.95</sub>Eu<sub>0.05</sub>Al<sub>1.95</sub>O<sub>4</sub>Sr<sub>0.05</sub> (ZAS-5) phosphor at around 93.2%. The high Corelated Color Temperature (~ 25,963 K), low color purity (50%), and low Color Rendering Index (~ 44) value were found for the ZAS-5 sample, that result (temperature) is indicating the prepared phosphor is emitting cold sky bluish light which may be useful for a sleeping light lamp, activation of photosynthesis reaction for crops, and background color for the display screen, because it may be a low dangerous color for human eyes. Antibacterial activity of phosphors indicated that combustion derived synthesized all ZAS samples may behave just like as an eco-material.

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## Investigation of structural, luminescence, and antibacterial properties of novel Zn<sub>1-x</sub>Eu<sub>x</sub>Al<sub>2-y</sub>O<sub>4</sub>Sr<sub>y</sub> phosphor

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#### **Optical Materials**

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#### **Research** Article

## Microstructural, luminescence properties and Judd-Ofelt analysis of $Eu^{3+}$ activated K<sub>2</sub>Zr(PO<sub>4</sub>)<sub>2</sub> phosphor for lighting and display applications



Optical Mail

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#### ARTICLE INFO

Keywords: K<sub>2</sub>Zr(PO<sub>4</sub>)<sub>2</sub>: Eu<sup>3+</sup> Photoluminescence J-O analysis CIE coordinate Decay time

#### ABSTRACT

A series of light emitting  $K_2Zr(PO_4)_2$  [KZP] phosphors activated with  $Eu^{3+}$  were synthesized through a conventional solid state reaction method. The phase structure, luminescence properties and decay lifetime of the prepared samples were analyzed in detailed. Photo-luminescence (PL) spectra exhibit five emission bands under the excitation at 394 nm. Furthermore, the optimal doping concentration of  $Eu^{3+}$  ion was determined as 2 mol% and the mechanism of energy transfer between two adjacent  $Eu^{3+}$  ions was dominated by the dipole-dipole (d-d) interaction. The  $\Omega_2$  and  $\Omega_4$  parameters were estimated for phosphate phosphors using Judd-Ofelt (J-O) theory from the emission spectra. The derived and radiative parameters were also predicted from PL spectra for the prepared phosphors to check their applicability in lasing and photonic applications. The possible lattice sites occupied by  $Eu^{3+}$  ions were investigated using the fitting function type of decay curves. The calculated CIE chromaticity coordinate of KZP:  $Eu^{3+}$  (2 mol%) phosphor verified that its emission light was traced in the pinkish-red zone. Thermally stimulated luminescence (TSL) properties of synthesized samples were also explained in terms of glow curve and kinetic parameters. The aforesaid results revealed that the KZP:  $Eu^{3+}$  phosphors could be potential candidate for solid state lightning and display systems.

#### 1. Introduction

Now a days, phosphate compounds have become promising potential phosphor due to their brilliant thermal stability, photo stability, charge stabilization, inexpensive cost, excellent luminescent and eco-friendly [1,2]. The phosphate host matrices have become the matter of great interest for comprehensive investigation owing to their wide applications in solid state illumination and display devices [3,4]. Solid-state devices using light-emitting diode combined with phosphor material to produce white light is the recent thrust area of research in the lighting based industry. Solid-state devices technology has several advantages over traditional fluorescent lamps, for example low power consumption, compactness, proficient light output and longer lifetime [5-7]. In recent years, phosphate compounds have established scientifically significant applications in optoelectronic devices such as plasma panels, flat panel displays, luminescent lightning etc [8]. It has also become an important host matrix due to their tremendous thermal and chemical stability. The thermally stable luminescence of KSrPO4:Eu2+ is investigated and reported by Tang et al. [9]. The investigation of KBaPO<sub>4</sub>:Ln (Ln = Eu, Tb,

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Sm) phosphors for white light UV light emitting diode is also studied and reported by Lin et al. [10]. Under near-UV (NUV) excitation, the phosphate matrices of alkaline metals and alkaline earth metals such as LiSrPO<sub>4</sub>:Eu<sup>2+</sup>, NaCaPO<sub>4</sub>: Eu<sup>2+</sup> and LiZnPO<sub>4</sub>:Mn<sup>2+</sup> exhibit emission in blue, green and green-yellow region, respectively [11–13]. The vacuum UV (VUV) luminescence properties of zirconium based compounds, such as ZrP<sub>2</sub>O<sub>7</sub>, CaZr(PO<sub>4</sub>)<sub>2</sub> and NaZr<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub> were explored by Kaneyoshi [14]. Conversely, the rare-earth activated K<sub>2</sub>Zr(PO<sub>4</sub>)<sub>2</sub> have not been investigated systematically [15].

Europium (Eu) is the most unstable rare earth element of lanthanide series and has two oxidation states +3 and + 2, but Eu tends to exist in trivalent oxidation state under most circumstances. Among various rareearth luminescent centers,  $Eu^{3+}$  is a unique activator which provides the opportunity of synchronized blue, green and red emissions based on the host material it is doped inside. The  $Eu^{3+}$  exposes a typical red emission ascribed to  ${}^{5}D_{0} \rightarrow {}^{7}F_{2}$  transition under UV light [16]. The most significant application of  $Eu^{3+}$  has been as a red phosphor (Y<sub>2</sub>O<sub>3</sub>: $Eu^{3+}$ ) in fluorescent lamps [17].

The Judd-Ofelt (JO) theory was considered to be one of the most



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#### **Research Article**

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## Microstructural, luminescence properties and Judd-Ofelt analysis of $Eu^{3+}$ activated K<sub>2</sub>Zr(PO<sub>4</sub>)<sub>2</sub> phosphor for lighting and display applications



Bhuneshwar Verma<sup>a,\*</sup>, R.N. Baghel<sup>b</sup>, D.P. Bisen<sup>b</sup>, N. Brahme<sup>b</sup>, V. Jena<sup>c</sup>

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#### ARTICLE INFO

Keywords: K<sub>2</sub>Zr(PO<sub>4</sub>)<sub>2</sub>: Eu<sup>3+</sup> Photoluminescence J-O analysis CIE coordinate Decay time

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properties of Praseodymium doped CaWO<sub>4</sub> phosphor

#### ARTICLE INFO

Keywords: Reitveld refinement UV-Visible absorption Photoluminescence **CIE** chromaticity Critical quenching concentration Thermoluminescence Order of kinetics

#### ABSTRACT

The structural, optical, photoluminescence and thermoluminescence behaviors of Praseodymium doped CaWO4  $(Ca_{1-x}Pr_{2x/3}WO_4; x = 0.01, 0.02, 0.03, 0.04, 0.05)$  phosphors prepared via conventional solid-state reaction route were reported in this paper. X-ray diffraction study revealed the fact that all the synthesized samples crystallize in a tetragonal structure with I41/a (88) space group and the structural parameters were obtained from the Reitveld refinement. The unit cell volume was found to rise with the increase in Pr concentration. The bandgaps of the prepared samples were obtained from the UV-Visible absorbance spectra by using the Wood-Tauc method. Bandgap and unit cell volume of the prepared samples were directly proportional to each other. Photoluminescence behaviors were investigated from the excitation and the emission spectra. The PL spectra highlight that the quenching occurs at x = 0.02 and the critical distance for energy transfer of the phosphor was found to be 20 Å. Dexter theory was applied to determine the mechanism of quenching and confirmed that the concentration quenching was caused by the dipole-dipole interaction. CIE Chromaticity denoted that the phosphors emit red color. Color purity and CCT of the material were calculated. Thermoluminescence behaviors were studied with different durations of UV dose for the composition x = 0.02 and the kinetic parameters were calculated. Variations of TL emission intensity with temperature confirmed the second-order kinetics of the phosphor with a critical quenching concentration at x = 0.02.

#### 1. Introduction

An interesting phenomenon of luminescence is shown by the phosphors under appropriate excitations. These phosphors can be named luminescence materials and play a significant role in the lighting devices such as display devices, LEDs, FEDs, etc as they tend to emit light [1,2]. Among all the luminescence materials scheelite-type tungstates capture more attention of the physicists due to their self-activating luminescence properties and wide range of emission band [3,4]. Calcium tungstate is a naturally occurring phosphor of the scheelite family with novel properties like low optical bandgap, low loss, high activation energy, good photoluminescence, and thermoluminescence intensity and emission spectra in the UV-Vis region and can be widely used in the field of optoelectronics. Hence it can be chosen as the host material by managing the luminescence properties of the phosphors. There was an extensive

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evolution in the investigation of the luminescence behaviors of the Calcium tungstates during last decades [5,6]. Further attention has been given to enhance the luminescence properties of Calcium Tungstate.

Generally doping is used as a trick to improve various properties of the host material by incorporating the atoms or ions of the suitable elements into the host lattices. Doping with a rare-earth ion can enrich the optical properties by creating different energy transfer paths, effects in the host material, and lowering the optical quenching centers of the material. The light emission can be favored by the unique electronic structure of the rare-earth elements. Various rare-earth elements have been doped in CaWO<sub>4</sub> to improve the luminescence behavior [8,9]. Xia et al. reported the red color luminescence behavior of Eu3+ doped CaWO<sub>4</sub> [10]. Liao et al. investigated the green color emission of Tb doped CaWO<sub>4</sub> synthesized by the hydrothermal method [11]. Zhang et al. described the energy transfer and luminescence mechanism of Dy

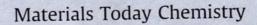
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# Efficient white light-emitting Mg<sub>21</sub>Ca<sub>4</sub>Na<sub>4</sub>(PO<sub>4</sub>)<sub>18</sub>: Dy<sup>3+</sup>, Tb<sup>3+</sup>, Eu<sup>3+</sup> triple-doped glasses: a multipurpose glasses for WLEDs, solar cell efficiency enhancement, and smart windows applications



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materialstoday CHEMISTRY

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#### ABSTRACT

As a kind of lanthanide-activated luminescent materials, the development of rare-earth-activated luminescent glasses is one of the promising trends in the modern luminescence research. In the proposed work,  $Dy^{3+}$ ,  $Tb^{3+}$ ,  $Eu^{3+}$  activated/co-activated/triple-activated Mg<sub>21</sub>Ca<sub>4</sub>Na<sub>4</sub>(PO<sub>4</sub>)<sub>18</sub> orthophosphate glasses have been prepared by melt quenching technique for the first time. XRD pattern of the proposed glass sample shows amorphous nature, but the most intense peak is get matched with the standard ICSD database of Mg<sub>21</sub>Ca<sub>4</sub>Na<sub>4</sub>(PO<sub>4</sub>)<sub>18</sub> material. Vibrational feature of the proposed glass sample has been investigated using FTIR analysis. SEM and EDS confirm the morphology and elemental analysis of the asprepared glass. Photoluminescence study of triple-activated Mg<sub>21</sub>Ca<sub>4</sub>Na<sub>4</sub>(PO<sub>4</sub>)<sub>18</sub> glass sample shows multiple emission peaks under NUV excitations which covers complete white light emission. Other optical properties like UV–Vis DRS, the refractive index of the glass and molar refraction of glass sample were investigated. Moreover, this glass sample is crushed homogeneously and coated on solar cell using doctor blade method shows the efficiency of solar cell enhanced by 43.33% than the blank solar cell, These results of the proposed sample prove its worth in the WLEDs, solar cell efficiency enhancement, and smart windows applications.

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#### 1. Introduction

Rare-earth-activated inorganic materials have gained more importance in the field of recent technology such as solid-state lighting sources [1], solar cells [2], displays [3–5], and telecommunications [6] over the past decade. Solid-state lighting sources based on white light-emitting diodes (WLEDs) have gained massive significance because of their superior characteristics, for instance, less power utilization, high brightness, and longer lifespan in addition to environmentally friendly characteristics which present it as a sustainable and proficient substitution to the traditional fluorescent and incandescent lamps [7–9].

In the modern age of technology, one way to attain white light emission is to combine the near-ultraviolet LED chip with red, blue, and green phosphors which can offer tunable color temperature and high rendering index [10-12]. Conversely, the white light from

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https://doi.org/10.1016/j.mtchem.2022.100938 2468-5194/© 2022 Elsevier Ltd. All rights reserved. the commercially available WLEDs obtained by encapsulation of phosphors in an epoxy resin excited by blue or NUV LED chips has some problems as weak white light and so on [13,14]. Rare-earth activated transparent glasses are produced to conquer this problem which exhibits admirable optical properties, good mechanical and thermal properties, low-cost production, high durability manufacturing process is easy in addition to epoxy resin-free [15–18]. Glasses are preferred over crystalline materials in WLEDs, since it performs the functions of encapsulation along with wavelength converter [19].

With time smart windows are getting more and more attention in the electrical field from the light due to their large optical modulation, low energy consumption, and their high weartherability [20,21]. Smart windows light is able to modulate the absorption and transmission of light in some transparent medium glass, thin film, and polymer coating [22]. These smart windows have various applications in modern buildings, manufacturing industry, clinical medicine, and military defense. A smart window that vigorously modulates light transmittance is vital in the demand for optical devices [23,24]. Comparing these smart

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### Luminescence properties of a novel cyan-blue light emitting Ce<sup>3+</sup>doped SrZrSi<sub>2</sub>O<sub>7</sub> phosphor



Optical

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Keywords: Photoluminescence Thermoluminescence SrZrSi2O2; Ce3-Phosphor **TL-Emission** 

#### ABSTRACT

A novel  $Ce^{3+}$  doped  $SrZrSi_2O_7$  (SZSO) phosphor with different doping concentration (0.05–1.5 mol %) were synthesized by conventional solid-state reaction method. To confirm crystal structure and phase purity of prepared phosphor X-ray diffractions (XRDs) have been done. Surface morphology, compositional and functional groups analysis were investigated using FE-SEM, EDXS & FTIR techniques. In order to study the optical properties of the synthesized phosphor photoluminescence and thermoluminescence were investigated in detailed. Photoluminescence studies of SZSO: Ce3+ phosphor shows strong broad excitation peak at 293 nm owing due to  $4f \rightarrow 5d$  transition and corresponding broad emission peak obtain at 480 nm due to 5d  $\rightarrow 4f$  spin allowed transition. The optimum PL intensity obtain for 0.1 mol% Ce3+ doping concentration. CIE co-ordinate, color purity and CCT of prepared phosphor are also calculated which shows the SZSO: Ce3+ phosphor emits cyan-blue light, can be applicable for solid state lighting. Thermoluminescence of SZSO: Ce<sup>3+</sup> phosphor shows two TL glow curve peaks at 56 °C and 130 °C temperature. The optimum TL intensity obtained for 0.2 mol% Ce<sup>3+</sup> doped SZSO phosphor for 15 min UV irradiation time at 254 nm UV excitation source. TL emission spectra and fading effect are also analyzed. TL kinetic parameters are determined by peak shape method. Thermoluminescence properties shows that prepared SZSO: Ce<sup>3+</sup> phosphor will be potential applicable for UV-dosimetry.

#### 1. Introduction

In lighting technology, rare earth doped solid state lighting materials get much attention due to their wide range of applications as a white light emitting diodes (W-LEDs), LEDs, display devices, lasers, traffic signals, backlight display etc. Among traditional incandescent and fluorescent lighting sources, white light emitting diodes (WLEDs) possess many properties such as power saving, low energy consumption, higher luminous efficiency & brightness, long lifetime and eco-friendly [1-4]. Commercially available W-LEDs are fabricating by combining blue LED (GaInN) chip with yellow (YAG: Ce3+) phosphor which has high correlated color temperature (CCT) and poor color rendering index (CRI). Another way to fabricate W-LEDs by mixing of red, green and blue emitting phosphors with UV-LED chip. The emitted white light by this way are very good CRI (above 90) and high luminous efficiency [5-7].

Different types of phosphor materials are namely such as-oxides, sulfides, aluminates, silicates, nitrides, oxy-nitrides, halides,

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phosphates, borates etc. [8,9]. The choice of phosphor matrix plays very important key role to obtain highly phosphor conversion devices. Silicates based phosphor shows great attention due to low cost, low phonon energy, high physical-chemical stability, excellent weather resistance and variety of crystal structure [9-11]. Also zirconium silicate based phosphor possesses excellent optical properties such as photo-thermal stability and low thermal conductivity. Additionally, zirconia has low phonon energy and it has been attractive to be used as support for rare-earth ion, since the transition probabilities are increased and creating this material suitable for photonic applications [12].

In many host lattice rare earth ions are mostly used as dopant ion due to their 4f-4f and 5d-4f transitions. Generally, Cerium (Ce3+) ion doped phosphors shows strong and broad absorption near UV region owing to spin-allowed 4f→5d transition of cerium ions. Since, cerium ions shows broad emission due to 5d+4f ( ${}^2F_{7/2}$  and  ${}^2F_{5/2}$ ) allowed transition and emission can vary from UV to red region, which strongly depends on host matrix [13-16]. Some articles are reported on cerium doped



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### The Effectiveness of Sump Dimension Design: A Case Study in Nickel Mining

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#### Abstract

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The presence of water in mining activities is common, especially in tropical areas that have high rainfall, such as the research location at PT ANTAM Maluku Utara at the Moronopo Site. While the sump maintenance needs to be considered so that the sump can accommodate the incoming discharge. The purpose of this research is to calculate the total discharge entering the mine and to design the dimensions of the sump according to the incoming water discharge. The research method used is the Gumbel method starting from the analysis of rainfall data at the research location starting in 2004-2013 and then continuing with 2019-2020 data, the planned rainfall value is 96.56 mm/day, rainfall intensity is 15.63 mm/day hours with a rain return period of 25 years and a hydrological risk of 18.46 % and the total inflow of mine water is 17,556 m<sup>3</sup>/hour. After calculating the sump capacity in the Danis 2 area, it still has not accommodated the incoming discharge with the remaining unaccommodated discharge of 2,319.1 m<sup>3</sup>/hour.

Keywords: mine water discharge; sump; sump volume; sump dredge time; ANTAM

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#### INTRODUCTION

PT Antam North Maluku has three sites, namely the Moronopo site, the Tanjung Buli site, and the Pakal site. The location of this research is at the Moronopo Site, Maba District, East Halmahera, North Maluku. This company uses the open pit method with a selective mining system in its mining activities. Open-pit mining operations will be significantly affected by weather conditions, especially rain (R. J. Lad and J. S. Samant., 2015). The presence of water in mining activities is expected in various mining activities, especially in tropical areas with high rainfall (Gautama, 1999). In extreme weather conditions in the form of high rainfall, the water can inundate the ground floer and result in muddy mining fronts (A. Chiarucci and A. J. M. Baker., 2007). Observations in the field show that there is a significant rain catchment area that the problem that often occurs at the Moronopo site is the condition of the sump, which is not able to accommodate the incoming water discharge, resulting in overflowing water around the mine area which does not rule out the possibility of causing pollution in the coastal area near the Moronopo site. The presence of stagnant water on the ground floor of the

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### Thermoluminescence studies of CdB<sub>4</sub>O<sub>7</sub>:Sm<sup>3+</sup> phosphor

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#### ARTICLE INFO

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#### ABSTRACT

 $\rm Sm^{3+}$  doped cadmium tetra borate CaB<sub>4</sub>O<sub>7</sub> phosphors were prepared using solid state reaction method. Xray diffraction technique for the structural characterization and EDX is used for confirmation of elemental composition. The samples were synthesised at two different temperatures. For the synthesized powder (phosphor) at 650 °C, a well matched diffraction pattern with the standard XRD (JCPDS file no. 30– 0204) was recorded, whereas for the second powder synthesized at 850 °C decomposed, polycrystalline, combined phase was recorded. The variations in thermoluminescence (TL) glow curves for different UV dose were recorded. The rise in TL intensity was recorded with the increment in the UV dose and the maximum TL intensity recorded was, for 25 min UV dose. The TL peak then decrease with the increment in the UV dose. Thermoluminescences of prepared powder with different percentage of samarium ions were also compared. The maximum thermoluminescence peak was recorded for the prepared phosphor with 0.5 % of Sm<sup>3+</sup> ions.

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#### 1. Introduction

Since last few decades, the materials studied executing TL properties are Silicates, Fluorides, Oxides, Sulphates, and Borates. Especially, amongst them the studies were more focused on borate phosphor materials. TL characteristics of borate phosphors are sensitive to neutron and gamma radiations and, near tissue equivalence. The study of borate based powder phosphor is more popular because of their easy synthesis method; their thermal treatment as well as due to their easy TL glow curve structure. Different synthesis techniques, different host materials with different modifiers and activators were studied to determine the thermoluminescence of borates. The dosimetric applications of BaB<sub>4</sub>O<sub>7</sub> compounds doped with Ce were reported by Yazici et al. reported [1]. Tb and Dy doped ZnB<sub>2</sub>O<sub>4</sub> phosphors were studied by Li and Juan et al. They reported luminescence properties (PL and TL) of the synthesized powder by using solid state technique [2,3]. In the dose linearity region Dogan and Yazici reported the fading and reusability properties for Ce doped MgB4O7 phosphors [4]. The TL dosimetry of Ln doped ZnB2O4 phosphor prepared by nitric acid was reported by Kucuk et al. [5]. The TL of irradiated sintered CaB<sub>4</sub>O<sub>7</sub>

\* Corresponding author. E-mail address: rvsharma65@gmail.com (R. Sharma). containing activators such as Cu, Pb, Eu or Dy was reported by Fukuda et al [6–8]. TSL studies of pure, Cu and Mn doped magnesium / lithium borate compounds were reported by J. Manam et al [9,10].

Cadmium borate (CdB<sub>4</sub>O<sub>7</sub>) is a boron-based inorganic material. In general, this material has wide-band-gap, excellent luminescence efficiency, high thermal stability, and of low cost. But, there are only limited and contradictory knowledge about the composition existing in the binary system CdO-B2O3. The binary borates can have the compositions in ratio 1: 1, 1: 2, 2: 1, 2: 3, and 3: 1 to form the compound CdB2O4, CdB4O7, Cd2B2O5, Cd2B6O11 and Cd3B2O6 respectively. Solid state reaction method at high pressure and temperature (7.5 GPa and 1100 °C) and hydrothermal synthesis in the quaternary system Na<sub>2</sub>O-CdO- B<sub>2</sub>O<sub>3</sub>-H<sub>2</sub>O were opted to synthesize CdB<sub>2</sub>O<sub>4</sub> borate [11,12]. The other cadmium borates could be prepared by firing pre compacted mixtures [13-17]. The solid state reaction was opted to prepare the powder of cadmium tetra borate at high temperature (slightly lower than the melting point). The object of the present study is to understand the phase structure, TL peaks and examine the results of change in the dopant concentration (Sm<sup>3+</sup>) on the TL of CdB<sub>2</sub>O<sub>4</sub> phosphors. For this purpose, we present TL glow curves of different samples with different doping concentration of the impurity (Sm3+) in CdB2O4 phosphors.

