Celebrating 75 आज़ादी का अमृत महोत्सव

International *e*-Conference

on

Recent Advances in Biological Sciences & Opportunities in Entrepreneurship

7th - 8th January 2022

ABSTRACTS

Jointly Organized By

School of Studies in Biotechnology
Pt. Ravishankar Shukla University
Raipur 492 010, Chhattisgarh

&

Alumni Association of Biotechnology
School of Studies in Biotechnology
Pt. R.S.U, Raipur 492 010, Chhattisgarh

In Academic Partnership With

Pt. Deendayal Upadhyay Memorial
Health Sciences & Ayush University
of Chhattisgarh, Raipur
Raipur 493 661, Chhattisgarh

डॉ. केशरी लाल वर्मा
कुलपति

Dr. Keshari Lal Verma
Vice Chancellor

पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छत्तीसगढ़) भारत
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Message

It is a matter of immense pleasure that the School of Studies in Biotechnology of Pt. Ravishankar Shukla University, Raipur and Alumni Association of Biotechnology, School of Studies in Biotechnology and Pt. Deendayal Upadhyay Memorial Health Sciences & Ayush University of Chhattisgarh Raipur, academic partners are jointly organizing Two Days **International *e*-Conference *on* "Recent Advances in Biological Sciences & Opportunities in Entrepreneurship,"** on **7th -8th January 2022**.

The conference will serve as an important platform to the scientists, researchers, and academicians to share their work and ideas and a great opportunity for aspiring researchers and academicians from all over the world to learn from the eminent scientists attending the conference. On this occasion, I appreciate the organizing committee members for their unwavering commitment to making this conference a huge success. I convey my heartfelt congratulations and best wishes for the success of this International *e*-Conference. I hope that this academic deliberation will result in discoveries and resolutions for the betterment of humanity.

I wish a grand success to the conference.

(Prof. Keshari Lal Verma)

Dr. A. K. Chandrakar
M.S. (Ophthalmology)

Vice Chancellor
Pt. Deendayal Upadhayay Memorial Health Sciences & Ayush University of Chhattisgarh
Atal Nagar, Sector - 40, Raipur (C.G.)
Tel. : 0771 - 2973001

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04/12/2021

Message

I am delighted, that Pt. Ravi Shankar Shukla University and Pt. Deendayal Upadhyay Memorial Health Sciences & Ayush University of Chhattisgarh, Raipur together are organizing **"International e-Conference on Recent Advances in Biological Sciences & Opportunities in Entrepreneurship on 7th & 8th January 2022".** It is a matter of personal and professional pleasure to be a part of this scientific event on "Recent Advances in Biological Sciences & Opportunities in Entrepreneurship".

I am sure that the conference will be meaningful, relevant and credible worth remembrance and will be best platform for dealing with all issues related to the Biological Sciences.

I extend my personal greeting to Prof. K.L.Verma, Vice-Chancellor, Pt. Ravi Shankar Shukla University Raipur, Prof. S.K. Jadhav, Prof. Keshav Kant Sahu, Prof. P.K. Patra, Conveners and Organizing Secretaries of this conference.

I look forward a great success of conference and wish them all success in spreading the knowledge.

Thanking you,

(Dr. A.K. Chandrakar)
Vice–Chancellor
Pt. Deendayal Upadhyay Memorial Health Sciences & Ayush University of Chhattisgarh

PREFACE

The International *e*-Conference *on* **Recent Advances in Biological Sciences & Opportunities in Entrepreneurship** will be jointly organized by School of Studies in Biotechnology, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh and Alumni Association of Biotechnology, SoS in Biotechnology, Pt. Ravishankar Shukla University, Raipur in academic partnership with Pt. Deendayal Upadhyay Memorial Health Sciences & Ayush University of Chhattisgarh Raipur during **7th - 8th, January 2022**.

Biological Sciences is a broad umbrella encompassing the study of all kinds of living organisms. It embraces the branches of basic sciences like Plant, Animal and Microbial sciences as well as a novel and budding collection of advanced techniques for analyzing and manipulating the molecular building blocks of life for the welfare of mankind. It is truly the amalgamation of various disciplines of biology which pervades all aspects of life. This branch of science is advancing by leaps and bounds giving rise to several newer areas of Biotechnology, Bioinformatics, Nano-biotechnology, Synthetic biology, and so on. Moreover, these emerging areas have the immense potential to endow with entrepreneurial opportunities.