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### Thermoluminescence studies of CdB<sub>4</sub>O<sub>7</sub>:Sm<sup>3+</sup> phosphor

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#### ABSTRACT

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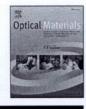
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## Structural, luminescent properties and Judd-Ofelt analysis of CaMgSiO<sub>4</sub>: Eu<sup>3+</sup> phosphor for solid state lighting



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#### ARTICLE INFO

Keywords: CaMgSiO<sub>4</sub>:Eu<sup>3+</sup> CCT CRI J-O analysis Decay life times Thermoluminescence

#### ABSTRACT

A series of Eu<sup>3+</sup> doped calcium magnesium silicate (CaMgSiO<sub>4</sub>) phosphor samples were successfully prepared via solid state synthesis technique. Their structural and morphological studies were investigated by powder X-ray diffraction (PXRD), scanning electron microscopy (SEM) and energy dispersive X-ray analysis (EDX) measurements. Phase structure and phase purity of sample were investigated by Rietveld refinement method. The vibrational and bonding behavior of silicate groups were confirmed by Fourier transform infrared (FTIR) and Raman spectroscopy. The luminescent properties of prepared samples were studied by photoluminescence (PL) and thermoluminescence (TL) characteristics. The emission spectra recorded under the excitation wavelength  $\lambda_{ex} = 396$  nm. The highest emission peak was observed at 595 nm which corresponds to the  ${}^5D_0 \rightarrow {}^7F_1$  transition of Eu<sup>3+</sup> ions with selection rule  $\Delta J = 1$ . The concentration quenching and energy transfer mechanisms were elucidated by Blasse and Dexter's formula. The photometric parameters correlated color temperature (CCT), color rendering index (CRI) and color purity (CP) were computed using CIE chromaticity co-ordinate diagram. In addition, Judd-Ofelt (JO) parameters ( $\Omega_2$ ,  $\Omega_4$ ) and other derived radiative parameters were calculated using Judd-Ofelt theory from the PL emission spectra. Time resolved fluorescence spectra were carried out to determine the decay lifetime of the samples. The prepared samples are expected to be suitable candidates for the applications as solid state devices, lighting and optical displays.

#### 1. Introduction

Recent years, the solid state lighting (SSL) technology has played important role in the field of displays, indoor lighting, outdoor lighting, industrial lighting, agriculture and health care applications [1,2]. The solid state lighting has also developed as an essential tool for the next generation lighting industry [3]. Generally, phosphor enhanced white LEDs have materialized as the essential light sources in the solid state illumination owing to their high energy efficiency, less power consumption, broad color spectrum, long lifetime and environmental friendliness [4,5]. Conventionally, the mixing of blue LED and yellow phosphors (YAG:Ce<sup>3+</sup>) is one of the popular method to produce white light with high correlated color temperature (CCT) and low color rendering index (CRI) [6]. The performance of WLEDs can be described by the luminescent properties viz luminous efficacy, CRI, CCT and lifetime. Consequently, in order to realize WLEDs with the optimal properties, high efficiency luminescent materials having suitable morphology need to be investigated.

Luminescent materials (phosphors) are extensively used to produce visible light, mainly in the field of fluorescent lighting technology. There are two types of fluorescent lamp to produce white light: low-pressure and high-pressure mercury vapor lamps [7]. Mostly, both lamps necessitate phosphors that absorb ultraviolet (UV) radiation and release a proper color set results in white emission. Presently, rare earth (RE) silicate phosphors have aroused substantial attention owing to their high stability, visible light transparency, relative easy preparation, low cost, water resistance and stable structure. Because of these properties, the silicates are widely investigated [8-10]. Until now, many researchers have focused on the photoluminescence (PL) properties of silicate compounds M3MgSi2O8 (M = Ba, Sr, Ca):Eu<sup>2+</sup> [11-13], M2MgSi2O7 (M Ba, Sr, Ca):Eu<sup>2+</sup> [14-16], CaMgSi<sub>2</sub>O<sub>6</sub>:Eu<sup>2+</sup> [17,18] extensively. However, a less attention has been paid to the calcium magnesium silicate (CaMgSiO<sub>4</sub>) host matrix because of higher physical, chemical and thermal stability and easier availability. Hence, this is selected as an

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### Structural, luminescent properties and Judd-Ofelt analysis of CaMgSiO<sub>4</sub>: Eu<sup>3+</sup> phosphor for solid state lighting

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#### ARTICLE INFO

Keywords: CaMgSiO<sub>4</sub>:Eu<sup>3+</sup> CCT CRI J-O analysis Decay life times Thermoluminescence

#### ABSTRACT

A series of Eu<sup>3+</sup> doped calcium magnesium silicate (CaMgSiO<sub>4</sub>) phosphor samples were successfully prepared via solid state synthesis technique. Their structural and morphological studies were investigated by powder X-ray diffraction (PXRD), scanning electron microscopy (SEM) and energy dispersive X-ray analysis (EDX) measurements. Phase structure and phase purity of sample were investigated by Rietveld refinement method. The vibrational and bonding behavior of silicate groups were confirmed by Fourier transform infrared (FTIR) and Raman spectroscopy. The luminescent properties of prepared samples were studied by photoluminescence (PL) and thermoluminescence (TL) characteristics. The emission spectra recorded under the excitation wavelength  $\lambda_{ex} = 396$  nm. The highest emission peak was observed at 595 nm which corresponds to the <sup>5</sup>D<sub>0</sub>  $\rightarrow$  <sup>7</sup>F<sub>1</sub> transition of Eu<sup>3+</sup> ions with selection rule  $\Delta J = 1$ . The concentration quenching and energy transfer mechanisms were elucidated by Blasse and Dexter's formula. The photometric parameters correlated color temperature (CCT), color rendering index (CRI) and color purity (CP) were computed using CIE chromaticity co-ordinate diagram. In addition, Judd-Ofelt (JO) parameters ( $\Omega_2$ ,  $\Omega_4$ ) and other derived radiative parameters were calculated using Judd-Ofelt theory from the PL emission spectra. Time resolved fluorescence spectra were carried out to determine the decay lifetime of the samples. The prepared samples are expected to be suitable candidates for the applications as solid state devices, lighting and optical displays.

#### 1. Introduction

Recent years, the solid state lighting (SSL) technology has played important role in the field of displays, indoor lighting, outdoor lighting, industrial lighting, agriculture and health care applications [1,2]. The solid state lighting has also developed as an essential tool for the next generation lighting industry [3]. Generally, phosphor enhanced white LEDs have materialized as the essential light sources in the solid state illumination owing to their high energy efficiency, less power consumption, broad color spectrum, long lifetime and environmental friendliness [4,5]. Conventionally, the mixing of blue LED and yellow phosphors (YAG:Ce<sup>3+</sup>) is one of the popular method to produce white light with high correlated color temperature (CCT) and low color rendering index (CRI) [6]. The performance of WLEDs can be described by the luminescent properties viz luminous efficacy, CRI, CCT and lifetime. Consequently, in order to realize WLEDs with the optimal properties, high efficiency luminescent materials having suitable morphology need to be investigated.

Luminescent materials (phosphors) are extensively used to produce visible light, mainly in the field of fluorescent lighting technology. There are two types of fluorescent lamp to produce white light: low-pressure and high-pressure mercury vapor lamps [7]. Mostly, both lamps necessitate phosphors that absorb ultraviolet (UV) radiation and release a proper color set results in white emission. Presently, rare earth (RE) silicate phosphors have aroused substantial attention owing to their high stability, visible light transparency, relative easy preparation, low cost, water resistance and stable structure. Because of these properties, the silicates are widely investigated [8-10]. Until now, many researchers have focused on the photoluminescence (PL) properties of silicate compounds  $M_3MgSi_2O_8$  (M = Ba, Sr, Ca):Eu<sup>2+</sup> [11-13], M<sub>2</sub>MgSi<sub>2</sub>O<sub>7</sub> (M = Ba, Sr, Ca):Eu<sup>2+</sup> [14–16], CaMgSi<sub>2</sub>O<sub>6</sub>:Eu<sup>2+</sup> [17,18] extensively. However, a less attention has been paid to the calcium magnesium silicate (CaMgSiO<sub>4</sub>) host matrix because of higher physical, chemical and thermal stability and easier availability. Hence, this is selected as an

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Optical

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## Type Ia supernovae SN 2013bz, PSN J0910 + 5003, and ASASSN-16ex: similar to 09dc-like?

022-23

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#### ABSTRACT

We present optical photometric and spectroscopic studies of three supernovae (SNe): SN 2013bz, PSN J0910 + 5003, and ASASSN-16ex (SN 2016ccj). UV-optical photometric data of ASASSN-16ex obtained with the *Swift* Ultraviolet/Optical Telescope (UVOT) are also analysed. These objects were initially classified as 09dc-like type Ia SNe. The decline-rate parameters  $(\Delta m_{15}(B)_{true})$  are derived as  $0.92 \pm 0.04$  (SN 2013bz),  $0.70 \pm 0.05$  (PSN J0910 + 5003), and  $0.73 \pm 0.03$  (ASASSN-16ex). The estimated *B*-band absolute magnitudes at maximum,  $-19.61 \pm 0.20$  mag for SN 2013bz,  $-19.44 \pm 0.20$  mag for PSN J0910 + 5003, and  $-19.78 \pm 0.20$  mag for ASASSN-16ex, indicate that all three objects are relatively bright. The peak bolometric luminosities for these objects are derived as log  $L_{bol}^{max} = 43.38 \pm 0.07$ ,  $43.26 \pm 0.07$ , and  $43.40 \pm 0.06$  erg s<sup>-1</sup>, respectively. The spectral and velocity evolution of SN 2013bz is similar to that of a normal SN Ia, hence it appears to be a luminous, normal type Ia supernova. On the other hand, the light curves of PSN J0910 + 5003 and ASASSN-16ex are broad and exhibit properties similar to 09dc-like SNe Ia. Their spectroscopic evolution shows similarity with 09dc-like SNe: strong C II lines are seen in the pre-maximum spectra of these two events. Their photospheric velocity evolution is similar to SN 2006gz. Further, in the UV bands, ASASSN-16ex is very blue, like other 09dc-like SNe Ia.

Key words: techniques: photometric – techniques: spectroscopic – supernovae: general – supernovae: individual: SN 2013bz – supernovae: individual: PSN J0910 + 5003 – supernovae: individual: ASASSN-16ex.

#### **1 INTRODUCTION**

Thermonuclear supernovae are an important class of supernovae (SNe): the progenitors are low-mass stars found in elliptical as well as spiral galaxies. They are commonly known as Type Ia SNe (SNe Ia) and populate the brighter side of the luminosity distribution of SNe. Most SNe Ia, referred to as 'normal SNe Ia', display uniform spectral and light-curve properties. Their luminosity is correlated with the width of their light curve (Phillips 1993; Phillips et al. 1999) and hence they are considered standardizable candles. This uniformity and high luminosity make them a vital probe for studying cosmic evolution (Riess et al. 1998; Perlmutter et al. 1999). SNe Ia are the primary source of iron-group elements (IGEs) and hence play an important role in enriching the interstellar medium (ISM) with IGEs (Matteucci & Greggio 1986; Matteucci et al. 2009; Nomoto, Kobayashi & Tominaga 2013).

Our understanding of the progenitor and explosion mechanism giving rise to these events still needs to be completed. From the theoretical and observational work, it is inferred that thermonuclear disruption of a carbon–oxygen (C/O) white dwarf (WD) in a binary system results in a Type Ia explosion (Hoyle & Fowler 1960; see Maoz, Mannucci & Nelemans 2014; Jha, Maguire & Sullivan 2019

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for reviews). There are two possible progenitor models suggested for a WD to explode. In the first one, a WD accretes matter from a non-degenerate star, known as the single-degenerate (SD) model (Whelan & Iben 1973). In the double-degenerate (DD) model, the explosion results from the merger of two WDs (Iben & Tutukov 1984; Webbink 1984). Most SNe Ia are considered to be an explosion of a Chandrasekhar-mass WD (Mazzali et al. 2007) via delayed detonation (Khokhlov 1991). However, if the accumulated material is He-rich, the explosion can occur at a sub-Chandrasekhar mass through double detonation. With sufficiently rapid He accretion on the surface of a C/O WD, a detonation is first initiated within the helium layer. The emanating shock wave propagates through the WD and triggers carbon detonation at the centre of the WD (Woosley & Weaver 1994; Woosley & Kasen 2011; Ruiter et al. 2014; Tanikawa, Nomoto & Nakasato 2018). The donor star could be either a nondegenerate He star (SD channel), another C/O WD with He in the outer layer, or a He WD (DD channel). This mechanism can explain normal and fast-declining SNe Ia of different brightness distributions (Pakmor et al. 2013). Currently, it is difficult to identify which SN results from which channel (see Livio & Mazzali 2018; Wang 2018; Soker 2019; Ruiter 2020, for reviews).

With the increasing number of well-studied SNe Ia, it became clear that there is a considerable spread in the luminosity of SNe Ia. There are objects populating both the higher and lower luminosity end of normal objects (Li et al. 2011). Some have extreme properties

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### Can the Violent Merger of White Dwarfs Explain the Slowest Declining Type Ia Supernova SN 2011aa?

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#### Abstract

We present optical observations and Monte Carlo radiative transfer modeling of the Type Ia supernova (SN Ia) SN 2011aa. With a  $\Delta m_{15}(B)$  of 0.59  $\pm$  0.07 mag and a peak magnitude  $M_{\rm B}$  of  $-19.30 \pm 0.27$  mag, SN 2011aa has the slowest decline rate among SNe Ia. The secondary maximum in the I band is absent or as equally bright as the primary maximum. The velocity of C II is lower than the velocity of Si II. This indicates either the presence of C at lower velocities than Si or a line-of-sight effect. Application of Arnett's radiation diffusion model to the bolometric light curve indicates a massive ejecta  $M_{ej}$  1.8–2.6  $M_{\odot}$ . The slow decline rate and large ejecta mass, with a normal peak magnitude, are well explained by a double degenerate, violent merger explosion model. The synthetic spectra and light curves generated with SEDONA considering a violent merger density profile match the observations.

Unified Astronomy Thesaurus concepts: Supernovae (1668)

Supporting material: data behind figures

#### 1. Introduction

Type Ia supernovae (SNe Ia) result from thermonuclear explosions of white dwarf (WD) stars in binary systems (Hoyle & Fowler 1960; Jha et al. 2019). The rate of decline in normal type Ia SNe (0.85 <  $\Delta m_{15}(B)$  < 1.70 mag) is correlated with the absolute magnitude in the B band (Phillips 1993). The radioactive decay of <sup>56</sup>Ni to <sup>56</sup>Co and finally to <sup>56</sup>Fe supplies the energy during the maximum of the light curve and its subsequent evolution (Pankey 1962; Colgate & McKee 1969; Branch & Wheeler 2017). In addition, the efficiency with which gamma rays and positrons from the decay of 56Ni are trapped in the ejecta also plays an important role in the evolution of the light curve (Cappellaro et al. 1997). The luminosity also increases with more <sup>56</sup>Ni produced in the explosion. This increased luminosity causes the ejecta to have a higher temperature. The opacity increases with temperature, and the diffusion timescales for the photons increases. This results in slower decline and broader light curves (Hoeflich et al. 1996). Hence, the decline rate versus absolute magnitude relation can also be interpreted as an opacity effect (Baron et al. 2012). While a majority of SNe Ia follow the luminosity decline rate relation, it is important to note that a good fraction of SN events that are of thermonuclear origin do not follow this relation (Maeda & Terada 2016; Taubenberger 2017). The overluminous super-Chandrasekhar SNe Ia (Howell et al. 2006; Ashall et al. 2021) lie at the extreme end of the  $\Delta m_{15}(B)-M_{\rm B}$  relation. They are slowly declining objects. The SNe Iax (SN 2002cx-like) are a peculiar class of thermonuclear explosions having low luminosity and low kinetic energy as compared to SNe Ia (Li et al. 2003; Dutta et al. 2022).

In the proposed progenitor scenario for SNe Ia, the exploding WD can have a nondegenerate star (single degenerate (SD)) or another WD (double degenerate (DD)) as its binary companion. In

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the SD scenario, the WD can accrete matter from a red-giant (Munari & Renzini 1992), sub-giant/main-sequence (van den Heuvel et al. 1992), or a He star (Liu et al. 2010). In the DD case, a violent merger of two similar-mass WDs (~0.9  $M_{\odot}$ ) has been shown to give rise to a subluminous type Ia SN explosion (Pakmor et al. 2010). However, more massive primary WDs, due to their higher densities will produce more <sup>56</sup>Ni and Fe group elements (IGEs) and give rise to brighter SNe Ia (Pakmor et al. 2012).

Using preexplosion Hubble Space Telescope images Li et al. (2011) has ruled out He stars or luminous red giants as the companion of SN 2011fe. But a main-sequence star (Nugent et al. 2011) or another WD as a companion cannot be ruled out. Observations of early UV emission in a thermonuclear SN iPTF14atg (Cao et al. 2015) hinted toward collision of ejecta material with its companion, supporting an SD scenario. The excess flux can also be explained by 56Ni in the outer layers (Magee & Maguire 2020). Some circumstellar mass can be formed from ejection of mass in tidal tails before the merger of two WDs. The interaction of the SN ejecta with the tidal tail ejecta produces signatures in X-ray/UV/optical (Raskin & Kasen 2013). The persistent presence of hydrogen in the spectra of PTF11kx can be understood in terms of ejecta interacting with circumstellar mass indicating a nondegenerate companion (Dilday et al. 2012; Silverman et al. 2013; Graham et al. 2017). The detection of [O1]  $\lambda\lambda$  6300, 6364 in the nebular spectra of SN 2010lp indicates that oxygen is present close to the center, which is predicted by a violent merger scenario (Taubenberger et al. 2013; Kromer et al. 2013). So, the very question of single/double degenerate progenitor still persists. The observed diversity in the explosions along with different models proposed to explain the diversity makes it important to study these systems.

In this Letter, we present optical observations and radiative transfer modeling with SEDONA of the spectra and light curves of a peculiar SN Ia, SN 2011aa. SN 2011aa was discovered on 2011 February 6.3 in the galaxy UGC 3906 (PGC 021381) at  $\alpha$  $(J2000) = 07^{h}36^{m}42^{s}63 \text{ and } \delta (J2000) = +74^{\circ}26'34''_{\circ}80 \text{ (Puck$ ett et al. 2011). There is another nearby galaxy PGC 021386







#### Modeling the late-time merger ejecta emission in short gamma ray bursts

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Abstract. The short gamma ray bursts (GRBs) are the aftermath of the merger of binary compact objects (neutron star-neutron star or neutron star-black hole systems). With the simultaneous detection of gravitational wave (GW) signal from GW 170817 and GRB 170817A, the much-hypothesized connection between GWs and short GRBs has been proved beyond doubt. The resultant product of the merger could be a millisecond magnetar or a black hole depending on the binary masses and their equation of state. In the case of a magnetar central engine, fraction of the rotational energy deposited to the emerging ejecta produces late-time synchrotron radio emission from the interaction with the ambient medium. In this paper, we present an analysis of a sample of short GRBs located at a redshift of  $z \le 0.16$ , which were observed at the late-time to search for the emission from merger ejecta. Our sample consists of seven short GRBs, which have radio upper limits available from very large array and Australian telescope compact array observations. We generate the model light curves using the standard magnetar model incorporating the relativistic correction. Using the model light curves and upper limits we constrain the number density of the ambient medium to be  $10^{-5}-10^{-3}$  cm<sup>-3</sup> for rotational energy of the magnetar  $E_{rot} \sim 5 \times 10^{51}$  erg. Variation in ejecta mass does not play a significant role in constraining the number density.

Keywords. Gravitational waves-surveys-gamma-ray burst: general-stars: magnetars-stars: neutron.

#### 1. Introduction

The most accepted progenitor model for the origin of short GRBs is the merger of binary compact objects (binary neutron stars (BNS) and neutron star-black hole (NS-BH)). These systems are also the prime candidates for producing gravitational waves and kilonovae. The joint detection of the GW 170817, GRB 170817A and AT2017gfo confirmed the connection among the three events (Abbott *et al.* 2017; Valenti *et al.* 2017; Savchenko *et al.* 2017; Andreoni *et al.* 2017; Drout *et al.* 2017; Tanvir *et al.* 2017). The most debated open question regarding the central engine of GRB is whether black hole, production is necessary for the emergence of short GRB

jet or the central engine could be a highly magnetized and rapidly spinning magnetar (Zhang & Mészáros 2001; Metzger et al. 2008). In case of a BNS merger, the nature of the remnant depends on the initial masses of the BNS and the equation of state of the NSs. The massive binaries  $(>3 M_{\odot})$  will directly collapse to a black hole whereas the less massive BNS merger creates a transient state in between the merger and the production of black hole which is a millisecond magnetar. In the Swift era, the Xray light curves from X-ray telescope (XRT, Gehrels et al. 2004) show a complex light curve morphology with an early-time X-ray excess ( $\leq 10$  s), mid time flattening or plateau (10-1000 s) and late time X-ray excess followed by a sharp decay ( $\geq 1000$  s). The plateau phase in the X-ray light curves is thought to be powered by the magnetar (Rowlinson et al. 2013).

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## Search for merger ejecta emission from late-time radio observations of short GRBs using GMRT

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#### ABSTRACT

In some cases, the merger of two neutron stars can produce a rapidly rotating and highly magnetised millisecond magnetar. A significant proportion of the rotational energy deposited to the emerging ejecta can produce a late-time radio brightening from interacting with the ambient medium. Detection of this late-time radio emission from short GRBs can have profound implications for understanding the physics of the progenitor. We report the radio observations of five short GRBs - 050709, 061210, 100625A, 140903A, and 160821B using the legacy Giant Metrewave Radio Telescope (GMRT) at 1250, 610, and 325 MHz frequencies and the upgraded-GMRT (uGMRT) at band 5 (1050-1450 MHz) and band 4 (550-900 MHz) after  $\sim 2 - 11$  years from the time of the burst. The GMRT observations at low frequencies are particularly important to detect the signature of merger ejecta emission at the peak. These observations are the most delayed searches associated with some GRBs for any late-time low-frequency emission. We find no evidence for such an emission. We find that none of these GRBs is consistent with maximally rotating magnetar with a rotational energy of ~  $10^{53}$  erg. However, magnetars with lower rotational energies cannot be completely ruled out. Despite the non-detection, our study underscores the power of radio observations in the search for magnetar signatures associated with short GRBs. However, only future radio observatories may be able to detect these signatures or put more stringent constraints on the model.

**Key words:** gravitational waves – surveys – gamma-ray burst: general – stars: magnetars – stars: neutron – gamma-ray bursts: Transients.

#### **1** INTRODUCTION

Double neutron star (DNS) or neutron star-black hole mergers have been argued to be the most promising progenitors for short-duration Gamma-Ray Bursts (short GRBs; Paczynski 1986; Narayan et al. 1992; Ruffert & Janka 1999). The Gravitational Waves (GWs) discovery from the DNS merger GW 170817 and simultaneous observation of a short GRB 170817A, along with the discovery of its electromagnetic counterparts in various bands, have revolutionised the era of multi-messenger astronomy (Abbott et al. 2017; Goldstein et al. 2017; Savchenko et al. 2017) and has strengthened the hypothesis that short GRBs result from the merger of compact objects.

However, there are uncertainties about the final phase of the merger as GW observations are not sensitive to the post-merger dynamics of neutron star mergers (see, for example, Fig. 1 of Bartos

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et al. 2013) given the current sensitivities of the detectors. Numerical simulations have shown that the merger remnant may form a rapidly spinning supra-massive, highly magnetised neutron star (magnetar) before collapsing to a black hole (Ozel 2011; Giacomazzo & Perna 2013). Whether the situation occurs or not depends crucially on the resultant mass of the remnant and the highly uncertain equation of states (EoS) of dense neutron stars (Ozel 2011; Lasky & Glampedakis 2016; Özel et al. 2016; Lan et al. 2020). With the recent discovery of millisecond pulsar MSP J0740+6620 having the mass of  $2.14^{+0.10}_{-0.09} M_{\odot}$  (Cromartie et al. 2020), this mass is often used as the lower limit of maximum neutron star mass. For a binary mass < 3  $M_{\odot}$ , a long-lived supra-massive neutron star remnant could be formed (Dai et al. 2006; Giacomazzo & Perna 2013) before collapsing to a black hole.

In the case of a DNS merger, the resultant product will be rapidly rotating with a spin period close to the centrifugal breakup value (P  $\sim 1$  ms). The remnant could also acquire a strong mag-

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## Study of chemically peculiar stars – I. High-resolution spectroscopy and *K2* photometry of Am stars in the region of M44

2022-23

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#### ABSTRACT

We present a study based on the high-resolution spectroscopy and  $K^2$  space photometry of five chemically peculiar stars in the region of the open cluster M44. The analysis of the high-precision photometric  $K^2$  data reveals that the light variations in HD 73045 and HD 76310 are rotational in nature and caused by spots or cloud-like co-rotating structures, which are non-stationary and short-lived. The time-resolved radial velocity measurements, in combination with the  $K^2$  photometry, confirm that HD 73045 does not show any periodic variability on time-scales shorter than 1.3 d, contrary to previous reports in the literature. In addition to these new rotational variables, we discovered a new heartbeat system, HD 73619, where no pulsational signatures are seen. The spectroscopic and spectropolarimetric analyses indicate that HD 73619 belongs to the peculiar Am class, with either a weak or no magnetic field, considering the 200-G detection limit of our study. The least-squares deconvolution profiles for HD 76310 indicate a complex structure in its spectra, suggesting that this star is either part of a binary system or surrounded by a cloud shell. When placed in the Hertzsprung–Russell diagram, all studied stars are evolved from the main sequence and situated in the  $\delta$  Scuti instability strip. This work is relevant for further detailed studies of chemically peculiar stars, for example on inhomogeneities (including spots) in the absence of magnetic fields and the origin of the pulsational variability in heartbeat systems.

Key words: techniques: photometric - spectroscopic - polarimetric - stars: chemically peculiar - stars: activity - stars: binaries.

#### **1 INTRODUCTION**

The chemically peculiar (CP) stars are a group of main-sequence B-, A-, and F-type stars having peculiar surface elemental abundances; they are characterized by abnormal spectral line strengths (Preston 1974). The chemical anomalies in these stars are thought to be confined to the outer stellar layers and to arise from gravitational settling and radiative levitation of certain elements, a process known as atomic diffusion (Michaud 1970; Michaud, Charland & Megessier 1981). This study is confined to one subset of CP stars, the metalliclined A (Am) stars, which are generally non-magnetic in nature and characterized by under-abundances of some light elements such as Ca and Sc, but with slight/moderate over-abundances of iron-peak elements, for example Zn, Sr, Y, Zr, and Ba. The projected rotational velocities of these stars are generally smaller than for ordinary A stars  $(v \sin i \text{ typically} < 120 \text{ km s}^{-1})$ , with the majority of the Am stars being members of close binary systems. Rotational braking through tidal interaction is regarded as a possible cause of the low rotational velocities.

Using four years of high-precision photometry from the nominal Kepler mission and the K2 campaigns, Balona et al. (2015) investigated the light variations in 29 Am stars and found that most of the Am stars in the Kepler field have light curves with the characteristics of rotational modulation arising from star spots or co-rotating structures. The origin of spots in Am stars seems to be different from that of solar-like spots, as these stars do not show any signs of the intense magnetic fields able to produce such magnetic features. Magnetic fields of the order of sub-Gauss strengths have been reported in some Am stars, for example Sirius A (Petit et al. 2011), Vega (Böhm et al. 2015),  $\beta$  UMa, and  $\theta$  Leo (Blazère et al. 2015), Alhena (Blazère, Neiner & Petit 2016) and p Pup (Neiner, Wade & Sikora 2017). It is thought that for the majority of these stars, convective flows in the atmospheres may disrupt any spot-like features (Kupka 2003). Hence, the rotational modulation in some Am stars indicates either that a weak magnetic field may lead to surface inhomogeneities in the form of spots across the stellar surface or, alternatively, that there is some unknown mechanism(s) producing these spots. If a weak magnetic field is indeed present, then the basic processes operating in Am stars would need to be revisited because magnetic fields have been omitted from the diffusion models attempting to explain their unusual chemical abundances (Guzik 2021).

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## Effect of TiO<sub>2</sub> on ion transport properties and dielectric relaxation of sodium ion-conducting novel PEO/ PAN-blended solid polymer electrolyte

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In the present manuscript, a comprehensive study of temperature-dependent ionic conductivity, dielectric behaviour, and thermal, structural, and morphological characteristics of nano-composite polymer electrolyte (NCPE) films has been performed. NCPE films were prepared by hot-press method from a blend of two polymers, Poly (ethylene oxide) (PEO) and Poly (acrylonitrile) (PAN), complexed with sodium perchlorate (NaClO<sub>4</sub>) complexing salt and titanium dioxide (TiO<sub>2</sub>) nanofiller. Electrochemical Impedance Spectroscopy (EIS) has been used to investigate electrical and dielectric properties and their correlations. The effect of TiO<sub>2</sub> concentration on ionic conductivity and dielectric relaxation has been investigated at different temperature ranges. Both the smoother surface and the presence of all essential components were verified by scanning electron microscopy (SEM) and energy-dispersive spectroscopy (EDAX), respectively. Thermogravimetric Analysis (TGA) revealed high thermal stability, and Differential Scanning Calorimetry (DSC) and X-ray Diffraction (XRD) confirmed enhanced amorphous phase. The cyclic voltammetry (CV) curve exhibits excellent reversibility and cyclability.

### Introduction

In materials, there are two types of conduction: due to electronic and ionic. Solid-State Ionics is a branch of Material Science, in which materials with high ionic transport characteristics are studied, these materials have a wide range of applications, one of them being for energy storage devices. The demand for safe, dependable, and effective energy storage devices to store electrical energy has increased [1]. In the modern era, portable electronic devices viz. mobile phones, fitness trackers, tablet computers, etc. become more widespread in our culture and many areas of our lives are now dependent on the functioning of electronic equipment directly or indirectly [2]. Furthermore, recent improvements in processing power, long durability, screen size, and the desire for ultra-thin and lighter gadgets have raised the demand for lighter batteries with improved energy density [3–6].

In the development of advanced energy storage systems and conversion devices, polymer electrolytes are more prominent materials due to their flexibility, desired shapes/sizes, mechanical/chemical/thermal stability over a wide temperature range, and light-weight, non-volatility, and corrosion-free properties [7, 8]. Polymer electrolytes are chosen for energy storage applications such as high energy density solid polymer batteries because they allow for easy formation of close electrode/electrolyte contact [9, 10]. The primary function of polymer electrolytes in the battery is to serve as a separator between the anode and cathode materials [11, 12]. It also acts as an ion transport medium for the conduction of ions during electrochemical processes, like charging/discharging. The ions in the electrolyte are adsorbed/desorbed on the porous electrode, due to which fast charging/discharging of the solid polymer battery system has occurred and that provides a high energy density [13-15]. Polymer Electrolyte materials have mainly been classified into Gel Polymer Electrolyte (GPE) and solvent-free/dry Solid Polymer Electrolyte (SPE). The GPE has higher ionic conductivity but exhibits poor mechanical stability, whereas the SPE is mechanically stronger and may be made into free-standing electrolyte membranes [16, 17]. In SPE, instead of using an additional



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## Electrical and thermal analysis on Na<sup>+</sup> - ion conducting novel blended solid polymer electrolyte membranes

Niranjan Kumar, Manju Sahu, Y.K. Mahipal Ӓ 🖾

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### Abstract

In this study, the hot press method has been used to synthesize a blended solid <u>polymer</u> <u>electrolyte</u> (BSPE), containing poly (ethylene oxide) and <u>polyacrylonitrile</u> (PEO/PAN) matrix complexed with <u>sodium</u> perchlorate (NaClO<sub>4</sub>) salt. The film with varying salt concentration has been prepared, in which the BSPE OCC (optimum conducting composition) film exhibits the highest <u>ionic conductivity</u> is ( $\sigma_{rt}$ )~2.10×10<sup>-6</sup> Scm<sup>-1</sup> at room temperature. X-ray diffraction (XRD), <u>Impedance Spectroscopy</u> (IS), <u>Differential Scanning Calorimetry</u> (DSC) and <u>Thermal Gravimetric Analysis</u> (TGA) techniques have been adopted for the characterization. These investigations are demonstrated their utility and potential for all-solid-state device applications.

### Introduction

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**ORIGINAL PAPER** 



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## Investigation of ZnO nano-filler-dispersed nano-composite polymer electrolytes and their ion transport property

2022-23

Niranjan Kumar<sup>1</sup> · Manju Sahu<sup>1</sup> · Dinesh K. Sahu<sup>2</sup> · <mark>Y. K. Mahipal<sup>1</sup></mark>

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#### Abstract

The present manuscript represents the comprehensive studies of the poly (ethylene oxide)-based sodium ion-conducting solid polymer electrolyte (SPE) and nano-composite polymer electrolyte (NCPE) membranes dispersed with different wt. (%) of ZnO nano-filler that have been synthesized by the hot-press method. This novel method gave rise to flexible, uniform/ thin polymer electrolyte films which can be achieved in any desired shape/size. X-ray diffraction (XRD) was used to analyze the structural properties of the SPE host and the NCPE optimum conducting composition (OCC) film. Scanning electron microscopy (SEM) confirmed the smoother surface and energy-dispersive spectroscopy (EDAX) confirmed the presence of all key elements. Thermo-gravimetric analysis (TGA) and differential scanning calorimetry (DSC), respectively, indicated good thermal stability and an improved amorphous phase. The dispersion of the ZnO nano-filler particles has enhanced the ionic conductivity, thermal stability, and also mechanical integrity. Ion transport properties have been characterized by assembling symmetric cells: SSIISPE/NCPEIISS (SS stainless steel), the NCPE OCC membrane exhibits the maximum ionic conductivity ( $\sigma_{rt}$ ) ~ 1.45 × 10<sup>-5</sup> S/cm at room temperature, low activation energy ( $E_a \sim 0.35 \text{ eV}$ ), and ionic transference number ( $t_{ion} \sim 0.99$ ) close to unity and also the cyclic voltammetry (CV) curve shows the good electrochemical stability so electrolyte has been found more suitable for device fabrication.

**Keywords** Solid polymer electrolyte · Nano-composite polymer electrolyte · Ionic conductivity · A.C. impedance spectroscopy · Thermal properties · Cyclic voltammetry

### Introduction

In the era of advanced technology, the development of renewable energy sources, such as wind, solar, and nuclear energy sources, has become necessary due to the limited availability of traditional fossil fuels [1]. However, with the advancement of renewable energy sources, we have to focus on portable electrical energy storage devices to smooth the intermittency of the energy sources. Battery devices have the potential to provide a solution, especially as they can store energy from renewable energy sources such as wind and solar power. The rechargeable battery can store chemical

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<sup>2</sup> State Forensic Science Laboratory (SFSL), Raipur, Chhattisgarh, India energy as well as it can convert it into electrical energy with high efficiency [2, 3]. In the latest technology of electrical energy storage devices, lithium-ion battery (LIB) has been dominating the market of portable electronic devices, electric vehicles, and hybrid electric vehicles due to their high output voltages, high energy densities, and long durability. But due to very high cost, less abundance and the toxic nature of lithium are inhibiting the application of LIB in large-scale energy storage [4-9]. Therefore, many researchers are trying to develop sodium-ion secondary batteries parallelly which could be able to replace Li-ion associated energy storage devices successfully. The most believable and competitive element with comparable performance and very close chemical insertion properties that have the potential to replace lithium (Li) and eliminate the hurdles is sodium (Na). The abundance of sodium resources (1000 times more than Li), low price of starting materials, voltage versus SHE (2.7 V), and low toxicity are favorable for sodium-ion battery (SIB) technology enhancement in industrial applications, viz., portable electronic devices and for electric road

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A graphene-printed paper electrode for determination of  $H_2O_2$  in municipal wastewater during the COVID-19 pandemic  $\dagger$ 

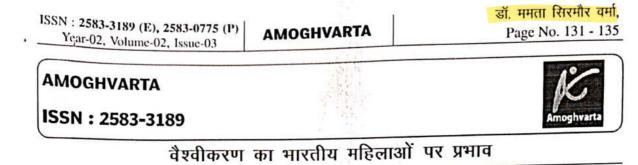
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### Abstract

Recently, hydrogen peroxide  $(H_2O_2)$  has been used as a disinfectant in sanitizers for cleaning hands, and solid surfaces of hospitals, offices and homes to prevent the spread of the COVID-19 virus. The effluents from domestic, hospital and municipal waste should be monitored for their  $H_2O_2$  content to avoid the entry of this toxic pollutant into the ecosystem. Therefore, we developed a low-cost graphene (Gr)-printed paper electrode for determination of  $H_2O_2$  using cyclic voltammetry (CV). An office inkjet-printer and Gr nano-ink stabilized with ethyl cellulose (EC) were used for the fabrication of printed paper electrodes (PPEs) to determine  $H_2O_2$  quantitatively. A stable Gr–EC nano-ink (2%) with viscosity and surface tension values of 12 mPa S<sup>-1</sup> and 35 mN M<sup>-1</sup>, respectively, was formulated to obtain conductive electrodes. A wide linear range (2  $\mu$ M–25 mM) with a better limit of detection (0.28  $\mu$ M) for the determination of  $H_2O_2$  was obtained when the Gr–EC/PPE was used as a working electrode. Further, the Gr–EC/PPE was successfully employed for analysis of  $H_2O_2$  in wastewater. The electrochemical determination of  $H_2O_2$  using the Gr–





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शोध सार

वैश्वीकरण एक जटिल घटना है जिसने मानव जीवन के हर पहलू को प्रमावित किया है, जिसमें लैंगिक भूमिकाएं और संबंध शामिल हैं। महिलाएं कई तरह से प्रमावित हुई हैं और मारत इसका अपवाद नहीं है। प्रस्तुत शोधपत्र भारत में महिलाओं पर वैश्वीकरण के प्रभाव की जांच करता है, तीन प्रमुख क्षेत्रों पर घ्यान केंद्रित करता है: आर्थिक, सामाजिक और सांस्कृतिक। अध्ययन से पता चलता है कि जहां वैश्वीकरण ने भारत में महिलाओं के लिए नए अवसर पैदा किए हैं, वहीं इसने लैंगिक असमानताओं और मेदमाव को भी कायम रखा है। लैंगिक समानता को बढ़ावा देने और महिलाओं को सशक्त बनाने के उद्देश्य से नीतियों को स्थानीय संदर्भ को घ्यान में रखना चाहिए और भारत में महिलाओं की जरूरतों और आकांक्षाओं के प्रति उत्तरदायी होना चाहिए। वैश्वीकरण ने लाभ और चुनौतियां दोनों लाते हुए

दुनिया को बदल दिया है। इसने आर्थिक विकास और गरीबी में कमी लाने में योगदान दिया है, इसने आय असमानता, पर्यावरणीय गिरावट और कुछ क्षेत्रों में नौकरियों के नुकसान में भी योगदान दिया है। वैश्वीकरण ने आर्थिक असमानता, पर्यावरणीय गिरावट और सांस्कृतिक समरूपता सहित महत्वपूर्ण चुनौतियाँ भी पेश की हैं। व्यापार और निवेश नीतियों के उदारीकरण ने प्रतिस्पर्धा में वद्धि की है और नौकरी के नुकसान और कुछ क्षेत्रों में मजदूरी में गिरावट आई है।

### मुख्य शब्द

मीडिया, महिला शिक्षा, महिला एवं समाज, वैश्वीकरण, महिला।

### प्रस्तावना

वैश्वीकरण एक बहुआयामी प्रक्रिया है जिसने दुनिया भर के समाजों को प्रभावित किया है। यह अंतरराष्ट्रीय व्यापार, निवेश और संचार के तेजी से विस्तार के कारण अर्थव्यवस्थाओं, समाजों और संस्कृतियों के बढ़ते अंर्तसंबंध को संदर्भित करता है। वैश्वीकरण ने आर्थिक वृद्धि और विकास के लिए नए अवसर पैदा किए हैं। यह विशेष रूप से लैंगिक समानता और महिलाओं के अधिकारों के संबंध में मेहत्वपूर्ण चुनौतियां भी लेकर आया है।

भारत में, महिलाओं पर वैश्वीकरण का प्रभाव विशेष रूप से महत्वपूर्ण रहा है। भारत में महिलाओं को ऐतिहासिक रूप से शिक्षा, रोजगार और राजनीतिक प्रतिनिधित्व तक पहुँचने में महत्वपूर्ण चुनौतियों का सामना करना

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भोधर्ग<u>ा</u>गग

आदिवासी जीवन शैली में पेसा अधिनियम 1996 का महत्व और उपयोगिता ममता सिरमौर वर्मा, Ph.D. रायपुर, छत्तीसगढ़ भारत

### शोध सार

स्वशासन की अवधारणा विश्वभर में लोकतंत्र की सफलता की कुंजी मानी जाती है। राजनीतिक प्रणाली और संस्थाओं में जनता की सहभागिता, जो उनके जीवन को नियंत्रित करती है, मानवाधिकार की मूल आवश्यकता है और उनके सामाजिक और आर्थिक विकास के लिए भी आवश्यक है। पंचायती राज व्यवस्था विकास की प्रक्रिया में सभी हितधारकों को शामिल करती हुई एक विकेंद्रीकृत शासन संरचना के रूप में कार्य करती है। अनुसूचित क्षेत्रों में पंचायती विस्तार अधिनियम, 1996 ने देश की पंचायती प्रणाली में बहुत समय से बंद रहे सुधारों को लागु किया है। पेसा एक साहसिक कानून है जो आदिवासी अधिकारों, सांस्कृतिक अधिकारों, भाषा और पहचान जैसे कई मुदों से जुड़ा हुआ है, इसके अलावा जनके क्षेत्र में स्थित रागी संसाधनों जैसे भूमि, जल, जंगल और खनिजों के अधिकारों और आदिवासी समुदायों के अधिकारों पर बल देता है। इसके माध्यम से लोग अपने स्वयं के संस्थानों, संस्कृतियों और परंपराओं को स्थायी रूप से सरक्षित रखने और मजबूत करने के साथ-साथ अपनी आकांभाओं और जरूरतों के अनुसार अपने विकास को आगे बढाने के लिए सक्षम होते हैं।

### मुख्य शब्द

स्वशासन, पेसा अधिनियम, विकास, आदिवासी.