This International e-Conference will be a step to bridge the gap in the knowledge and learning created during this tough time of the COVID19 pandemic. The primary objective of this International Conference, which will be conducted through an online platform, is to bring academicians, scientists, researchers and industry professionals in the field of Biological Sciences from around the globe to encourage and transform research in this area to meet industrial requirements. The conference also aims to cater to innovative ideas and start-up opportunities in the field of Biological Sciences. Therefore, the objective of the conference is completely aligned with the conference theme "Recent Advances in Biological Sciences & Opportunities in Entrepreneurship".

The Conference is a joint venture of two eminent universities of Chhattisgarh State, namely Pt. Ravishankar Shukla University, Raipur and Pt. Deendayal Upadhyay Memorial Health Sciences & Ayush University of Chhattisgarh, Raipur. Therefore, it is a matter of pride and pleasure for the fraternity of Pt. Ravishankar Shukla University, Raipur.

At this Conference, a total of one Keynote address and ten different Invited Lectures covering various aspects of biological sciences will be delivered by eminent scientists and

academicians from all around India as well as from outside the country. More than 168 faculties, research scholars, postgraduate and graduate students will deliver poster presentations on the online platform. We hope that all the delegates and concerned persons will have a technically rewarding experience during this Conference.

We would like to express our gratitude and sincere thanks to all the organizational staff, and the members of the local organizing committee of this Conference. We would also like to express our gratitude to members of the advisory committee for their help and support. The hard work and valued contribution of all the faculty members, staff members, research scholars, M.Sc. students are also appreciated.

At last but not least, we extend our sincere gratitude to Hon'ble Vice-Chancellor Prof. K.L. Verma Sir and the registrar Prof. Girish Kant Pandey of Pt. Ravishankar Shukla University, Raipur, and Hon'ble Vice-Chancellor Dr. A. K. Chandrakar Sir and the registrar Dr. R. Hishikar of Pt. Deendayal Upadhyay Memorial Health Sciences & Ayush University of Chhattisgarh, Raipur, for their constant help and support all through the organization of this Conference.

We veritably believe that this Conference will surely play a key role to keep the academicians and researchers linked to the recent advances in the field of biological sciences and inculcate innovative ideas for the start-ups and open avenues for entrepreneurial opportunities amidst the pandemic situations around the globe.

Prof. SK Jadhav Prof. Keshav Kant Sahu Prof. PK Patra

Conveners

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

Pt. Ravishankar Shukla University Raipur is one of the oldest leading higher education institutes of Chhattisgarh, established on 1st May 1964, through Madhya Pradesh State reorganization Act 1934. University named after the first chief minister of undivided Chhattisgarh. Institute has completed 58 glorious years of its establishment and continues to impart quality education to the students of Chhattisgarh and neighboring states. University has grown by leaps and bounds by establishing excellent infrastructure spread over an exemplary clean and lush green 300.17 acre campus. It is hassle-free to reach the campus as it lies on NH-6 and is well connected to transport means from the Raipur railway station and airport. University hosts 29 Schools of Studies and interdisciplinary canters offering postgraduate, certificate and diploma, postgraduate diploma and research programs. There are 180 educational institutions affiliated with the university. Pt. Ravishankar Shukla University has alliances with University Grant Commission (UGC), New Delhi; Association of Indian University (AIU), New Delhi; All India Council of Technical Education (AICTE), New Delhi, and Association of Commonwealth University (ACU), New Delhi. It has NAAC accreditation with Grade A.

The library of this university was selected as one among eleven University libraries in India for Computerization and automation under the INFLIBNET program of UGC, New Delhi. Further, the UGC-INFONET program has chosen the university library for participation in the first phase. The library is constantly receiving the World Bank Publications, free of cost directly from Washington D.C. under very few selected “Depository Library Program”.

SCHOOL OF STUDIES IN BIOTECHNOLOGY

School of Studies in Biotechnology came into existence in the year 2004. This School makes the teaching-learning process more effective, transparent, and interesting, by incorporating the latest aids/ facilities, organizing quizzes and academic competitions, *etc*. Furthermore, a rich departmental library of featured books, e-books and thousands of e-journals are available through the UGC-INFLIBNET network *via* University. Apart from teaching, the faculties of the department are also involved in research guidance/ project work and other research activities through well established and specified research laboratories. Their significant contribution to R&D is providing excellent opportunities to the students. The students exchange their views and update knowledge through Guest Lectures/ Workshops/ Seminars/ Symposia/ Conferences in various thrust research areas.