### प्रस्तावना

लोकतांत्रिक विकेन्द्रीकरण निर्णय लेने की प्रक्रियाओं में लोगों की भागीदारी पर जोर देने के साथ शासन का एक प्रमुख साधन है जिससे विकास कार्यक्रमों के कार्यान्वयन में जवाबदेही और पारदर्शिता सुनिश्चित होती है। यह माना जाता है कि विकेंद्रीकरण एक वैध संस्थागत, ढांचे के माध्यम से स्थानीय शासी संस्थाओं को राजनीतिक. प्रशासनिक और वित्तीय शक्तियों को निहित करवे जर्मानी

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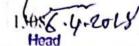
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### छत्तीसगढ़ में गोदना चित्रकलाएं

ममता सिरमौर वर्मा, (Ph.D.) समाजशास्त्र अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छत्तीसगढ़, भारत

#### शोध सार

विभिन्न प्रकार के गोदना पहचान चिह्नों के रूप में कार्य करते हैं जो एक व्यक्ति को दूसरे व्यक्ति से, एक जातीय समूह को दूसरे जातीय समूह से और एक संस्कृति क्षेत्र को दूसरे संस्कृति क्षेत्र से अलग करते हैं। सरगुजा और रायगढ़ जिलों में रहने वाली उरांव जनजाति की महिलाएँ अपने माथे पर तीन रेखाएँ गुदवाती हैं। भील महिलाओं के दोनों आँखों के कोण पर विशिष्ट पक्षी जैसा गोदना होता है। यह उन्हें स्थायी रूप से लंबी पलकों वाला रूप आकार देता है। पक्षी और बिच्छू आकृति विशेष रूप से भील लोगों में पायी जाती है। बैगा जनजाति की महिलाओं में उनके माथे के केंद्र में भौंहों के बीच 'वी' आकृति का विशिष्ट गोदना होता है। गोदना के कुछ सामान्य और लोकप्रिय आकृति आदिवासियों की मुख्य पसंद हैं। वे फूल और ज्यामितीय डिज़ाइन, घोड़े, सवार के साथ हाथी, बिच्छु, मोर, और आदिवासी मिथकों को चित्रित करते हैं। सामान्यतः लड़कियों को फूलों का गोदना, जबकि छोटी लड़कियों को चेहरे के विभिन्न स्थानों पर एकल बिंदु या माथे पर घोड़े की नाल जैसा अर्ध चक्र पसंद होता है। बुजुर्ग महिलाएँ बिच्छू, हिरण, मोर तथा टखनों, हाथों और कंधों पर फूलों जैसे आकृति के गोदना पसंद करती हैं। प्रस्तुत शोधपत्र में छत्तीसंगढ़ में गोदना चित्रांकन के बारे में विस्तार से बताया गया है। साथ ही छत्तीसगढ़ की लोक संस्कृति में गोदना के महत्त्व को भी बताया गया है।

### मुख्य शब्द

गोदना, लोक संस्कृति, छत्तीसगढ़.

"नाक गोदा ले नाक के फूली, माथ गोदा ले बिंदिया। बाँह गोदा ले बाँह बहुटवा, हाथ गोदा ले ककनी।। माँग ऊपर छै बुन्दिया गोदा ले, पाँव गोदा ले बिछिया। हिरदे में तोर राम गोदा ले, दाग लगा ले छतिया।।"

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### जोदना-प्रिय जनजाति बैगा के जोदना में परिवर्तन (छत्तीसगढ़ राज्य के खैरागढ़-छुईखदान-गंडई जिले के विशेष संदर्भ में)

### अीमती सोमेश्वरी कुमारी वर्मा

डॉ. हेमलता बोरकर वासनिक ÷

अपना घर समझते आये हैं तथा

वहाँ के पेड़-पौधे, जीव-जन्तु

तथा जंगली जानवरों के सहचर

हो गये हैं। यह मूलरूप से जंगल

पर निर्भर जनजाति है। इनके

जीवन में शिक्षा, स्वास्थ्य तथा

आवास का पूर्णतः अभाव रहा

है। बैगा अपनी अर्थव्यवस्था के

लिए शिकार, वैद्यर्का, वनोपज

तथा बेवाड़ कृषि पर निर्भर रहे

हैं। शारीरिक बनावट की दृष्टि

से बैगा जनजाति हृष्ट-पुष्ट,

गठीला बदन, चपटी नाक, श्याम

वर्ण, चौड़े ललाट तथा मध्यम

कद के होते हैं। बैगा पुरूष

प्रधान समाज है परन्तु सबको

स्वतंत्रता और समानता का

अधिकार प्राप्त है। बैगा जनजाति

की विशेष पहचान उसकी गोदना

गोदना :- गोदना अर्थात् बैगा

स्त्री का सौन्दर्य, श्रृंगार, आत्मा

का अलंकरण, धर्म तथा संस्कार

का प्रतीक, बीमारियों से मुक्ति

तथा मरणोपरांत स्वर्ग लोक में

साथ जाने वाली देहकला है।

है।

जनजाति की कुल जनसंख्या 89,744 है तथा छुईखदान

में वैगा परिवारों की कुल जनसंख्या 4357 है। बैगा अपने को ''वाघ का भाई'' शव्द से संबोधित करते हैं। प्रारंभ से ही ये जंगल को

सूचक शब्द : गोदना, गुदना, देहकला, अलंकरण, वैद्यकी, देव प्रकोप, रूप-रेखा, बैगा जनजाति।

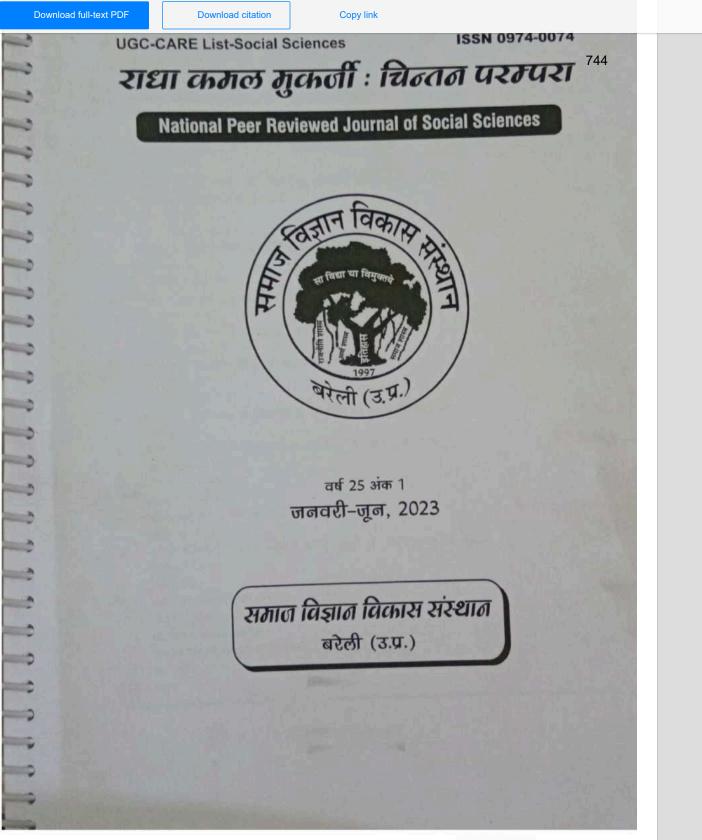
जनजाति समुदाय की परम्परायें मनमोहक, आकर्षक, भारत की विशेष पिछड़ी जनजाति बैगा गोदना के लिए जानी जाती है। बैगा महिलाओं के जीवन में गोदना परम्परागत अमिट देहकला के रूप में पीढ़ी दर पीढ़ी संचरित होता रहा है। कठिन पीड़ा और दुःख सहकर भी बैगा औरतें गोदना गुदवाती है। गोदना गुदवाना सीन्दर्य भावना के साथ-साथ धार्मिक एवं सांस्कृतिक विश्वासों से भी जुड़ा हुआ है। गोदना वह अभिव्यक्ति है जो बैगा जनजाति को अपने समुदाय से जुड़ाव की भावना हेतु प्रेरित करती है तथा जिसमें व्यक्ति के सुरक्षा भाव अंतर्निहित होते हैं। प्रस्तुत अध्ययन खेरागढ़-छुईखदान-गण्डई (के.सी.जी.) जिले के वैगा जनजाति के गोदना पर केन्द्रित है। बैगा महिलाओं की पहचान 'गोदना' आज भी प्रासंगिक है लेकिन बाह्य संपर्क, शिक्षा, शहरीकरण का प्रभाव, वदलते परिवेश एवं विचारों में परिवर्तन के कारण इसके प्रति आकर्षण में कर्मा आई है। वैगा जनजाति की वदलती सोच नें इन्हें संस्कृति की मूल जड़ों से काटकर फैशन एवं भौतिकता की भावना से जोड़ दिया है। प्रस्तुत शोध अध्ययन प्राथमिक एवं अनुभवजन्य शोधों पर आधारित है जिसमें बैगा जनजाति के गोदना में परिवर्तन को जानने हेतु समय को आधार बनाते हुए गोदना गुदवाने के कारण, प्रेरणा, आयु तथा गुदवाए गए अंगो का तुलनात्मक अध्ययन प्रस्तुत किया गया है। गोदना-प्रिय बैगा जनजाति के गोदना में परिवर्तन का यह अध्ययन गोदना के प्राचीन पहचान के कारणों व महत्व के नष्ट होने की दृष्टि से विशेप रूप से विचारणीय हो जाता है। रहते हैं। छत्तीसगढ़ में बेगा

जीवंत एवं विविधताओं से भरी हैं। जनजाति अपनी मौलिकता एवं कल्पनाशीलता के लिए जानी जाती है। भारत में कुल जनसंख्या के 8.6 प्रतिशत भाग में जनजातियाँ निवास करती हैं। भारत में कुल 705 अनुसूचित जनजतियों मे से 75 जनजातियाँ विशेष पिछड़ी जनजातियाँ है। में छत्तीसगढ़ राज्य कुल लगभग का जनसंख्या एक-तिहाई जनजाति निवास करती हैं। छत्तीसगढ़ की कुल 42 जनजातियों में 5 केन्द्र सरकार तथा 2 राज्य सरकार द्वारा मान्य विशेष पिछड़ी जनजाति हैं। वैगा जनजाति छत्तीसगढ़ की एक विशेष पिछड़ी जनजाति है। बैगा समृद्ध सांस्कृतिक विरासत कलात्मक जीवंत परम्पराओं एवं लोककलाओं के लिए जानी जाती है। बैगा छत्तीसगढ़ में सर्वाधिक कवर्धा, खैरागढ़-छुईखदान-गंडई, बिलासपुर, मुंगेली तथा कोरिया जिलें मे

🗅 शोप अष्येत्री समाजशास्त्र एवं समाज कार्य अष्ययनशाला पंडित रविशंकर शुक्ल विश्वविद्यालय रायपुर (छ.ग.) सह प्राध्यापक, समाजशास्त्र एवं समाज कार्य अध्ययनशाला पंडित रविशंकर शुल्क विश्वविद्यालय रायपुर (छ.ग.)

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(PDF) गोदना प्रिय बैगा जनजाति के गोदना में परिवेर्तन



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	जनसंख्या का एक-तिहाई जनजाति करती हैं। छत्तीसगढ़ 42 जनजातियों में सरकार तथा 2 राज्य द्वारा मान्य विशेष जनजाति हैं। बैगा छत्तीसगढ़ की एक विशे जनजाति है। बैगा छत्तीसगढ़ की एक विशे जनजाति है। बैगा सांस्कृतिक विरासत परम्पराओं एवं लोककलाओं के लि जाती है। बैगा छत्ती सर्वाधिक कवर्धा, छुईखदान-गंडई, वि मुंगेली तथा कोरिया रहते हैं। छत्तीसगढ़	वैगा जनजाति। 1 परम्पराये मनमोहल मैं से भरी मौलिकता के लिए मैं कुल करती हैं। अनुसूचित त्रचा है। में कुल लगभग त्रिया है। में कुल लगभग लगभग त्रिया है। में कुल लगभग लगभग के लुए पछडी में कुल तर्गातिया है। में कुल लगभग लियाम के कुल ट केन्द्र सरकार पिछडी समृद्ध कलात्मक जीवंत एवं विचा में कुल तगभग त्रियाहम् सरकार पिछडी समृद्ध कलात्मक जीवंत एवं विचा समृद्ध कतातने हैं सरकार पिछडी समृद्ध कतातने हैं सरकार पिछडी समृद्ध कतातने हैं सरकार पिछडी समृद्ध कतातने हैं सरकार पिछडी समृद्ध कतातने हैं सरकार पिछडी समृद्ध कतातने हैं के सुरक्षा पहचान के कुल पहचान के कुल पहचान के कुल कताति कतातने हैं के कारण समृद्ध कतातमक के कारण समृद्ध कतातने हैं के कारण सम् के कारण के के कारण के के कारण के कारण का	क. आकर्षक, विशेष पिछड़ी जन ती है। बैगा महिल असिट देहकला असते गोदना गुद औरते गोदना गुद गावना के साथ-सा से भी जुड़ा हुआ गा जनजाति को ता हेतु प्रेरित करत भाव अंतर्निहित इर्डवदान-गण्डई (वं के गोदना पर केनि गोदना' आज भी शवा, शहरीकरण व रो में परिवर्तन के आई है। बैगा जन हति की मूल जड़े की भावना से जं प्राधीमक एवं अनुभ बैगा जनजाति बे प्राधामक एवं अनुभ बैगा जनजाति बे प्राधीन पहचान के प्राधीन पहचान के	जनजाति की कुल जनन ने वैमा परिवारों की क	संख्या 89,744 है तथा छुईखवान दूल जनसंख्या 4357 है।' का माई'' शब्द से संबोधित करते हैं। प्रारंभ से ही ये जंगल को अपना घर समझते आये हैं तथा वहाँ के पेड़-पौधे, जीव-जन्तु तथा जंगली जानवरों के सहचर हो गये हैं। यह मूलरूप से जंगल पर निर्भर जनजाति है। इनके जीवन में शिक्षा, स्वास्थ्य तथा आवास का पूर्णत: अभाव रहा है। वैगा अपनी अर्थव्यवस्था के लिए शिकार, वैद्यकी, वनोपज तथा बेवाड़ कृषि पर निर्भर रहे हैं। शारीरिक बनावट की दृष्टि से बैगा जनजाति हण्ट-पुष्ट, गठीला बदन, चपटी नाक, श्याम वर्ग, चौड़े ललाट तथा मध्यम कद के होते हैं। वैगा पुरुष प्रधान समाज है परन्तु सबको स्वतंत्रता और समानता का अधिकार प्राप्त है। बैगा जनजाति की विशेष पहचान उसकी गोदना है। गोदना :- गोदना अर्थातु बैगा स्त्री का सौन्दर्य, शृंगार, आत्मा का अलंकरण, धर्म तथा संस्कार का प्रतीक, बीमारियों से मुक्ति तथा मरणोपरांत स्वर्ग लोक में साथ जाने वाली देहकला है।		
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डॉ. ममता सिरमौर वर्मा Page No. 191 - 197

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महिलाओं के विरुद्ध घरेलू हिंसा का समाजशास्त्रीय अध्ययन



### शोध सार

घरेलू हिंसा भारत में एक व्यापक समस्या है जो हर साल लाखों लोगों को प्रभावित करती है। यह एक जटिल मुद्दा है जिसके कई अंतर्निहित कारण हैं, जिनमें लैंगिक असमानता, आर्थिक तनाव और मादक द्रव्यों का सेवन शामिल है। घरेलू हिंसा शारीरिक हिंसा से लेकर भावनात्मक शोषण तक कई रूप लेती है और पीड़ितों के लिए इसके गंभीर परिणाम होते हैं, जिसमें शारीरिक और मनोवैज्ञानिक नुकसान, सामाजिक अलगाव और यहां तक कि मृत्यू भी शामिल है। हाल के वर्षों में, घरेलू हिंसा के मुद्दे के बारे में जागरूकता बढ़ी है और इस समस्या के समाधान के लिए प्रयास किए गए हैं। भारत सरकार ने घरेलू हिंसा के पीड़ितों की सुरक्षा के लिए कानून बनाए हैं और संगठन और हिमायती समूह इस मुद्दे के बारे में जागरूकता बढ़ाने और पीड़ितों को सहायता प्रदान करने के लिए काम कर रहे हैं। इन प्रयासों के बावजूद, घरेलू हिंसा भारत में एक महत्वपूर्ण समस्या बनी हुई है। कई

पीड़ित सामाजिक कलंक, बदले की कार्रवाई के डर और समर्थन प्रणाली की कमी के कारण दुर्व्यवहार की रिपोर्ट करने से हिचकते हैं। इसके अतिरिक्त, घरेलू हिंसा के कई अपराधियों को उनके कार्यों के लिए जवाबदेह नहीं ठहराया जाता है, जिससे दुर्व्यवहार का एक चक्र अनियंत्रित हो जाता है। इस शोध पत्र का उद्देश्य घरेलू हिंसा के कारणों, प्रभावों और निवारक उपायों का पता लगाना है। समस्या के अंतर्निहित कारणों और पीड़ितों पर इसके प्रभाव को समझकर, हम घरेलू हिंसा को रोकने और इससे प्रभावित लोगों का समर्थन करने के लिए प्रभावी रणनीति विकसित कर सकते हैं। हम आशा करते हैं कि यह शोध पत्र घरेलू हिंसा से निपटने के लिए चल रहे प्रयासों में योगदान देगा और सभी के लिए एक सुरक्षित, अधिक न्यायसंगत समाज का निर्माण करेगा।

### मुख्य शब्द

घरेलू हिंसा, लिंग आधारित हिंसा, समाजशास्त्रीय दृष्टिकोण.

### प्रस्तावना

घरेलू हिंसा एक व्यापक सामाजिक समस्या है जिसने दुनिया भर में महिलाओं को प्रभावित किया है, भले ही उनकी उम्र, नस्ल, जातीयता, धर्म और सामाजिक आर्थिक पृष्ठभूमि कुछ भी हो। यह एक ऐसा मुद्दा है जो सदियों से प्रचलित है और महिलाओं के अधिकारों और सुरक्षा के लिए सबसे महत्वपूर्ण खतरों में से एक बना हुआ है। घरेलू हिंसा के प्रभाव शारीरिक और मानसिक दोनों तरह से दर्दनाक हो सकते हैं, और अवसाद, चिंता और पोस्ट—ट्रॉमेटिक स्ट्रेस डिसऑर्डर (PTSD) जैसे दीर्घकालिक परिणाम हो सकते हैं।

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### कोविड-19 लॉकडाउन पश्चात् प्रवासी महिला मजदूरों का समाजशास्त्रीय विश्लेषण

#### चेतानंद जांगडे

### डॉ. एल.एस. गजपाल

हैं। कोविड-19 आंतरिक प्रवास का कारक है लेकिन दुर्भाग्य से यह रिवर्स माइग्रेशन है। प्रवास आम तौर पर ग्रामीण से शहरी क्षेत्रों में होता है लेकिन कोविड-19 के

कारण यह शहरी से ग्रामीण क्षेत्रों में भी दिख रहा है। भारत में कोविड-19 से होने वाले प्रकोप को आपदा घोषित कर दिया गया है। विश्व स्वास्थ्य संगठन ने अस्थायी रूप से इस नये वायरस 2019 को नोवेल कोरोना वायरस का नाम दिया एवं 12 फरवरी 2020 को अधिकारिक तौर पर इस संकामक रोग का नाम कोरोना वायरस 2019 रखा गया। गुह मंत्रालय द्वारा राष्ट्रीय आपदा प्रबंधन के बाद आपदा प्रबंधन अधिनियम 2005 के अंतर्गत महामारी प्राधिकरण (एनडीएमए) का 24 मार्च 2020 को आदेश जारी किया गया। अचानक लाकडाउन का आदेश और बंद परिवहन ने कई राज्यों में मानवीय संकट पैदा कर दिया क्योंकि भयभीत प्रवासी श्रमिक राजमार्गों के द्वारा हजारों किलोमीटर पैदल चलकर अपने घर जाने की कोशिश करते रहे

प्रवास एक जटिल परन्तु आधारभूत सामाजिक प्रक्रिया है, जिसकी सरलतापूर्वक व्याख्या कर पाना अत्यंत कठिन कार्य है। जटिल सामाजिक प्रक्रिया होने के साथ ही यह जटिल सामाजिक, आर्थिक एवं मनोवैज्ञानिक समस्याओं को जन्म देने का कारक होता है। सामान्य तौर पर किसी एक भौगोलिक क्षेत्र से दूसरे भौगोलिक क्षेत्र में सापेक्षतः स्थायी गमन की प्रक्रिया को ही प्रवास के नाम से जाना जाता है। दूसरे शब्दों में मनुष्य के निवास में परिवर्तन की घटना को ही प्रवास कहा जाता है। भारत में राष्ट्रव्यापी लॉकडाउन लागू किए जाने के कारण व्यवसायों, कारखानों और अन्य कार्यस्थलों के वंद होने के कारण देशभर के लाखों लोगों की आजीविका प्रभावित हुई। विशेष रूप से प्रवासी मजदूर सबसे वूरी तरह प्रभावित हुए क्योंकि उनमें से अनेकों को अपनी नौकरी ऐसी स्थिति में गंवानी पड़ी जिनके लिए सामाजिक सुरक्षा से संबंधित कोई भी योजनाएं नही थीं और ना वे परिवार के संपर्क में थे। प्रारंभ में अंतरराज्यीय यात्रा पर प्रतिबंध लगा दिया गया जिससे प्रवासी मजदूरों को सैकड़ों किलोमीटर तक घर वापस जाने के संवंध में समाचार के माध्यम से रिपोर्ट आने लगी। यात्रा प्रतिबंध हटा दिए जाने के पश्चातू 1.1 करोड़ अंतर्राज्यीय प्रवासी अपने राज्य लौट आए। प्रस्तुत शोध प्रवासी महिला मजदूरों के लॉकडाउन के पूर्व एवं पश्चातु की स्थिति उनसे होने वाली समस्या एवं प्रवास के कारणों पर आधारित हैं।

सूचक शब्द : लाकडाउन, प्रवासी मजदूर, सामाजिक सुरक्षा, कोविड महामारी।

लॅं**कडाउन को** कोविड-19 के प्रसार को रोकने के लिए व्यापक रूप से अनिवार्य विकल्प के रूप में स्वीकार किया जाता हैं। परंतु अधिकांश जनमत विशेष रूप से समाज के आर्थिक रूगं से कमजोर वर्गो दारा झेली गई कठिनाइयों को देखते हुए नागरिकों के कल्याण पर लॉकडाउन के समग्र प्रभाव पर विभाजित दिखाई देते हैं। कोविड-19 सबसे पहले चीन वुहान शहर में रिपोर्ट क किया गया था एवं इसके बाद ही दुनिया में विभिन्न देशों में तीव्रता के साथ विस्तार हुआ। लक्षणों की प्रारंभिक तिथि 1 दिसंबर 2019 थी एवं जो इनसे ग्रसित थे उनमें लक्षण कुछ इस प्रकार थे बुखार, थकान, सुखी खांसी एवं सांस लेने में दिक्कत होना r' सबसे बुरी तरह प्रभावित वर्गो में से एक वर्ग प्रवासी महिला मजदूरों का है। जो अपने परिवारों विशेष रूप से अपने पति के साथ रोजगार

हैं। उत्तर प्रदेश के 1.35 लाख प्रवासी मजदूर, बिहार के 10 लाख, महाराष्ट्र के 11 लाख प्रवासी मजदूरों ने राज्य छोड़ा है और 20.05 लाख ने गुजरात छोड़ा और

व आर्जीविका के अवसरों की तलाश में अपने गृह राज्य छोड़कर दूसरे राज्य जाते हैं तथापि कोविड 19 संकट ने इन मजदूरों को बेरोजगार, धनहीन और बेघर बना दिया

🗅 शोष अष्येता समाजशास्त्र एवं समाजकार्य अष्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.) प्राष्यापक समाजशास्त्र एवं समाजकार्य अथ्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

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### A Review on Child Sex-Ratio of Kabeerdham and Janjgir-Champa Districts of Chhattisgarh

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#### Abstract:

This research paper seeks to analyze the Child Sex-Ratio of Kabeerdham and Janjgir-Champa districts of Chhattisgarh which showed divergent trends in Child Sex-Ratio in 2011, with the former showing a thirteen-point increase and the latter a sixteen-point decline. These two districts have certain basic similarities in terms of percentage of Rural population, General population as a proportion of the Total population, besides near equal Child Sex-Ratios in 2001 Census (with Kabeerdham at 973 and Janjgir-Champa just four points behind at 969). Census data has been examined for understanding the temporal, spatial and social variation in Child Sex-Ratio in the study area. Temporal variation in Child Sex-Ratio has been analyzed over three decades starting with 1991 Census. Spatial variation has been examined across Rural/Urban populations as a whole as well as across specific Tehsils and towns. Social variation in Child Sex-Ratio is examined in terms of the Child Sex-Ratio of Scheduled Caste, Scheduled Tribe and General population.

Keywords: Child Sex-Ratio, Scheduled Tribe, Scheduled Caste, General population, spatial variation, social variation.

#### Introduction:

Child sex-ratio is the ratio of the number of girls to the number of boys in a given population of children below the age of six. It is a crucial indicator of the prevalence of gender discrimination in a society, as skewed sex-ratios can be indicative of a preference for male children over female children. This preference can manifest in various forms, such as female infanticide, sex-selective abortion, and neglect of female children's health and education.

In India, there has been a long-standing concern over declining child sex-ratios, particularly in certain regions and communities. The Indian government has implemented various measures to address this issue, including the Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act of 1994, which prohibits sex-selective abortion and regulates the use of pre-natal diagnostic techniques.

It is important to monitor child sex-ratios in different regions and communities to identify areas where gender discrimination may be prevalent and take measures to address it. However, it is also important to note that sex-ratios can be influenced by various factors, such as cultural and socioeconomic factors, and should not be used as the sole indicator of gender discrimination in a society.

Chhattisgarh, located in Central India is the ninth largest State of the country covering an area of 1,35,192 square kilometres. It is a landlocked State surrounded by Uttar Pradesh and Jharkhand in the North, Telangana in the South, Odisha in the East and Madhya Pradesh and Maharashtra in the West. 93 percent of the population are Hindus, 2 percent Muslims and 1.9 percent Christians followed by Buddhists, Sikhs and Jains. Chhattisgarhi is the most widely spoken language followed by Hindi while Urdu, Punjabi and Gujarati too are spoken by substantial numbers.

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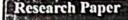
### शोध सार

भारत में महिला शिक्षा का इतिहास प्राचीन वैदिक काल से जंडा हुआ है। उल्लेखनीय है कि लगभग 3000 से अधिक वर्ष पूर्व वैदिक काल के दौरान महिलाओं को समाज में एक प्रतिष्ठित स्थान प्राप्त था और उन्हें पुरुषों के समान समाज का एक महत्वपूर्ण अंग समझा जाता थान-ब्रिटिश इंडिया काल में पहला ऑल-गर्ल्स बोर्डिंग स्कूल वर्ष 1821- में दक्षिण भारत के तिरुनेलवेली में स्थापित किया गया था। वर्ष 1840 तक स्कॉटिश चर्च सोसाइटी द्वारा दक्षिण भारत में निर्मित 06 स्कूल मौजूद थे जिनमें कुल 200 लड़कियों का नामांकन कराया गया था। वर्ष 1848 में पूर्ण में ज्योतिबा फूले एवं सावित्रीबाई फूले ने पूर्ण में प्रथम गर्ल्स स्कूल की स्थापना की। मद्रास मिशनरियों ने 1850 में स्कूल में लगभग 8000 से अधिक संडकियों का तामांकन कार्य किया था। वर्ष 1848 में पूर्ण में ज्योलिबा फूले एवं सावित्रीबाई फूले ने पूर्ण में प्रथम गर्ल्स स्कूल की स्थापना की। मद्रास मिशनरियों ने 1850

में स्कूल में लगभग 8000 से अधिक लड़कियों का नामांकन कार्य था। ईस्ट इंडिया कंपनी के कार्यक्रम वुड्स डिस्पैच ने वर्ष 1854 में महिलाओं की शिक्षा और उनके लिए रोजग्रासःकी आवश्यकता को स्वीकार किया । वर्ष 1879 में स्थापित बेथ्यून कॉलेज वर्तमान में एशिया का सबसे पुराना महिला कॉलेज है। स्वतंत्रता प्राप्ति के पश्चात प्रथम पंचवर्षीय योजना से महिला शिक्षा पर ध्यान केंद्रित किया गया। जनगणना 1951 के अनुसार भारत में महिला साक्षरता दर 9 प्रतिशत था जिसे उन्नत करने का लक्ष्य रेखा गुया। यही कारण है की 2011 की जनगणना अनुसार भारत में महिला शिक्षा का प्रतिशत बढ़कर 65 प्रतिशत हुआ है। आज महिलाएं शिक्षित होकर सामाजिक, आर्थिक एवं राजनैतिक विकास में अपना योगदान दे रहीं हैं। इस शोध आलेख में महिलाओं के सामाजिक, आर्थिक एवं राजनैतिक विकास में शिक्षा की भूमिका को ज्ञांत करने का प्रयास किया गया है। प्रस्तुत शोध आलेख द्वितीयक डाटा पर आधारित है। द्वितीयक डाटा का सारणीयन, विश्लेषण एवं प्रस्तुतीकरण कर तथ्यों को समझने का प्रयास किया गया है। द्वितीयक डाटा से प्राप्त आंकड़ों से स्पष्ट होता है कि महिलाएँ आज सामाजिक संस्थाओं के अध्यक्ष, सदस्य एवं सचिव के साथ अपने बच्चों के समाजीकरण के माध्यम से समाज का विकास कर रही हैं। ये अब परिवार के सभी प्रकार के कार्यों में अपनी सहभागिता सुनिश्चित कर रही हैं। पुरुष वर्ग द्वारा प्रत्येक कार्यों में महिलाओं से सहमति ली जा रही है। महिलाओं को अब प्रत्येक प्रकार के सरकारी एवं निजी क्षेत्रों में कार्य करते हुए देखा जा सकता है। महिलाएं अब पुरुषों के साथ कंधे से कंधा मिलाकर कार्य फर रही हैं। भारत सरकार के त्रिस्तरीय पंचायती राज व्यवस्था एवं संवैधानिक प्रावधानों के जरिये महिलाएं अब सरपंच, पंच, सचिव, पार्षद, महापौर और यहाँ तक की संसद एवं विधानसभाओं के सदस्य के रूप में सामने आ रही हैं। इस प्रकार शिक्षा ने महिलाओं का सर्वांगीण विकास किया है। 中点。 四天 内部 林门 武治

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### बैगा जनजाति के प्रमुख तीज त्यौहार एवं बदलते प्रतिमान का एक नृजातीय अध्ययन। (कबीरधाम एवं मुंगेली जिला के विशेष संदर्भ में )

डॉ.रश्मि कुजूर 1| डॉ संजय कुमार सिंह 2| डॉ.एन.कुजूर 3| चम्पा साह 3

1 सहायक प्राध्यापक शास.प.श्यामाचरण शुक्ल महाविद्यालय धरसींवा रायपुर, छत्तीसगढ़.

<sup>2</sup> सहायक प्राध्यापक शास.प.श्यामाचरण शुक्ल महाविद्यालय धरसींवा रायपुर, छत्तीसगढ़.

<sup>3</sup> प्राध्यापक एवं विभागाध्यक्ष समाजशास्त्र एवं समाजकार्य अध्ययन शाला प.रविशंकर शुक्ल वि.वि. रायपुर (छ.ग.)

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4 शोधार्थी समाजशास्त्र एवं समाज कार्य अध्ययन शाला पं.रविशंकर शुक्ल विश्वविद्यालय रायपुर, छत्तीसगढ़.

#### ABSTRACT:

प्रस्तुत शोध अध्ययन छत्तीसगढ़ राज्य के विशेष पिछड़ी जनजाति बैगा के प्रमुख तीज-त्यौहार एवं बदलते प्रतिमान का एक नृजातीय अध्ययन पर आधारित है। जिसके अंतर्गत बैगा जनजाति की प्रमुख पारंपरिक सांस्कृतिक तीज-त्योहारों का अध्ययन कर उसमें होने वाले वर्तमान परिवर्तन को भी दर्शाया गया है। प्रस्तुत अध्ययन कबीरधाम एवं मुगेली ज़िले के बोड़ला एवं लोरमी विकासखण्ड के बैगा निवासरत गौव बोदलपानी,सोनवाही,टिंगीपुर,एवं सुरहीगाँव के अध्ययन पर आधारित है। अध्ययन में तथ्य संकलन हेतु प्राथमिक एवं द्वितीयक तथ्यों का संकलन किया गया है प्राथमिक तथ्य संकलन हेतु साक्षात्कार निर्देशिका ,डायरी ,समूह वार्ता तथा द्वितीयक तथ्यों के संकलन हेतु विभिन्न पूर्व में किये गये शोध पत्र-पत्रिकाए, पुस्तक एवं ट्वेटानेट का उपयोग किया गया है। शोध अध्ययन से प्राप्त कात्म तथ्य संकलन हेतु साक्षात्कार निर्देशिका ,डायरी ,समूह वार्ता तथा द्वितीयक तथ्यों के संकलन हेतु विभिन्न पूर्व में किये गये शोध पत्र-पत्रिकाए,पुस्तक एवं ट्वेटानेट का उपयोग किया गया है। शोध अध्ययन से प्राप्त जानकारी के अनुसार बैगा जनजाति विभिन्न सांस्कृतिक तीज-त्योहारों जैसे,बिदरी,छेरता,फाग,छाया ढरना,नवाखाई (धान नवाखाई ,मक्का नवाखाई ,भाजी नवाखाई ) आठ साल नौ कार्तिक आदि पारंपरिक पर्वो का आयोजन करते है,जिसमें कुछ आंशिक परिवर्तन भी दिखाई दे रहा है जो इनके जीवन में विशेष महत्त्व रखते है।

स्टर्भ स्टर्भ स्टर्भ स्टर्भ स्टर्भ स्टर्भ स्टर्भ सांस्कृतिक तीज-त्यौहार एवं परिवर्तन ।

#### प्रस्तावनाः-

Kaufmann, W. (1941). Folk-Songs of the Gond and Baiga. The Musical Quarterly 1 में बैगा जनजाति को मध्य भारत की जनजाति बताया है जिसका निवास स्थान सतपुड़ा पर्वत के पूर्वी छोर मैकाल श्रेणी है बैगा जनजाति देश के मुल निवासी है जो आक्रमणकारियों के भय के कारण पहाड़ो एवं जंगलो में शरण ले लिया | वर्तमान में बैगा जनजाति अपनी सभी प्राचीन आदतों को बरकरार रखते हुए हिन्दू धर्म को अपना लिया है लेकिन अपनी प्राचीन रीति-रिवाजों को संरक्षित रखे हुए है | वर्तमान में बैगा जनजाति भारत देश के विभिन्न राज्यों मध्य प्रदेश, बिहार, झारखण्ड, पश्चिम बंगाल, एवं छत्तीसगढ़ में निवास करते है ,जो एक अत्यंत पिछड़ी एवं विलुप्तप्राय जनजाति है | एल्विन 2 ने अपने अध्ययन में बताया कि छत्तीसगढ़ में बैगा जनजाति सबसे पहले छोटा नागपुर के रास्ते से प्रवेश किया जो वर्त्तमान में छत्तीसगढ़ राज्य के विभिन्न जिलो कबीरधाम, मुंगेली, बिलासपुर, गौरेलापेंड्रामारवाही, राजनांदगांव, कोरिया, आदि क्षेत्रो में निवास करती है | बैगा आधुनिकता से दूर दुर्गम स्थनों जंगलो पहाड़ो में निवास करती है जो संस्कृति रूप से समृद्ध मानी जाती है जिनकी जीवन शैली संस्कार, कला, परम्परा एवं तीज-त्योंहारो, नीति नियम आदि अलग विशिष्ट होते हैं | जो बैगा जनजाति को एक अलग पहचान दिलाती है | प्रत्येक समाज का अपना एक सांस्कृतिक पक्ष होता है जिसके द्वारा हम किसी भी समाज को बेहतर ढंग से समझ सकते हैं, और इन्ही सांस्कृतिक पक्षों का एक विशिष्ट अंग होता है तीज –त्यौहार | सांस्कृतिक पक्ष किसी भी समाज की प्रतिबिम्ब को दर्शाता है | बैगा जनजाति के संस्कृति परम्परागत एवं प्राचीन है जो बैगा जनजाति को एक विशिष्ट पहचान दिलाती है ,वर्तमान में हम अपनी प्राचीन परमपराओ एवं संस्कारो में आधुनिकता को समाहित करते जा रहे हैं वैसे ही बैगा जनजाति के लोग आज भी अपनी परम्परा एवं प्राचीनता को बनाये हुए आधुनिक एवं हिन्दू परमपराओं को आंशिक मात्रा में सम्मिलित करते जा रहे है ने हम अपनी माँ के सीने पर हल नही चलाते हैं ,इसके साथ ही बैगा जनजाति प्राकृतिक औषधियों जड़ी – बूटियों को आरे में आधु हि बताते हैं | बैयॉकि इनकी मान्यता है की हम अपनी माँ करीने पर हल नही चगा जनजाति प्राकृतिक औषधियों जड़ी – बूटियों के बारे में अधिक जानकारी रखते हैं | बैगा जनजाति के लोग अपने स्यस्थ्य से सम्थ स्थत है है। जनजाति प्राकृतिक औषधियों जड़ी – बूटियों क बा

शोध अध्ययनों की समीक्षा :- जैसा की हमें ज्ञात है की बैगा जनजाति देश की एक अत्यंत पिछड़ी जनजाति है, इनका रहन–सहन, स्वास्थ्य, शिक्षा पेयजल की समस्या, सामाजिक-आर्थिक स्थिति, परम्परागत चिकित्सकीय ज्ञान ने कई शोधार्थियों का ध्यान अपनी ओर आकर्षित किया है जिसमें मानवशास्त्री, समाजशास्त्री, अर्थशास्त्रीय एवं मनोवैज्ञानिक के द्वारा शोध अध्ययन किये है |प्रस्तुत शोध अध्ययन में पूर्व में किये गये शोध साहित्यों का पुनरावलोकन करने का प्रयास किया गया है जो निम्न है-

भागवत डी. (1957)<sup>4</sup> ने द करमा में करमा अनुष्ठान, नृत्य,गीत के साथ करमा नृत्य के विभिन्न रूपों का वर्णन किया है जिसमें इन्होंने करमा को गोंड संस्कृति का स्वदेशी हिस्सा नहीं माना है बल्कि कोलारियान या मुंडा संस्कृति का उत्पाद माना है। इन्होंने अपने अध्ययन में स्पष्ट किया है की बैगा,मझवार और सावर वे लोग है जो मुख्य रूप से करमा का अभ्यास करते है और बाकि जनजातियों ने उनकी नकल की है, इसके साथ ही यह भी कहा है की करमा नृत्य केवल बिलासपुर कि जनजातियों द्वारा मनाया जाता है जिसे पूर्वी अनुष्ठानों के साथ मिला दिया गया है। यह नृत्य पुरे प्रान्त एवं हिन्दुओं में बहुत ही लोगप्रिय है जिसे गोलाकार प्रदर्शन की तकनीक के आकार में भिन्न-भिन्न चरण में प्रदर्शन करते हैं।

भागवत डी. (1968)<sup>5</sup>ने जनजाति त्यौहार का उल्लेख करते हुए कहा की जनजातियां त्योहारों के लिए उतने ही शौक़ीन है जितनी हम है फिर भी वे हमसे कहीं अधिक बेहतर त्योहारों के बारे में जानते हैं कि उनका आनंद कैसे लेना है। जनजातियों में त्यौहार के अवसरों पर मदिरा अपरिहार्य है |वहां रात भर नाच-गाना चलता रहता है और स्त्री –पुरुष व्यवहार प्राय:असंमित रहता है जहाँ इनके त्योहारों का हिस्सा अश्वील इशारे और अश्वील गाने भी होते हैं। इनके कई अनुष्ठानों और रीति-रिवाओं जैसे विवाह, अत्येष्टि संस्कारों ,फसल उत्सव फाग और सुअर बलि आदि में ऐसे औपचारिक दुरुपयोग अपरिहार्य है। इसके साथ ही साथ जनजाति अपने समारोहों एवं त्यौहार में अपने कुल देवी-देवताओं को रक्त और शराब अर्पित करते है, सभी जनजाति अपने इष्ट देवताओं को सुअर,बकरे,मुर्गी आदि चढ़ाते है।

1. रसेल हीरालाल (1936) मध्य प्रदेश की जनजाति का सबसे पहली बार चार खंडो में क्रमबद्ध विवरण प्रकाशित ''कस्टम एंड ट्राइब्स इन सेन्ट्रल प्रोविसेंज पुस्तक में किया।

2. एल्विन (1939)' ने ''द बैगा''में वैगा जनजाति को मिडिसीन में कहा है | उन्होंने बैगा जनजाति के वंश गोत्र समूह उत्पत्ति एवं सम्पूर्ण जीवन शैली का गहन अध्यन कर बताया की बैगा जनजाति जो है छत्तीसगढ़ में सबसे पहले छोटा नागपुर के रास्ते से प्रवेश किया था |जो वर्त्तमान में छत्तीसगढ़ राज्य के विभिन्न जिलो कबीरधाम, बिलासपुर, राजनांदगांव,कोूरिया,मुंगेली आद्वि क्षेत्रो में निवास

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### The Occupational Structure of Hill Korwa with Reference to Sarguja District (AbstractView.aspx?PID=2023-29-1-7)

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### मानव तस्करी से पीड़ित जनजातीय परिवारों की सामाजिक पृष्ठभूमि का समाजशास्त्रीय अध्ययन

### सुश्री ज्योति ठाकुर

### डॉ. निस्तर कुजुर

भूमि कि कमी, मौसमी खेती, सयुंक्त परिवार होने से भोज्य समाग्री कि कमी मुख्य कारण हैं।

विदुसी विमल' के अनुसार वड़े शहरों में आकर्षक

रोजगार प्रस्ताव अवैध व्यापार की धारा 1860 के अंतर्गत एक अपराध हैं, अनु.23(1) दलालों और एजेंटो द्वारा बेहतर के अंतर्गत भारत में मानव तरकरी निषिद्ध हैं, बच्चों व तथा आरामदायक जीवन देने का वादा, विवाह के लिए युवा लडकियों की माँग की जाती है। अत्यन्त गरीवी व वंचित होने. जागरूकता का अभाव, घरेलू हिंसा से पीड़ित लोग तस्करों के चगुलों में फँस जाते हैं। जीवनयापन के लिए उन्हें अपनी दैनिक आवशक्ताओं की पूर्ति के लिए प्रतिदिन संघर्ष करना पड़ता है। यहाँ तस्कर कॉफी संगठित हैं, जो वाहर से आकर प्रत्येक वर्ष शहरों एवं महानगरों में इन आदिवासी बहुल जिलों की लड़कियों को प्लेसमेंट, एजेन्सियों के द्वारा नौकरी दिलाने के नाम पर ले जाते हैं, और घरेलु काम एवं देह व्यापार में धकेल दिया जाता है। कुज़ुर निस्तर<sup>2</sup> के अनुसार आदिवासी क्षेत्रों में रोजगार का आभाव होना जिसके परिणाम स्वरूप जनजाति

सूचक शब्द : मानव तस्करी, आजीविका, वेरोजगारी, टिकाऊ साधनों तक पहुँच का अभाव, चुनौतियाँ। छत्तीसगढ़ राज्य भी मानव तस्करी की समस्या से अछूता

> महिलाओं को बहला फुसलाकर वेचा व खरीदा जाता हैं। उन्हें अन्य राज्यों या देशों में भेज दिया जाता है, देह व्यापार की मांग महिलाओं के शोषण को बढ़वा देती है, पुरूषों, वच्चों में मजदूरी व भीख मंगवाई जाती है, हर साल हजारों लोग मानव तस्करी के दुष्चक्र में फँस कर शिकार हो जाते हैं। जनजातीय समुदाय भी इस अपराध के दुष्चक्र से दूर नही हैं। जनजातीय समुदाय सदियों से विभिन्न समस्याओं का शिकार होता रहा है, इन समस्याओं में मानव तस्करी की समस्या एक प्रमुख समस्या है। यह समस्या संविधान की 5वीं अनुसूचित क्षेत्र संपूर्ण छोटानागपुर क्षेत्र (वर्तमान झाऱखण्ड, ओड़ीसा एवं छत्तीसगढ़) में देखने को मिलती है। पूर्वोत्तर छत्तीसगढ़ के जिला इस समस्या से जूझ रहे हैं, प्रस्तुत अध्ययन जशपुर जिला पर केंद्रित है। यहाँ, लोगों में उन्नत आजीविका के साधनों का अभाव है, परिणामस्वरूप जनजातीय परिवारों में बेरोजगारी, गरीबी प्रमुख समस्या है। बेहतर जीवन की खोज में इन परिवारों के युवा, युवती एवं महिलाएँ वड़ी संख्या में महानगरों में रोजगार के लिए पलायन करते हैं और ज्ञान व शिक्षा की कमी से आसानी से मानव तस्करों के चंगुल में फंस जाते हैं, तस्कर इन युवतियों का कई रूपों में शोषण करते हैं। समस्या इस स्तर तक पहुँच गयी है, कि प्रभावित क्षेत्रों में घरों के दीवारों पर "मानव तस्करों से सावधान" "मानव तस्करों का पता चलने पर इस नंबर पर डायल करे।" लिखा देखा जा सकता है।

नहीं है, यहां का जशपुर जिला मानव तस्करी एक वैश्विक समस्या हैं। मानव तस्करी IPC राज्य में मानव तस्करी समस्या से सबसे अधिक पीड़ित जिलों में से एक है। यूनिसेफ के सर्वेक्षण रिपोर्ट (2012-14) में बच्चों के 1500 मामले केवल छत्तीसगढ राज्य के जशपुर जिला के 05 विकासखण्डों में मानव तस्करी मामले दर्ज किये गये थे। छत्तीसगढ़ राज्य के जनजातीय वाहुल्य अन्य जिले भी मानव तस्करी की समस्या से जूझ रहे हैं। मानव तस्करी प्रत्येक समाज के लिये एक मुख्य चुनौती है, वहीं वर्तमान समय में छतीसगढ राज्य का आदिवासी बहुल जिला जशपुर मानव तस्करी का गढ़ बना हुआ है, जहाँ पर जनजाति सुमदाय भी तस्करी जैसी समस्या की चुनौतियों का सामना कर रहा है। इस जिले में उरांव, गोंड, पहाड़ी कोरवा, बिरहोर जनजातियाँ निवासरत हैं, विकास के अभाव

> महिलाएं बड़े रूपों में महानगरों की ओर पलायन करती हैं, रोजगार की तालाश में, अच्छे परिवार में कार्य मिलने की स्थिति में इनकी स्थिति ठीक होती है, वहीं परिवार

में जनजातीय परिवार भी रोजगार की कमी. गरीबी व अशिक्षा जैसे दंश झेल रहे हैं, परिणामस्वरूप यह समाज जीवनयापन हेतु रोजगार की तलाश में सदैव रहा है।

शोध अध्येत्री समाजशास्त्र एवं समाजकार्य अध्ययनशाला, पंडित रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.) प्रोफेसर एवं अध्यक्ष समाजशास्त्र एवं समाजकार्य अध्ययनशाला, पंडित रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

मानव तस्करी से पीड़ित जनजातीय परिवारों की सामाजिक पृष्ठभूमि का समाजशास्त्रीय अध्ययन (145)

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### मुरिया जनजातियों के वन से संबंधित देशज ज्ञान एवं परम्पराएं

धर्वजय फुमार नेताम शोध छात्र, सपावशास्त्र एवं समावकार्य अप्ययनशाला, पं. रविशंकर शुक्त विश्वविद्यालय, रायपुर (छ.ग.)