The department established with the vision:

1. To develop state-of-the-art laboratory facilities for PG students and research scholars.
2. To establish academic collaborations with the peers of the subject as well as organizations of repute located nationally and internationally.
3. To develop interdisciplinary research projects with different departments like Forest, Agriculture, etc., of the state government.
4. To establish it as one of the recognized Microbial Identification Centre of the country.
5. To establish this School as a Centre of Excellence for both teaching and research in the realm of Biotechnology.

The department received research grants from various research agencies like DST (DST-FIST), UGC, DRDO, DBT, CCOST Raipur, *etc.* It continually worked to obtain such opportunities that led the department towards excellence. The department is striving to create an education system with multifaceted outcomes including research, entrepreneurship, technical leadership and above all, responsible citizen so that it could be established as a Centre of Excellence to deliver well-trained biotechnologists to cater for the needs of Biotechnology.

ALUMNI ASSOCIATION OF BIOTECHNOLOGY

The Alumni Association of Biotechnology, Pt. Ravishankar Shukla University, Raipur exists since 2010. It has registered under the Firm and Societies, Govt. of Chhattisgarh, Raipur, dated on 05/05/2014, and Registration no. 29709. More than 200 members have joined the association and 170 members have been registered in the association as Life members. Alumni association significantly contributes in the progression of this School by frequently organizing academic programs and providing financial support to a comprehensive array of initiatives for students, as well as members of the association. Above programs are incepted in view to strengthen bonding between students and alumni, and among alumni of this School. The institute has had many notable alumni who went on to spread their wings and reach new heights after successfully completing their academic years both in private as well as government sectors.

The main objectives of the society are:

- Raising awareness towards research, and development among students/members. Alumni Association most of the time provides financial assistance to this School during organization of conferences, seminars, *etc*. In addition, donated an acrylic made attractive signboard to this School which has been fixed at the entry of this School.
- Encourage plantation and protection of medicinal plants. A good number of medicinal, aromatic and economically important plants have been planted by different alumni of this School on the occasion of World Environment Day, *etc*.
- Emphasize on higher education and biotechnology to promote social and economic development in rural areas by building capacity and knowledge in populace, helping them to make informed decisions about their farms and to innovate in agricultural affairs.
- Organize superstition abolition camp.
- Timely organization of subject related awareness programme.

In these ways, the Alumni Association contributes in progression of the School and sincerely attempts to improve the academic environment. It has played a pivotal role in shaping and preserving a long lasting relationship between the former and existing students of the School, and among this School and society.

PT. DEENDAYAL UPADHYAY MEMORIAL HEALTH SCIENCES AND AYUSH UNIVERSITY OF CHHATTISGARH, RAIPUR

The purpose is to ensure efficient and systematic education, training, R&D of Health sciences. It includes Modern System of Medicine, Ayurved, Yoga and Naturopathy Unani, Siddha, Homoeopathy, Dentistry, Pharmacy, Physiotherapy, and Nursing. The Ayush and Health Science University of Chhattisgarh Act 2008 was enacted by the Chhattisgarh Legislature. The University has established on 16th September 2008. It has now been named Pt. Deendayal Upadhyay Memorial Health Sciences and Ayush University of Chhattisgarh. The objective of the University is to disseminate, create, and preserve the knowledge of health sciences through teaching, research and service by its demonstration.

The University exercises the powers under the Ayush and Health Science University of Chhattisgarh Act, 2008 provisions. Performing various functions as per the Act, the University is particularly taking care of the training of the teachers of different faculties, organizing lectures by eminent scholars to help the study of health science, and promoting research in Medical & Ayurveda science and especially on locally available herbal plants.

SCHEDULE

International *e*-Conference

on

"Recent Advances in Biological Sciences & Opportunities in Entrepreneurship"

Organized by

School of Studies in Biotechnology

Pt. Ravishankar Shukla University, Raipur, Chhattisgarh

In association with

Alumni Association of Biotechnology, Amanaka Raipur

S.o.S in Biotechnology, Pt. R.S.U. Raipur, Chhattisgarh

In Academic partnership with

Pt. Deendayal Upadhyay Memorial

Health Sciences & Ayush University of Chhattisgarh, Raipur

7th – 8th January 2022

SCIENTIFIC PROGRAMME		LINK
Friday, 7thJanuary 2022 **(Time: IST)**		
9:00 am - 9:30 am	**Keynote Address: Prof. Babu L. Tekwani, USA**	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Prof. K.K. Ghosh	
9:30 am - 10:00 am	**Inauguration**	
10:05 am - 10:30 am	Invited Lecture: Prof. Mirza Hasanuzzaman, Bangladesh	
	Chairperson: Dr. S.B. Verulkar	
10:35 am - 11:30 am	Oral Presentation **SESSION-I (DNA) : AE 01-07, IE 01-03, FF 25**	
	SESSION-I (RNA) : BC 01–10, FF 24	Google meet: https://meet.google.com/cgr-tmxg-szn
	SESSION-I (PROTEIN) : BC 11-16, CB 01-05	Google meet: https://meet.google.com/nwk-qcem-okb