#### डॉ. निस्तर कुजुर

प्रोफेसर एवं अध्यक्ष, समाजशास्त्र एवं समाजकार्यं अध्ययनशाला. पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

ABSTRACT:

खतः जो बाते शामिल है वे इम प्रकार हैं- वन का महत्व एवं मान्यताएँ. वन से संबंधित समुदाय के गोत्र एवं टोटम संबंधी विचार, वनों में पशु---पक्षियों के संबंध में मान्यताएँ, वन का जीवन में शुभ-अशुभ संकेत, वन से प्राप्त किए जाने वाले जडी-बूटियों की जानकारी, नदी-नालों का महत्व एवं उपयोगिता, पेड-पौपों की उपयोगिता एवं शुभ-अशुभ के संकेत, वन में शिकार पद्धति एवं समय विशेष का ज्ञान, वनोपज की उप-लब्धता एवं पशु-पक्षियों के दृष्टिकोण से वन की उपयोगिता आदि इन सभी का परंपरागत एवं देशज ज्ञान के आधार पर अध्ययन किया गया है। जनजाति समुदाय में बहुतायत से खाना बनाने हेतु मिट्टी के बर्तन और भोजन करने हेतु अधिकाशंत: दोना-पत्तल का उपयोग किया जाता है। वांस शिल्प के माध्यम से बांस से बनी टोकनी एवं अन्य सामग्री का निर्माण किया जाता है। बांस का चटाईनुमाटहे बना कर आवास में दरवाजोंऔर सैठने के लिए चटाई की तरह भी उपयोग किया जाता है।

बस्तर में सरई (सौल) वृक्षों से देके वन जो यहाँ की जनजातियों को बाग्हमासी आय के साधन प्रदान करते हैं.सरई (साल) के पेड़ से रोना .पतल निर्माण, साल बीज का संग्रहण एवं विक्रय, साल पेड से घुद का संग्रहण, सरई (साल) के वनों से बासात में एक विशेष सम्जी के रूप में सभी जनजातीय महिलाएँ बोड़ा संग्रहण कर बाजार में विक्रय करती है इससे भी अच्छा आर्थिक सहयोग मिलता है। सरई बुध भी महुआ और सस्फी वृक्ष की भाँति बस्तर के जन-जीवन के लिए अति महत्वपूर्ण हैं। वनों में चार वृक्ष से चिरौंजी का संग्रहण ग्रीप्म ऋतु में जन-जातियों के द्वारा किया जाता है बस्तर के प्रायः सभी जिलों में इसकी उपलब्धता हैं। डब्लूग्रिग्सन लिखते है कि - "बस्तर में अकाल कभी भी एक समस्या नहीं रही है, क्योंकि मारिया और अन्य जनजातियां हमेशा अपने विशाल बंगलों के असंख्य खाच उत्पादों की आपूर्ति का आधा हिस्सा प्राप्त करने में सक्षम रही हैं।"' महुआ वृक्ष जनजातियों के लिए विशेष महत्व का वृक्ष है इनकी धार्मिक एवं सांस्कृतिक आस्था के लिए अधिक महत्वपूर्ण एवं उपयोगी रही है। तेन्दूपता को हरा सोना के रूप में बाना जाता है और आर्थिक सुदुढ़ता के लिए जनजाति जीवन में इसकी प्राचीनकाल से उपयोगिता रही है। ऐसा नहीं है कि मुरिया

अनआतीय जीवनयापन एवं अर्थव्यवस्था का मूल आपार वन ही रहा है प्राचीनकाल से जनआतीव समुदाव वनोपज एवं शिकार के माण्यम से दिनचर्या के सभी आवश्यकताओं की पूर्ति करते आये है। वनों पर नि-भेरता ही इनकी मूल पहचान रही है चाहे वनों से भोजन संकलन, पेंदा कृषि से उन्नत कृषि तक का सफर, औषधियाँ, वनोपज, आवास से लेकर पोल् उपयोग के लिए लकड़ी, पशुओं के लिए चारागाह, आखेट एवं मनोरंजन आदि सभी आवश्यकताएँ वनों के माण्यम से ही पूर्ति करते रहे हैं। वनों को अपने आश्रयदाता के रूप में मुरिया जनजाति स्वीकार काता है और उनका संरखण भी करता रहा है चाहे वह अपने टोटम के रूप में या अपनी देवीय शाकियों के रूप में हो। प्रकृति पुत्र के रूप में ये आदिवासी समुदाय अपनी आवश्कताओं की पूर्ति के लिए ही प्रकृति का दोहन करते है और किसी भी प्रकार से अनावश्यक दोहन करना इनकी परंपना नहीं रही है।

बस्तर के परिप्रेश्य में देखे तो वनोपज के रूप में जनजातियों की जीविका का मुख्य स्रोत साल बीज, चार (चिरौजी). महुआ, टोग, हर्ग, आंवला, बेहडा, इमली, शहद, जड़ी-बूटी, लाख, लास, पूप, तेन्दू फल एवं तेन्दूपता आदि का संग्रहण करते हैं साथ ही विभिन्न औवधियो का भी ज्ञान जनजातियों में है।बस्तर के पर्वतीय एवं क्रुसि क्षेत्रों में ऊहाँ अन्य बाहमी लोगों से संपर्क नहीं रहा वहाँ पर वन संसाधन ही जीवन-वापन के साधन रहे हैं, ऐसे बहुत से क्षेत्र है जहाँ पर वन संसाधन ही जीवन-वापन के साधन रहे हैं, ऐसे बहुत से क्षेत्र है जहाँ पर वन संसाधन ही जीवन-वापन के साधन रहे हैं, ऐसे बहुत से क्षेत्र है जहाँ पर पुरिया आदिवासी अपनी सम्पूर्ण जीवन की आवस्यकता हेतु वर्नो पर ही निर्पर हैं, सालपर वनों से फल-फूल, कंद-मूल एवं अन्य सामधियों की प्राप्ति मुलभ रहती है, वर्नो में इनका जीवन ऐसे पुला हुआ है कि इन्हें आधुनिकता एवं भौतिकता की कोई सुध नहीं रहती। अनुभवी बुजुर्ग पीढ़ी जो लगभग जीवन के आखिरी सोपन पर है उनकी दिनचर्या हमें बहुत प्रभावित करती है प्रकृति के हरेक परिवर्तन का भलीभौति आंकलनऔर उनसे सामंबस्य एक अदितीय अनुभव है। प्रस्तावना

जीवन की आधारभूत आवश्यकताओं में वन के योगदान और बनबातियों की निर्भरता को इम उनके दैनिक दिनचर्या से जोड़कर देख सकते हैं। बस्ठर के मुरिया बनबाति का वन संबंधी देराव ज्ञान में प्रमु-

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बस्तर के मुरिया जनजाति का देशज ज्ञान एवं अभ्यास:एक नृजातीय अध्ययन

### धनंजय कुमार नेताम

शोध छात्र, समाजशास एवं समाजकार्य अध्ययनशाला,

एव

### डाँ. निस्तर कुजूर

प्रोफेसर एवं अध्यक्ष, समाजशास्त्र एवं समाजकार्यं अप्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

### ABSTRACT :

देशब ज्ञान बीवन जीने की कला एवं उन्तत दिशा का मार्ग प्रशस्त करता है। देशब ज्ञान का सदुपयोग जीवन को सहब, सरल, सु-मधुर बनाता है। देशब ज्ञान प्रकृति से सामंखस्य कराता है। यह कहना अतिश्वोक्ति नहीं होगी कि मुरिया जनजाति इस कला में सिरमौर रही है देशब ज्ञान सुबनात्मक कार्यों का बन्मदाता है देशब ज्ञान की श्रृंखला मुरिया समुदाय में अद्भुत रही है। भरण-पोषण से लेकर जीवन के प्रत्येक आयाम में इनकी रचनात्मकता और बौध्दिकता का विशुध्द अनुपम प्रतिरूप देखने को मिलता है।

बस्तर की मुरिया जनजाति अपनी सांस्कृतिक विरासत तथा जीवनशैली के लिए विश्व प्रसिद्ध है। यहाँ निवास करने वाली जनजातियों में मुरिया जनजाति की अपनी विशिष्ट सांस्कृतिक परंपरा रही है, इनके जीवन जीने का बेजोड़ देशज झान इन्हें प्रकृति से जोड़े रखता है और प्रकृति एवं जंगल में छिपे बहुमूल्य औषधियों के ज्ञान से परिपूर्ण जीवनशैली अन्य जनजातियों से पृथक करती है, आजीविका के साधन, वनों से भोजन प्राप्त करने की कला, कृषि के देशज व पारंपरिक झान, स्वास्थ्य देखभाल एवं जड़ी-बूटियों की प्रयोग विधि तथा बेबोड़ आस्था एवं अनूठे सामाजिक संस्कार, तीज त्यौहार तथा प्राकृतिक एवं दैवीय शक्तियों पर अटूट श्रध्दा वाले समुदाय संसार में विरले में ही दुष्टिगोचर होते हैं। समुदाय में देशज ज्ञान की पद्धति एवं उनकी जीवान्तता को निरंतर बनाये रखने में इनकी योगवानपीढ़ी दर पीढ़ी अनवरत रही है। इनकी सांस्कृतिक एवं सामाजिक रचनात्मकता जीवन के हरेक पक्ष में दर्शनीय है।

#### प्रस्तावना(Introduction)

बस्तर की मुरिया जनजाति जो अपनी विशेष सपृद्ध संस्कृति और विशिष्ट वेशभूषाओं तया पारम्परिक देशज झान के लिए समूचे विश्व में प्रसिद्ध है बस्तर लोक संस्कृति यहाँ की जनजातीय परंपरा की देन है, इनके जीवनगैली अन्य समाज या समुदाय से फिन्न और अन्हे हैं। इनकी सांस्कृतिक विरासत एवं शिक्षा का केन्द्र गोटुल आदिकाल से संस्कृति की अतिरल धारा प्रवाहित करता रहा है। मुरिया जनजाति जीवन विविधताओं और विशिष्टाताओं से भरा है। मुरिया जीवन शैली पारिस्थितिकीय तन्त्र के आधार पर ही संचालित एवं गतिमान होती ही समुदा के पारंपरिक स्वास्थय देखभाल में पारिस्थितिकीय तन्त्र का विशेष महत्व होता है, उसे पिछली पीढी से ही मालूम होता है कि वन के किस हिस्से में कौन से पौधे की उपलब्धता देखभाल में पारिस्थितिकीय तन्त्र का विशेष महत्व होता है, उसे पिछली पीढी से ही मालूम होता है कि वन के किस हिस्से में कौन से पौधे की उपलब्धता है और उक्त पौधा मिलने का सही समय कौनसा है, वह अपने इसी देशज ज्ञान के सहारे दुर्गम क्षेत्र में अपने जीवन को संभव बनाता है। मुरिया जनजाति में देशज ज्ञान की समझ सामुदायिक आधार पर होती है, क्योकि इनमें किसी एक बीमारी के उपचार के लिए किसी खास तरह के, एक समान अच्यास विधि को अपनाया जाता है, दूसरे शब्दों में इसे हो से समुदायिक उपयोग कर रहा है। प्रस्तु शोध पत्र में मुरिया जनजाति के प्रार्था स्व हे जई। बूटी संबंधी ज्ञान है जिसका बीमारी के उपचार में समुदाय उपयोग कर रहा है। प्रस्तुत शोध पत्र में मुरिया जनजाति के प्रार्थारिक स्वास्थ्य देखभाल में सामुदायिक एवं देशज ज्ञान की उपयोगिता वर्तमान में कहां तक है, स्पष्ट करने का प्रयास किया गया है।

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Madhya Bharti (मध्य भारती) ISSN: 0974-0066 UGC Care Group I Journal Vol-85, July - December: 2023

### मुरिया जनजाति के स्वाध्य देखभाल में सामुदायिक एवं देशज ज्ञान की उपयोगिताः एक समाजशास्त्रीय अध्ययन

धनंजय कुमार नेताम शोध छात्र, समाजशास एवं समाजकार्य अध्ययनशाला,

> आकाश छिकारा (भा.प्र.से.) कलेक्टर, जिला गरियार्बद

#### एवं

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प्रोफेसर एवं अध्यक्ष, समाजशास्त्र एवं समाजकार्य अघ्ययनशाला,

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### **ABSTRACT**:

### सारांश:

विविधताओं और विशिष्टाताओं से भरे मुरिया जीवन शैली परिस्थितिकीय तन्त्र के आधार पर ही संचालित एवं गतिमान होती है। समुदाय के पारंपरिक स्वास्थ्य देखभाल में परिस्थितिकीय तन्त्र का विशेष महत्व होता है, समुदाय कोपीढी दर पीढ़ी ज्ञात रहा है कि वन केकिस क्षेत्र में कौन से औषधि पौधे की उपलब्धता है और उक्त औषधि पौधा मिलने का उचित समय तथा संग्रहण की विधि कौनसी है, वह अपने इसी देशज ज्ञान के सहारे दुर्गम क्षेत्र में अपने जीवन को संभव बनाती है। मुरिया जनजाति में देशज ज्ञान की समझ सामुदायिक आधार पर होती है, क्योकि इनमें किसी एक बीमारी के उपचार के लिए किसी खास तरह के, एक समान अभ्यास विधि अपनाई जाती है, दूसरे शब्दों में कहें तो इसे सामुदायिक उपचार विधि कहा जा सकता है। मुरिया समुदाय के समक्ष बीमारी के उपचार संबंधी कई जड़ी-बूटी का ज्ञान है जिसका वे बीमारी के उपचार में उपयोग कर रहेहें। प्रस्तुत शोध पत्र में मुरिया जनजाति के पांपरिक स्वास्थ्य देखभाल में सामुदायिक एवं देशज ज्ञान की उपयोगिता वर्तमान में कहां तक है जानने का प्रयास किया गया है।

प्राकृतिक रूप से मुरिया जनजाति शांत, सुसंस्कृत, सरल एवं सभ्य मानी जाती है इनकीबनावटीपन तथा भौतिकता से दूरी स्वाभाविक है। जंगलों में आदिकाल से निवासरत होने के कारण मुरिया समुदाय एक स्वच्छन्द वातावरण में जीवन-यापन करते रहे है। प्रकृति प्रेमी होने एवं प्रकृति से सम्पूर्ण आवश्यकता की वस्तुएं अर्जित करने के कारणइनकी जीवन शैली अन्य समुदायो से पृथक ही रही है।बस्तर की मुरिया जनजाति का जीवन पहाड़ी एवं घने वर्नो के साथे में फलता-फूलता आया है जहाँ आधुनिक चिकित्सा सुविधाओं का नितांत अभाव रहा।आजादी के 75 साल बाद भी बस्तर के कई दुर्गम व संवेदनशील क्षेत्र हैं जहाँ आज भी चिकित्सा सुविधा के लिए मीलों चलकर जाना पड़ता है। ऐसी परिस्थितियों में आदि काल से अपनी पीढ़ी को जीवित रखते हुए आधुनिक युग तक का सफर करना उनकी जीवन शैली के साथ-साथ स्वास्थ्य के प्रति सगजता की ओर संकेत करता है।कई महामारियाँ और बीमारियाँ जो मनुष्यों के लिए घातक होती हैं और जिनके इलाज

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### A Modified Regression Type Estimator Using Two Auxiliary Variables

### Vyas Dubey, Yeesha Verma

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\*Corresponding Author: yeeshav11@gmail.com

### ABSTRACT

In this paper, a modified regression type estimator has been proposed for estimating population mean using two auxiliary variables under simple random sampling. The optimum properties of proposed estimator is determined and we find that the proposed estimator is more efficient than the Desraj (1965) and Srivastva (1967). Empirical studies have also done to demonstrate the efficiency of the proposed estimator.

**KEYWORDS:** Auxiliary variables, Bias, Mean Square Error, Relative Efficiency, Simple Random Sampling without Replacement (SRSWOR).

### 1. INTRODUCTION

The purpose of the survey sampling is to get accurate information about the population characteristics for improving the efficiency of the estimator under study. The use of the auxiliary information fulfills this purpose. If the study variable (y) and auxiliary variable (x) are linearly related Hansen, Hurwitz and Madow (1953) suggested difference method of estimation for estimating population mean.

Let  $\overline{y}$  and  $\overline{x}$  be sample means of y and x respectively based on sample of size n drawn from a population of size N and let  $\overline{X}$  be known population mean of x. The difference estimator is define as

$$\overline{\mathbf{y}}_{\perp} = \overline{\mathbf{y}} + \beta (\overline{\mathbf{X}} - \overline{\mathbf{x}})$$

(1.1)

Where B is constant. Modifying in this estimator Bedi and Hajala (1984) suggested estimator

$$\mathbf{t}_{\perp} = \mathbf{W} \left[ \overline{\mathbf{y}} + \beta \left( \overline{\mathbf{X}} - \overline{\mathbf{x}} \right) \right]$$

Where W is constant, in general  $t_1$  is more efficient than  $\bar{y}_d$ . Further Modifying in difference estimator Dubey and Singh (2001) suggested new estimator

$$t_{2} = W_{1}\bar{y} + W_{2}\bar{x} + (1 - W_{1} - W_{2})\bar{x}$$
(1.2)

Where  $W_1$  and  $W_2$  are suitable chosen constants. The estimator  $t_2$  is more efficient than  $t_1$  if  $\overline{X}$  lies between  $(0,2\overline{Y})$  i.e.  $0 < \overline{X} < 2\overline{Y}$ 

In many practical situations it is easily see that the study variable y-related to two or more auxiliary variables. Let as consider another auxiliary variable z. Using two auxiliary variables Desraj (1965) and Srivastva (1967) proposed estimator as

$$\mathbf{t}_{x} = \mathbf{W}_{x} \left[ \mathbf{\bar{y}} - \boldsymbol{\beta}_{xx} \left\{ \mathbf{\bar{x}} - \mathbf{\bar{X}} \right\} \right] + \left( \mathbf{I} - \mathbf{W}_{x} \right) \left[ \mathbf{\bar{y}} - \boldsymbol{\beta}_{yx} \left( \mathbf{\bar{z}} - \mathbf{\bar{Z}} \right) \right]$$
(1.3)

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### A Transformed Product Type Estimator of Population Mean

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#### Abstract

The paper deals with a transformed product type estimator for the population mean. Properties of proposed estimator are studied under simple random sampling without replacement. It is seen that the suggested estimator is more efficient then Reddy (1974) transformed ratio estimator up to  $0(n^{-2})$ . Numerical illustrations have been

Keywords: Auxiliary Information; Bias; Mean Square Error (MSE); Relative Efficiency; Simple Random Sampling without Replacement (SRSWOR)

#### 1. Introduction

In many practical situations, auxiliary information (x) is used for estimating population mean  $\overline{Y}$  of a study variable (y). If variables are highly positively correlated, ratio estimator is used. Let  $\hat{Y}$  and  $\hat{X}$  be sample means of y and x respectively based on any sampling design, and let  $\overline{X}$  be known population mean of x, ratio estimator is define as - 1/

$$\overline{Y}_{i} = \overline{Y} \frac{A}{\hat{X}}$$
(1)

$$B\left(\overline{Y}_{r}\right) = \overline{Y}(V_{02} - V_{11})$$
<sup>(2)</sup>

$$M(\hat{Y}_{r}) = \bar{Y}^{2} (V_{20} + V_{02} - 2V_{11})$$
(3)

where 
$$V_{ij} = \frac{\mu_{ij}}{\overline{Y}^{i} \overline{X}^{j}}$$
,  $\mu_{ij} = E(\hat{\overline{Y}} - \overline{Y})^{i} (\hat{\overline{X}} - \overline{X})^{j}$ 

Using the fact that ratio estimator is generally positively biased, adjustment should be done in denominator, Walsh (1970) proposed almost unbiased ratio estimator

$$\overline{Y}_{r_1} = \overline{\overline{Y}} \frac{X}{K\overline{X} + (1 - K)\overline{X}}, \text{ where } K = \frac{V_{11}}{V_{02}}$$

$$\tag{4}$$

If variables are passes through the origin, ratio estimator is equally efficient as regression estimator  $\hat{Y}_{tr} = \hat{Y} + \hat{Y}$  $b(\bar{X} - \bar{X})$ , where b is sample regression coefficient of y on x. When it is not passes through origin Reddy (1974), using a transformation on variable x by x+dx in ratio estimator proposed a transformed ratio estimator. The estimator so obtained is same as (4). Again using a different type of transformation, Reddy further conclude that the estimator (4) is suitable for negatively correlated variables also. If variables are negatively correlated, Murthy (1964) suggested product estimator for estimating  $\overline{Y}$  as

$$\overline{\widehat{Y}}_{\rho} = \overline{\widehat{Y}} \frac{\widehat{X}}{\overline{\widehat{X}}}$$
(5)

which is negatively biased. Bias of  $\hat{Y}_p$  is given by

$$B(Y_p) = YV_{11} \tag{6}$$

$$M(Y_p) = \overline{Y}^2 (V_{20} + V_{02} + 2V_{11})$$
In section 2, we define a transformed as 1 (7)

In section 2, we define a transformed product estimator and studied its properties.

### 2. Proposed Estimator

Let us consider a transformation on auxiliary variable x by x+dx in product estimator, we proposed a transformed product estimator



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### An Almost Unbiased Estimator of Population Mean Using Multi-auxiliary Variables

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#### Abstract

In this paper, we propose an almost unbiased estimator of population mean using multi-auxiliary variables. We have obtained bias and mean square error (MSE) of the suggested estimator and its efficiency has been compared with all the other existing estimators. It is theoretically shown that the proposed estimator is more efficient than existing estimators under defined conditions. In addition, we support these theoretical results with the aid of a numerical example. Again, efficiency of estimators is compared using simulation technique.

Keywords: Multi-auxiliary Variables; Bias; Mean Squared Error (MSE); Simple Random Sampling Without Replacement (SRSWOR); Order of Approximation

#### 1. Introduction

In sample surveys the information on auxiliary character X is used to increase the efficiency of the estimators. Such information is generally used in ratio, product and regression type estimators for the estimation of population mean of study variable Y. When correlation between X and Y are positive, ratio method of estimation is used. If X and Y are negative, product method of estimation is preferred. Further if the correlation between X and Y are linearly related, regression method of estimation is used. Consider a finite population U of N units, let variables X and Y taking values  $x_i$  and  $y_i$  on the  $i^{th}$  unit of the population. Let a sample of size n

is drawn from the population using SRSWOR. Further let  $\overline{Y}$  and  $\overline{X}$  be unbiased estimators of population mean  $\overline{Y}$  and  $\overline{X}$  of variables X and Y. Then the ratio, product and difference estimators are correspondingly defined as

$$\hat{\overline{Y}}_r = \frac{\overline{Y}}{\hat{\overline{X}}} \overline{X}$$
(1)

$$\overline{\mathbf{Y}}_{\mathbf{p}} = \frac{1}{\overline{\mathbf{X}}} \overline{\mathbf{X}} \tag{2}$$

 $\overline{Y}_{d} = \overline{Y} + \beta_{01} \left( \overline{X} - \overline{X} \right)$ (3) where  $\beta_{01}$  is regression coefficient of Y and X. In general difference estimators is known to be more precise than acting the product estimators. Prov (1969) studied that ratio estimators is more efficient than expression estimators.

ratio and product estimators. Rao (1969) studied that ratio estimator is more efficient than regression estimator for small populations. For increasing efficiency of usual estimators, Srivastava (1967) suggested ratio-comproduct estimator  $(2.5)^{4}$ 

$$\tilde{\overline{Y}}_{\alpha} = \tilde{\overline{Y}}\left(\frac{\overline{X}}{\overline{X}}\right)$$
(4)

which is equally efficient as difference estimators  $\overline{\hat{Y}}_d$  up to first order of approximation but this estimator is a biased estimator. For reductions bias of ratio estimator  $\overline{\hat{Y}}_r$ , Reddy (1974) suggested ratio estimators

$$\frac{\mathbf{\dot{\overline{Y}}}_{0}}{\mathbf{\overline{X}} + \mathbf{0}\left(\mathbf{\hat{\overline{X}}} - \mathbf{\overline{X}}\right)}$$
(5)

up to the terms of order n<sup>-1</sup> the estimators are unbiased and is equally efficient as  $\hat{\overline{Y}}_d$ . In case of availability of multi-auxiliary variables  $X_1, X_2, ..., X_p$ , let a simple random sample  $(x_{1i}, x_{2i}, ..., x_{pi})$  (i = 1,2,...,n), from the population is observed. Let  $\hat{\overline{X}}_i$  be unbiased estimators of population mean  $\overline{X}_i$  of  $X_i$  (i = 1,2,...,p); respectively

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JOURNAL OF STATISTICS, OPTIMIZATION AND DATA SCIENCE VOL: 1. ISSUE 2. (DECEMBER 2023), PP:36-48 . ISSN: 2583-2462

### A Note on Variance Estimation Using Multi-Auxiliary Information

### Reena<sup>a</sup> and Vyas Dubey<sup>b</sup>

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#### ARTICLE HISTORY

Compiled January 15, 2024

#### ABSTRACT

In this paper we explore the problem of estimation of finite population variance in simple random sampling without replacement by utilizing information of multiauxiliary variables. We propose an almost unbiased multivariate estimator that has a smaller mean squared error than the conventional biased multivariate estimators. In addition, we support these theoretical result with the aid of a numerical investigation and simulation study into the performance of the estimator has been made.

### KEYWORDS

Auxiliary information, Bias, Mean Squared Error, Simple random sampling without replacement (SRSWOR). Relative efficiency, simulation technique.

#### 1. Introduction

In sample surveys the information on auxiliary character X is used to achieve higher precision in the estimates of some population parameters such as the mean or the variance of the study variable. It is well established that when the auxiliary information is to be used at the estimation stage, the ratio, product and regression methods of estimation are widely used in many situations. When correlation between study variable Y and auxiliary variable X are positive, ratio method of estimation is used. If correlation between Y and X are negative, product method of estimation is preferred. Further if the correlation between Y and X are linearly related, regression method of estimation is used.

Let  $Y_i$  and  $X_i$  be the measurement in respect of the study variable Y and the auxiliary variable X respectively, on the *i*th unit of the population of size N from which a random sample of size n is drawn. Further let  $s_y^2$  and  $s_x^2$  be unbiased estimators of population variance  $S_y^2$  and  $S_x^2$  of variables Y and X. Now assume that the problem is to estimate the population variance

$$S_y^2 = \frac{1}{N-1} \sum_{i=1}^{N} (y_i - \overline{Y})^2,$$

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International Journal of Statistics and Reliability Engineering Vol. 9(2), pp. 201-205, 2022 (ISSN(P): 2350-0174 ; ISSN(O):2456-2378)

#### ORIGINAL ARTICLE

### An Estimator of Population Mean Using Auxiliary Information for Small Samples

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#### Abstract

In this paper a new class of estimators for estimating population mean under general sampling design has been proposed. The expressions of bias and mean square error of the suggested estimator are derived. For the optimum choice of constants it is more efficient than other existing estimators. Further properties of the proposed estimator are discussed under simple random sampling without replacement procedure. Numerical illustrations have been made.

Keywords: Auxiliary Information; Bias; Mean Squared Error (MSE); Relative Efficiency; Simple Random Sampling without Replacement (SRSWOR): Order of Approximation.

#### 1. Introduction

In sample survey literature, the use of information on auxiliary variable is a common practice to find out more precise estimate of population parameters .If study and auxiliary variables are highly positively correlated, the ratio method of estimation is used while in case of negative correlation, product method of estimation is used. If such variable are linearly related difference method [Hansen, Hurwitz and Madow (1953)] of estimation is

Let  $U = \{U_1, U_2, \dots, U_N\}$  be a finite population of size N. Let a sample of size n is drawn from the population using simple random sampling without replacement. Further, let y and x be study and auxiliary variables taking values  $y_i$  and  $x_i$  on the i<sup>th</sup> unit of U respectively. Let sample means  $\overline{y}$  and  $\overline{x}$  be unbiased estimators of population mean  $\overline{Y}$  and  $\overline{X}$  of variables  $\mathcal{Y}$  and  $\overline{x}$  respectively. Then, for estimating  $\overline{Y}$  ratio, product and difference estimators are defined as  $\tilde{v}_{r} = \frac{\tilde{v}}{\tilde{X}} \tilde{X}$ 

$$\vec{v}_{p} = \frac{\vec{v}}{\vec{X}} \cdot \vec{v}$$
(1.1)

$$\overline{y}_d = \overline{y} + \beta \left( \overline{X} - \overline{x} \right) \tag{1.2}$$

where  $\beta$  is regression coefficient of y on x. In general, difference estimator is known to be more precise than

For improving efficiency of above estimators, Chakraborty (1967), Srivastava (1971), Reddy (1974), Ray and Sahai (1980) and others proposed generalized ratio-cum-product estimators. Further, Bhal and Tuteja (1991), Singh and Vishwakarma (2007), Kadilar (2016) and others discussed exponential type estimators. But all such estimators have minimum mean square error equal to difference estimator up to first order of approximation. Under the assumption that population variance of auxiliary variable is known. Das and Shrivastava and Jhajj (1981) suggested

$$t_1 = \overline{y} + \alpha_1(\overline{x} - \overline{x}) + \alpha_2(S_x^2 - s_x^2)$$

Where  $s_x^2 = \frac{1}{(n-1)} \sum_{i=1}^n (x-\overline{x})^2$  is an unbiased estimator of  $S_x^2 = \frac{1}{(N-1)} \sum_{i=1}^N (x_i - \overline{x})^2$ . The estimator  $t_1$  is more efficient then all the above estimators for asymmetric populations.

In section 2, we propose a new estimator of population mean. It is seen that the proposed estimator is more

### 2. Proposed Estimator

Let  $\hat{\vec{Y}}$  and  $\hat{\vec{X}}$  be unbiased estimators of  $\vec{Y}$  and  $\vec{X}$ , respectively, under any sampling design and let  $V(\hat{\vec{X}})$  be variance of  $\hat{X}$  which is assumed to be known. Then we propose an estimator of  $\hat{Y}$ 

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Suggestions and recommendations a) Social media should positively highlight various schemes for children so that students' financial knowledge is enriched.

 b) Introduction of part-time courses for stock market knowledge through banks promoting D-MAT accounts

c) Steps should be taken to increase financial literacy.

d) Abolition of capital gains tax rates.

e) Various programs should be organized to increase the knowledge of investors regarding risk avoidance in Stock market.

f) Efforts should be made to attract investors even by presenting actual demonstration. Reference:

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### A study of research attitude among the research scholars of the state universities in the subject of education

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#### Abstract :

Research is a key to possible solution for any problem in the daily life of human. The statistics related to research in Indian universities are in worrying condition. One of the main factors is the research attitude of the research scholars. This study is to determine the research attitude of research scholars of education subject in State University of U. P. It is clear that the overall research attitude of the male and female scholars is similar. The significant difference found in male and female scholars on dimension 'usefulness of research in professional career'.

Key words: Higher Education, State University, Research.

Introduction :

Higher education is vital to keep pace विद्यावाता: Interdisciplinary Multilingual Refereed Journal ImpactFactor 9.154(IIJIF)



### A Study of Secondary Level Teachers' Attitude Towards The Use of Technology in Teaching

\*Amitesh Kumar Singh, \*\*Namrata Singh

#### Abstract

In this research, the researcher studied the attitude of secondary level teachers towards the use of technology in teaching. The study method was descriptive survey in nature. Statistical population of the study has consist of secondary level teachers in the academic year 2019-2020. Sample of 60 teachers was collected through the random sampling technique. Standardised tool used for collecting data and analysing by mean. SD and t-test statistical techniques. The results indicated that the teacher's attitude towards the use of technology in teaching is positive.

### Introduction

Education is an environment with a developmental process, which is used to bring changes in the thinking, attitude and behaviour of every person. Due to no technological development in the Vedic era's education system, education was given only in oral form. But, gradually innovation and printing system developed, due to which the ideas of teachers were printed in theform of books. Technological development influenced education in each period. It increases the speed and ease of learning, quality, varieties efficiency, integrity and confidence in students. It also influence the institution including administration, time table, project work and text distribution etc. Teachers use tools ranging from multimedia presentations to computer simulations to excel their teaching. Technology has made teaching-learning process like assessment, examination system etc. It is more relevant to the learner and connected to real life.

#### Technology

Use of scientific knowledge in daily life. Initially the word technical means, any work in which scientific knowledge or principles should be used in the field of education. Technology is a broad term that often describes a discipline devoted to techniques or ways to make learning more efficient (Earle, R.S., 2000). Educational technology refers to a systematic approach that is used to design and evaluate teaching learning methods.

Today, new discoveries are being made in the field of education, due to which new teaching methods and teaching principles are constantly being presented. There is a need for systematic use of new teaching methods,

new tools and teaching aids to make teaching learning effective. Generally seen in the field of education, some teachers do not show positive attitudes towards new technologies and develop a fear when confronting them. In India there is need for enhancing the teaching-learning skills of the teachers with the help of technology.

In this study, attitude of secondary schools' teachers of Kanpur district towards the technology in teaching was studied.

### Technical words of the study

Secondary level Education: Secondary level education covers classes 9 to 12 of higher secondary school. Students at this level study the following general subjects, such as English, Hindi, Social Science, Science and Mathematics and other elective courses.

Secondary level Teachers : Teachers teaching in Classes 9-10 of the U.P. Board and CBSE Board Schools.

Use of Technology in Teaching : Methods and Instruments used in Teaching in classroom.

Attitude : Thinking of teachers towards the use of technology in teaching.

### Variables

Independent variables: Use of Technology in Teaching

#### Dependent variables: Teacher's Attitude

#### **Control variables:**

- Secondary level (9-10 class) Teachers,
- U.P. Board and CBSE Board

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Research Paper / Article

### शिक्षकों के आत्म -सक्षमता का विद्यार्थियों की शैक्षिक उपलब्धि पर पडने वाले प्रभाव का अध्ययन

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<sup>2</sup> डॉ. पद्मा अग्रवाल, <sup>3</sup> डॉ. (श्रीमती) सुमनलता सक्सेना 1 क. प्रीति सिंह,

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सारांश : प्रस्तुत अध्ययन का उद्देश्य उच्चतर माध्यमिक स्तर के शिक्षकों की आत्म-सक्षमता का विद्यार्थियों की शैक्षिक उपलब्धि पर पड़ने वाले प्रभाव को ज्ञात करना है । अध्ययन हेतु सर्वेक्षण विधि का प्रयोग किया गया है । सोद्देश्य न्यादर्श विधि द्वारा दुर्ग जिले के शहरी एवं ग्रामीण क्षेत्र में स्थित उच्चतर माध्यमिक विद्यालयों के कक्षा बारहवी में अध्यापन करने वाले 110 शिक्षकों एवं 550 विद्यार्थियों का चयन न्यादर्श के रूप में किया गया है। शिक्षकों के आत्म-सक्षमता के मापन के लिए सूद एवं सेन द्वारा निर्मित शिक्षक आत्म-सक्षमता मापनी (2017) का प्रयोग किया गया है एवं विद्यार्थियों की शैक्षिक उपलब्धि को पूर्व कक्षा में प्राप्त प्राप्तांक के आधार पर ज्ञात किया गया है । प्राप्त प्रदत्तों का एक दिश प्रसरण विश्लेषण से सांख्यिकीय विश्लेषण करने पर निष्कर्ष प्राप्त हुआ कि उच्चतर माध्यमिक स्तर पर अध्ययनरत विद्यार्थियों की शैक्षिक उपलब्धि शिक्षको की आत्म-सक्षमता से सार्थक स्तर पर प्रभावित होती है ।

मुख्य शब्द : शिक्षक, आत्म-सक्षमता, विद्यार्थी, शैक्षिक उपलब्धि, उच्च माध्यमिक स्तर ।

### 1. प्रस्तावनाः

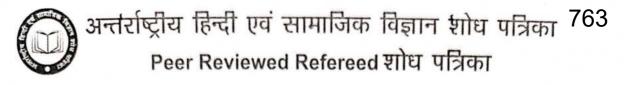
शिक्षक अपने छात्रों के सर्वागीण विकास में सार्थक भूमिका निभा सकते है। शिक्षकों को अपनी आत्म-सक्षमता का ज्ञान होना आवश्यक है, जिससे कि वे अपनी क्षमता का उपयोग अध्यापन कार्य में आने वाली समस्याओं का समाधान करने में कर सकते है। छात्र का अवधान नवीन चीज पर सीखने के लिए केन्द्रित करना, विषय को रूचिकर बनाना, शिक्षण अधिगम सामग्री की व्यवस्था करना, कक्षा वातावरण को अधिगम के लिए उपयुक्त बनाना, आवश्यक सामग्री की व्यवस्था करना, विद्यालय प्रबंधन से समायोजन एवं बालकों के सीखने की इच्छाशक्ति के दृढ़ीकरण में अध्यापक का प्रयत्नशील रहना महत्वपूर्ण है जिसमे शिक्षकों की आत्म-सक्षमता का महत्वपूर्ण योगदान होता है। बैण्डुरा ने आत्म-सक्षमता शब्द को प्रयोग किया है। आत्म – सक्षमता की अवधारणा बैण्डुरा के सामाजिक अधिगम सिद्धांत पर आधारित है। बैण्डुरा के अनुसार आत्म-सक्षमता से तात्पर्य एक ऐसे आत्म - प्रत्यक्षण से होता है जिसमें व्यक्ति यह अनुमान लगाता है कि वह किसी दी हुई परिस्थिति में कितने प्रभावकारी ढंग से कार्य कर सकता है । बैण्डुरा (1977) ने आत्म-सक्षमता को लोगों को अपनी क्षमताओं में अपने स्वंय के कार्यी द्वारा वांछित प्रभाव उत्पन्न करने के विश्वास के रूप में परिभाषित किया है।

मोजावजी अहमद एवं तमीज मरजीह (2012) ने छात्रो के उपलब्धि पर शिक्षक आत्म -सक्षमता के प्रभाव का अध्ययन कर निष्कर्ष प्राप्त किया कि शिक्षक आत्म- सक्षमता छात्रों की प्रेरणा और उपलब्धि पर सकरात्मक प्रभाव डालती है। खान (2012) ने माध्यमिक स्तर पर शिक्षक की आत्म-सक्षमता और छात्रों की शैक्षिक उपलब्धि के मध्य संबंध पर अध्ययन किया । निष्कर्ष निकाला कि गणित और अंग्रेजी दोनो विषयों में शिक्षक की आत्म-सक्षमता और छात्र की शैक्षिक उपलब्धि के मध्य सार्थक संबंध है। **हवांग** (2015) ने आत्म -सक्षमता और शैक्षिक उपलब्धि के मध्य संबंध - एक 5 साल का पैनल विश्लेषण किया ।अध्ययन से ज्ञात हुआ कि आत्म - सक्षमता, विश्वास और शैक्षिक उपलब्धि के मध्य पारस्परिक संबंध है। **शहजाद एवं सजिदा (2017)** ने माध्यमिक विद्यालय के छात्रों की शैक्षिक उपलब्धि पर शिक्षक आत्म–सक्षमता के प्रभाव का अध्ययन किया । निष्कर्ष में पाया गया कि शिक्षक आत्म – सक्षमता और छात्रों की शैक्षिक उपलब्धि के मध्य एक सार्थक सहसंबंध है। स्वर्णलता (2019) ने शिक्षक आत्म –सक्षमता का माध्यमिक विद्यालय के छात्रों की शैक्षिक उपलब्धि पर प्रभाव का अध्ययन कर कि छात्रों की शैक्षिक उपलब्धि पर शिक्षकआत्म-सक्षमता का सार्थक सकरात्मक प्रभाव है ।

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उच्चतर माध्यभिक विद्यालय के शिक्षकों के आत्म-सक्षमता एवं शिक्षक प्रमावशीलता के मध्य

संबंध का अध्ययन डॉ. प्रीति सिंह

सहायक प्राध्यापक अध्यापक शिक्षा संरथान पं.रविशंकर शुक्ल विश्वविद्यालय रायपुर छ.ग.

शोध सार – प्रस्तुत अध्ययन में शहरी एवं ग्रामीण क्षेत्र के उच्चतर माध्यमिक विद्यालयों में कार्यरत शिक्षकों के आत्म–सक्षमता एवं शिक्षक प्रभावशीलता के मध्य संबंध का अध्ययन किया गया है। अध्ययन का उद्देश्य शिक्षकों के आत्म–सक्षमता, शिक्षक प्रभावशीलता को ज्ञात करना तथा शिक्षकों के आत्म–सक्षमता एवं शिक्षक प्रभावशीलता के मध्य पाए जाने वाले संबंध को ज्ञात करना है। यादृच्छिक न्यादर्श का प्रयोग कर कुल 80 शिक्षकों का चयन न्यादर्श हेतू अध्ययन में किया गया है। डाटा संकलन के लिए डॉ. विशाल सूद एवं सपना सेन द्वारा निर्मित शिक्षक आत्म –सक्षमता स्केल एवं शिक्षक प्रभावशीलता के मापन के लिए डॉ. प्रमोद कुमार एवं डी.एन.मुथा द्वारा निर्मित शिक्षक प्रभावशीलता मापनी का प्रयोग अध्ययन में किया गया है। कार्ल पीयर्सन द्वारा प्रतिपादित गुणनघात विधि का उपयोग कर डाटा का सांख्यिकीय विश्लेषण किया गया है। अध्ययन से निष्कर्ष प्राप्त हुआ कि शहरी क्षेत्र में कार्यरत शिक्षकों की आत्म–सक्षमता एवं शिक्षक प्रभावशीलता में संबंध नहीं है, जबकि ग्रामीण क्षेत्र में कार्यरत शिक्षकों की आत्म-सक्षमता एवं शिक्षक प्रभावशीलता में सार्थक संबंध है।

बीज शब्द – उच्चतर माध्यमिक विद्यालय, शिक्षक, आत्म–सक्षमता, शिक्षक प्रभावशीलता।

प्रस्तावना – शिक्षक समाज की इकाई है जो कि समाज की भावी पीढ़ी के निर्माण में सहायक है। विद्यालय एक लघु परिवार है जहाँ बालक शिक्षकों के सानिध्य में रहकर एक सामाजिक प्राणी बनता है। छात्रों की अधिगम प्रक्रिया में अध्यापक की भूमिका अत्यंत महत्वपूर्ण है जो प्रत्यक्ष अथवा अप्रत्यक्ष दोनो ही रूप में छात्रों के व्यवहार को प्रभावित करती है। शिक्षक का व्यवहार, शिक्षण विधि एवं उसके कार्य का छात्रों पर प्रभाव पड़ता है। शिक्षक अपने छात्रों के सर्वागीण विकास में सार्थक भूमिका निभा सकते है। कभी – कभी विद्यालय में ऐसी परिस्थिति उत्पन्न हो जाती है कि कोई कार्य असंभव लगने लगता है तब हमारा मनोबल जाग्रत होता है और हम यह सोचने लगते है कि इस कार्य को किस प्रकार पूर्ण किया जा सकता है। व्यक्ति अपने अंदर निहित क्षमता को पहचानने की कोशिश करने लगता है और उस क्षमता का प्रयोग कर कार्य को पूर्ण करता है। यही क्षमता व्यक्ति की आत्म-सक्षमता है। इसी प्रकार अपनी आत्म-सक्षमता का प्रयोग शिक्षक अपने शिक्षण कार्य में करते है। सर्वप्रथम बैण्डुरा ने आत्म–सक्षमता शब्द को प्रयोग में लाया। "आत्म–सक्षमता से तात्पर्य एक ऐसें आत्म–प्रत्यक्षण से होता है जिसमें व्यक्ति यह अनुमान लगाता है कि वह किसी दी हुई परिस्थिति में कितने प्रभावकारी ढंग से कार्य कर सकता है। "

एक अच्छे शिक्षक से कुछ महत्वपूर्ण गुणों की अपेक्षा की जाती है जिसके अंतर्गत व्यक्तिगत एवं शैक्षिक योग्यता, विषय में निपुणता, बाल मनोविज्ञान का ज्ञान, नयी शिक्षण पद्वतियों का ज्ञान, शिक्षण सामग्री निर्मित करना, शिक्षा में नई—नई तकनीकियों का ज्ञान, प्रयोगशाला का ज्ञान, विशिष्ट बालकों का

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## उच्चतर माध्यमिक स्तर पर अध्ययनरत विद्यार्थियों की शैक्षिक चिंता का अध्ययन

\* प्रीति सिंह

### सारांश

प्रस्तुत शोध में उच्चतर माध्यमिक विद्यालयों में अध्ययनरत विद्यार्थियों के शैक्षिक चिंता का अध्ययन किया गया है। शोध अध्ययन वर्णनात्मक अनुसंधान प्रकार का है, जिसमें आंकड़ों के संकलन हेतु सर्वेक्षण विधि का प्रयोग किया गया है। यादृच्छिक न्यादर्श विधि के माध्यम से दुर्ग जिले के शहरी एवं ग्रामीण क्षेत्र में स्थित उच्चतर माध्यमिक विद्यालय का चयन एवं साद्देश्य न्यादर्श विधि के प्रयोग से चयनित उच्चतर माध्यमिक विद्यालय में अध्ययनरत कुल 240 विद्यार्थियों का चयन किया गया है। सूद एवं आनंद द्वारा निर्मित शैक्षिक चिंता सूची के प्रयोग से विद्यार्थियों की शैक्षिक चिंता का मापन किया गया है। प्राप्त आंकड़ों का सांख्यिकीय विश्लेषण मध्यमान, प्रामाणिक विचलन एवं टी-परीक्षण द्वारा करने पर परिणाम ज्ञात हुआ कि शहरी और ग्रामीण क्षेत्र में स्थित उच्चतर माध्यमिक विद्यालय में अध्ययनरत विद्यार्थियों की शैक्षिक चिंता में सार्थक अंतर नहीं है। इसी प्रकार संकाय के आधार पर विज्ञान, कला एवं वाणिज्य विषय का अध्ययन करने वाले विद्यार्थियों की शैक्षिक चिंता में सार्थक अंतर नहीं पाया गया है। निष्कर्ष में कहा जा सकता है कि विद्यालय की स्थिति एवं संकाय के आधार पर विद्यार्थियों की शैक्षिक चिंता में सार्थक अंतर नहीं है।

### प्रस्तावना

शैक्षिक चिंता तनाव या भय की भावनाओं को संदर्भित करती है जो शैक्षिक कार्यों से जुड़ी होती है। चिंता संवेग का एक प्रकार है, जो भय के कारण उत्पन्न होती है। किशोरावस्था में विद्यार्थियों में सकरात्मक एवं नकरात्मक दोनो प्रकार के संवेग होते है, जिसकी अभिव्यक्ति में भी परिवर्तन आता रहता है। किशोरावस्था में संवेगात्मक शक्ति का प्रवाह तेज होने के कारण उस पर नियंत्रण रखना कठिन होता है। जब विद्यार्थी किसी डर, आशंका एवं परेशानी से भयभीत होते हैं तब वह चिंता की अवस्था में होते हैं। जब भय बहुत समय तक विद्यार्थियों में रहता है तो इससे उनमें चिंता की उत्पत्ति होती है। विद्यालयों में अध्ययन करते समय विद्यार्थियों में प्रायः अपने कक्षा व्यवहार, पठन-पाठन विषय एवं परीक्षा में प्रदर्शन से संबंधित चिंता देखी जाती है, जैसे-जैसे परीक्षा का समय निकट आता है विद्यार्थियों में चिंता का होना स्वाभाविक है। कम स्तर की शैक्षिक चिंता वास्तव में शैक्षिक लक्ष्यों को प्राप्त करने में सहायक हो सकती है परन्तु उच्च स्तर की शैक्षिक चिंता विद्यार्थियों की शैक्षिक सफलता के लिए हानिकारक हो सकती है। अतः विद्यार्थियों को अपनी शैक्षिक चिंता के प्रति जागरूक होना आवश्यक है। फ्रायड के अनुसार चिंता तीन प्रकार की होती है- वास्तविक चिंता, तंत्रिकातापी चिंता एवं नैतिक चिंता। शैक्षिक चिंता वास्तविक प्रकार की चिंता है क्योंकि इस प्रकार की चिंता भविष्य के प्रति आंशका से डर कर उत्पन्न होती है। वास्तविक चिंता बाह्य वातावरण पर अहं की निर्भरता से उत्पन्न होती है।

### संबंधित शोध अध्ययन

कक्कड़ (2014) ने हिन्दी और अंग्रेजी माध्यम के छात्रों में शैक्षिक चिंता का स्तर का अध्ययन कर परिणाम ज्ञात किया कि शैक्षिक चिंता पर शिक्षा के माध्यम का कोई प्रभाव नहीं है। बंगा (2014) ने माध्यमिक विद्यालय के विद्यार्थियों के शैक्षिक चिंता का अध्ययन कर बताया कि माध्यमिक विद्यालय के विद्यार्थियों के मध्य शैक्षिक चिंता का स्तर कम है। बिहारी (2014) ने माध्यमिक विद्यालय के विद्यार्थियों के मध्य शैक्षिक चिंता का लिंग, निवास और विद्यालय के प्रकार के संबंध में अध्ययन किया। अध्ययन से ज्ञात हुआ कि लिंग और निवास का माध्यमिक विद्यालय के विद्यार्थियों के द्वारा अनुभव की गई शैक्षिक चिंता में भूमिका नही है, जबकि विद्यालय के प्रकार का विद्यार्थियों की शैक्षिक चिंता मे एक प्रमुख भूमिका है। खेमका एवं राठोड़ (2016) ने माध्यमिक विद्यालय के छात्रों की शैक्षिक चिंता का अध्ययन कर निष्कर्ष प्राप्त किया कि अशासकीय विद्यालय के बालकों की तुलना में शासकीय विद्यालय के बालकों में शैक्षिक चिंता अधिक पायी गयी। शासकीय विद्यालय की छात्राओं की तुलना में अशासकीय विद्यालय की छात्राओं में शैक्षिक चिंता अधिक थी। राव एवं चतुर्वेदी (2017) ने लिंग एवं स्थानीयता के संबंध में माध्यमिक विद्यालय के विद्यार्थियों की शैक्षिक चिंता का अध्ययन किया। निष्कर्ष में शहरी और ग्रामीण क्षेत्रों में स्थित माध्यमिक विद्यालय के विद्यार्थियों की शैक्षिक चिंता में सार्थक अंतर पाया गया। शर्मा एवं शकिर (2019) ने उच्चतर माध्यमिक विद्यालय के विद्यार्थियों की शैक्षिक चिंता का अध्ययन स्थानीय एवं विद्यालय के प्रकार

सहायक प्राध्यापक, अध्यापक शिक्षा संस्थान, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छ.ग.

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### शिक्षक प्रभावशीलता का विद्यार्थियों के शैक्षिक चिंता पर पड़ने वाले प्रभाव का अध्ययन

### डॉ. प्रीति सिंह\*

### सारांश

प्रस्तुत अध्ययन में उच्चतर माध्यमिक विद्यालय में अध्यापन करने वाले शिक्षकों की शिक्षक प्रभावशीलता और उनके द्वारा शिक्षित विद्यार्थियों की शैक्षिक चिंता पर पड़ने वाले प्रभाव का अध्ययन किया गया है। अध्ययन का उद्देश्य शहरी एवं ग्रामीण क्षेत्र में स्थित उच्चतर माध्यमिक विद्यालय में कार्य करने वाले शिक्षकों की शिक्षक प्रभावशीलता का विद्यार्थियों की शैक्षिक चिंता पर पड़ने वाले प्रभाव को ज्ञात करना है। स्तरीकृत न्यादर्श के प्रयोग से शहरी एवं ग्रामीण क्षेत्र में स्थित उच्चतर माध्यमिक विद्यालयों से 110 शिक्षकों एवं उद्देश्यपूर्ण न्यादर्श का प्रयोग कर न्यादर्श में चयनित शिक्षकों के 550 विद्यार्थियों का चयन शोध अध्ययन में किया गया है। शिक्षक प्रभावशीलता के मापन हेतु कुमार एवं मुथा द्वारा निर्मित शिक्षक प्रभावशीलता माापनी एवं शैक्षिक चिंता के मापन हेतु सूद एवं आनंद द्वारा निर्मित शैक्षिक चिंता सूची का प्रयोग किया गया है। एक दिश प्रसरण विश्लेषण का प्रयोग कर प्राप्त आंकड़ो का सांख्यिकीय विश्लेषण किया गया है। परिणाम में उच्चतर माध्यमिक विद्यालयों में अध्यापन करने वाले शिक्षकों की शिक्षक प्रभावशीलता का विद्यार्थियों की शैक्षिक चिंता पर सार्थक प्रभाव पाया गया है।

बीज शब्द : शिक्षक प्रभावशीलता, उच्चतर माध्यमिक विद्यालय, शिक्षक, विद्यार्थी, शैक्षिक चिंता

### प्रस्तावना

शिक्षक का समाज में एक महत्वपूर्ण स्थान है। वह सामाजिक अभियन्ता है जो समाज में नयी चेतना एवं ज्ञान का प्रसार करता है। शिक्षक का अपनी क्षमता, योग्यता एवं नैतिकता से बालकों को शिक्षित कर उसके सामाजीकरण करने में महत्वपूर्ण योगदान है। शिक्षकीय कार्य एक महत्वपूर्ण दायित्व है। शिक्षक देश के लिए भावी नागरिकों को निर्मित करते हैं। विद्यार्थियों के शारीरिक, मानसिक, बौद्विक, नैतिक ,सामाजिक गुणों को विकसित करना एवं उसमे छिपी हुई प्रतिभा को पहचानने का कार्य शिक्षक अच्छी तरह से कर सकते हैं। पाठ्यक्रम की संरचना इस प्रकार होती है कि शिक्षक पाठ्यक्रम सहायक गतिविधियों के माध्यम से विद्यार्थियों के विकास में उन्हे निर्देशित कर सहायता प्रदान करते हैं। शिक्षक को शिक्षकीय कार्य करने से पहले अपने छात्रों के मानसिक स्तर, पढ़ाए जाने वाले विषय के बारे में छात्रों की जानकारी को ज्ञात करना होता है। शिक्षण करते समय शिक्षक छात्रों को शिक्षित करने के लिए शिक्षण सहायक सामग्री का प्रयोग करते हैं जिससे छात्रों में विषय के प्रति समझ विकसित होने में सहायता मिलती है। कक्षा में शिक्षण करने के लिए शिक्षक पढ़ाए जाने विषय के किसी एक प्रकरण पर पाठ योजना तैयार करते हैं जिसमें कक्षा शिक्षण में प्रयोग किए जाने वाले शिक्षण विधि, प्रविधि, सूत्र , शिक्षण सहायक साम्रगी, विषय वस्तु का प्रस्तुतीकरण, कक्षा कार्य एवं गृह कार्य का वर्णन होता है। इसी प्रकार शिक्षण कार्य व्यस्थित होता है। शिक्षण कार्य के दौरान ही शिक्षक अपने विद्यार्थियों को सीखने में आ रही कठिनाईयों की

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Review

### Therapeutic potential and novel formulations of ursolic acid and its derivatives: an updated review

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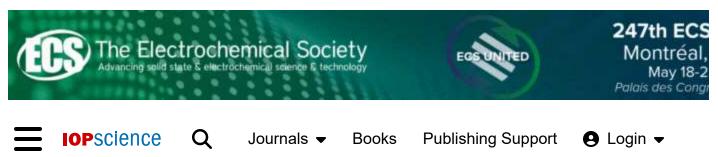
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### Abstract

Plants produce biologically active metabolites that have been utilised to cure a variety of severe and persistent illnesses. There is a possibility that understanding how these bioactive molecules work would allow researchers to come up with better treatments for diseases including malignancy, cardiac disease and neurological disorders. A triterpene called ursolic acid (UA) is a pentacyclic prevalent triterpenoid found in fruits, leaves, herbs and blooms. The biological and chemical aspects of UA, as well as their presence, plant sources and biosynthesis, and traditional and newer technologies of extraction, are discussed in this review. Because of its biological function in the creation of new therapeutic techniques, UA is a feasible option for the evolution and medical management of a wide range of medical conditions, including cancer and other life threatening diseases. Despite this, the substance's poor solubility in aquatic environments makes it unsuitable for medicinal purposes. This hurdle was resolved in many different ways. The inclusion of UA into various pharmaceutical delivery approaches was found to be quite effective in this respect. This review also describes the properties of UA and its pharmacokinetics, as well as therapeutic applications of UA for cancer, inflammatory and cardiovascular diseases, in addition to its anti-diabetic, immunomodulatory, hepatoprotective and anti-microbial properties. Some of the recent findings related to novel nano-sized carriers as a delivery system for UA and the patents related to the applications of UA and its various derivatives are covered in this



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## NGC 5216: An interesting galaxy with a sign of merging activity

Amit Kumar Tamrakar and Laxmikant Chaware Published under licence by IOP Publishing Ltd Journal of Physics: Conference Series, Volume 2576, 2nd National Conference on Signal Processing, Sustainable Energy Materials and Astronomy & Astrophysics 2023 16/03/2023 - 18/03/2023 Raipur, India Citation Amit Kumar Tamrakar and Laxmikant Chaware 2023 J. Phys.: Conf. Ser. 2576 012013 DOI 10.1088/1742-6596/2576/1/012013

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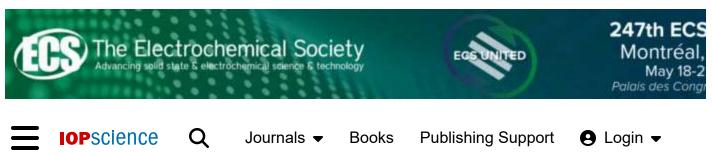
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### Abstract

We present results of isophotal shape analysis of an interesting elliptical galaxy *NGC 5216* with a clear sign of merging activity with its companion galaxy NGC 5218. We have used r-bands image analysis of the galaxy from Sloan Digital Sky Survey Data Release 9 (i.e. SDSS DR9) to perform bulge-disk decomposition of the light profile of the galaxy. We look for the correlation between systematic departure of isophotes from pure ellipses along the semi-major axis of the galaxies. The contour image of the galaxy clearly indicates that stellar mass exchange is taking place via a star forming bridge. The estimated B/T value confirms its morphology as an elliptical galaxy.





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## Photometric Study of the nuclear region of the galaxy NGC 5689

Mahendra Verma, Avinash Singh and Laxmikant Chaware Published under licence by IOP Publishing Ltd Journal of Physics: Conference Series, Volume 2576, 2nd National Conference on Signal Processing, Sustainable Energy Materials and Astronomy & Astrophysics 2023 16/03/2023 - 18/03/2023 Raipur, India Citation Mahendra Verma *et al* 2023 *J. Phys.: Conf. Ser.* **2576** 012014 DOI 10.1088/1742-6596/2576/1/012014

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### Abstract

The nuclear regions of the galaxies are fascinating. It contains a vital clue about galaxy formation and evolution. This letter presents a detailed photometric study of the galaxy NGC 5689. The Hubble space telescope WFC2 PC and 3.6 micron Spitzer image are adopted for the analysis. A one-dimensional photometric study is used to analyze the nuclear galaxy profile. The twodimensional analysis(GALFIT) is performed to study bulge and disc counterparts. Our study shows that the nuclear region of the NGC 5689 is incarnated with a colossal nuclear dust lane, which causes drastic changes in the position angle and ellipticity profile of the galaxy.

### Mathematical Modelling on Dynamics of Multi-variant SARS-CoV-2 Virus: Estimating Delta and Omicron Variant Impact on COVID-19

Sadhana Gupta, Rupali\*, Yogendra Kumar Rajoria, and Govind Prasad Sahu

Abstract—COVID-19, caused by the novel coronavirus SARS-CoV-2, resulted in health threats on a global scale. We developed a modified SIQR mathematical model to study the transmission dynamics of the SARS-CoV-2 with two different variants: Delta and Omicron. First, we establish the well-posedness of our model and then analyse the local and global stability of the model at the equilibrium points. Further, we compute the reproduction number denoted by R<sub>0</sub> analytically and numerically. The model analysis shows that the disease-free equilibrium point remains globally asymptotically stable as long as the value of  $R_0$  is below one. While if  $R_0$  exceeds one, the stability of disease-free equilibrium becomes unstable. A numerical simulation of the mathematical model was carried out to understand its quantitative behaviour. The sensitivity analysis is performed to identify the parameters which are sensitive to reproduction number, R<sub>0</sub>. The results of the sensitivity analysis show that the transmission rate and the birth rate were the most sensitive parameters for  $R_0$ . A PRCC-sensitive analysis is also performed to quantify uncertainty and sensitivity at the level of the infected class. Further, we try to explore the measures to curb the incidence of COVID-19 due to delta and omicron variants.

*Index Terms*—SIQR model, COVID-19, Delta and Omicron, Local and global stability, Reproduction number, Multivariants, Sensitivity.

#### I. INTRODUCTION

COVID-19, which was first identified in 2019 in Wuhan, China, spread quickly to several nations and regions of the world due to its high contagiousness, causing disruption [1]– [4]. The virus from the SARS-CoV family was named SARS-CoV-2, and the disease was named COVID-19 by WHO in February 2020. On 30<sup>th</sup> Jan 2020, WHO announced it as a worldwide public health emergency. The mortality due to COVID-19 was very high globally. Among the different strains of the SARS-CoV-2 virus, the Delta variant was highly contagious, causing the highest mortality. It is crucial to have a better knowledge of the characteristics linked with the virus in order to prevent future pandemics. It has been demonstrated that mathematical models are useful tools to study the dynamics of diseases and generate evidence for

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Govind Prasad Sahu is an Assistant Professor of Mathematics at Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh 492010 India (e-mail: govind3012@gmail.com). decision-making in global health [5]. In order to investigate the COVID-19 spread pattern, various mathematical and numerical models have been developed using ordinary differential equations and delay differential equations. A SIR model is developed [4] to investigate the effects of the pandemic caused by the transmission of the rare COVID-19 disease. Ming et al. [6] studied an optimized SIR-type model and forecasted the COVID-19 infected cases and the burden on isolation wards and ICUs. In order to comprehend COVID-19 illness, certain compartment models were created, some of which may be found in [7]-[17]. Using an optimum control method, the impact of enhanced control and mitigation measures such as isolation, screening, medical treatment, and quarantine was investigated by [18]-[24]. To determine the critical inflammatory factors and the role of a combination of medical treatment of COVID-19, a simple within-host tool model was created in [7]-[12]. Compartmental models were proposed to predict the COVID-19 spread in India in [25]. Analysis of local and global stability was performed with reference to  $(R_0)$  for the model equilibria. The study reveals that the transmission rate was very effective in lowering  $R_0$ . The authors traced the COVID-19 outbreak throughout Indian states using the SMAART RAPID Tracker in [26]. The study emphasized the necessity of a nationcentric strategy for tracking and controlling the COVID-19 pandemic. The factors that probably led to the third wave in India were examined by the authors using a compartmental model in [27]. To prepare for future waves of COVID-19, this study suggests increasing vaccination coverage. Similarly, [28] addressed the importance of using NPIs effectively to lower the death rate in India. A study by Sukandar et al. [29] analyzed a Susceptible-Exposed-Infectious-Recovered (SEIR) based mathematical model to effectively measure the transmission indicators per day to control the spread of the epidemic. Zhang et al. [30] introduced a modified SEIR model to enhance decision-making during COVID-19 outbreaks, providing more accurate infection trend predictions. This model supported effective resource allocation and policy formulation during pandemics. Viruses evolve into different variants as they get multiple hosts to mutate. The SARS-CoV-2 virus also evolved into many variants, to name a few variants of concern: Alpha, Delta, and Omicron. The Delta variant of COVID-19 caused severe complications in the infected and soon overwhelmed the health system in many countries, including India, with increased demands for hospitalization, oxygen, ICU, and ventilators.

On the other hand, the Omicron variant had higher transmissibility and spread fast. Thus, Compared to the Delta version, there were more infected people, but because the