11:35 am -12:00 pm	Invited Lecture: Dr. Khamsah Suryati Binti Mohd, Malaysia	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr. V.K. Kanungo	
12:05 pm - 01:05 pm	Oral Presentation **SESSION-II (DNA) : EM 01-10**	
	SESSION-II (RNA) : EM 11-17, MT 01-03	Google meet: https://meet.google.com/cgr-tmxg-szn
	SESSION-II (PROTEIN) : MT 04-13	Google meet: https://meet.google.com/nwk-qcem-okb
1:15 pm - 1:40 pm	Invited Lecture: Dr. Azad Ismail Saheb, Kuwait	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr. Renu Maheshwari	
1:45 pm - 2:10 pm	Invited Lecture: Prof. Anita Yadav, India	
	Chairperson: Dr. S.K. Prasad	
2:15 pm - 3:15 pm	Oral Presentation **SESSION-III (DNA) : MT 14-20, PS 01-04**	
	SESSION-III (RNA) : PS 05-15	Google meet: https://meet.google.com/cgr-tmxg-szn
	SESSION-III (PROTEIN) : PS 16-26	Google meet: https://meet.google.com/nwk-qcem-okb
3:20 pm - 3:45 pm	Invited Lecture: Dr. Bhupendra Kaushik, United Kingdom	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr. Deependra Singh	
3:50 pm - 5:00 pm	Oral Presentation **SESSION-IV(DNA) : HT 01-10**	
	SESSION-IV(RNA) : HT 11-20	Google meet: https://meet.google.com/cgr-tmxg-szn
	SESSION-IV (PROTEIN): HT 21-31	Google meet: https://meet.google.com/nwk-qcem-okb

SCIENTIFIC PROGRAMME		LINK
Saturday, 8th January 2022 **(Time: IST)**		
09:30 am - 9:55 am	Invited Lecture: Dr. Harsh Bais, USA	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr. M.P. Thakur	
10:00 am - 11:00 am	Oral Presentation **SESSION-V (DNA) : WM 01-09, BR 15**	
	SESSION-V (RNA) : BM 01-10	Google meet: https://meet.google.com/cgr-tmxg-szn
	SESSION-V (PROTEIN) : BM 11-20	Google meet: https://meet.google.com/nwk-qcem-okb
11:05 am - 11:30 am	Invited Lecture: Dr. Sudarshan Singh, Thailand	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr. Trilochan Sathpati	
11:35 am - 12:35 pm	Oral Presentation **SESSION-VI (DNA) : BM 21-29, IE 04**	
	SESSION-VI (RNA) : PP 01-10	Google meet: https://meet.google.com/cgr-tmxg-szn
	SESSION-VI (PROTEIN) : PP 11-20	Google meet: https://meet.google.com/nwk-qcem-okb
12:40 pm - 1:05 pm	Invited Lecture: Dr. J.R. Kanwar, Australia	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr. Shailendra Saraf	
1:15 pm - 2:15 pm	Oral Presentation **SESSION-VII (DNA) : PP 21-30**	
	SESSION-VII (RNA) : PP 31-33, BR 01-07	Google meet: https://meet.google.com/cgr-tmxg-szn
	SESSION-VII (PROTEIN) : PP 34, BR 08-14, ET 01-03	Google meet: https://meet.google.com/nwk-qcem-okb
2:20 pm - 2:45 pm	Invited Lecture: Dr. Smita Sahu, India	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr.Zenu Jha	
2:50 pm - 3:50 pm	Oral Presentation **SESSION-VIII (DNA) : ET 04 -13**	
	SESSION-VIII (RNA) : FF 01-10	Google meet: https://meet.google.com/cgr-tmxg-szn

	SESSION-VIII (PROTEIN): FF 11-23, FF 26	Google meet: https://meet.google.com/nwk-qcem-okb
3:55 pm - 4:20 pm	Invited Lecture: Dr. A.M. Deshmukh, India	Google meet: https://meet.google.com/uxu-aqaz-sgh
	Chairperson: Dr. Vasudha Mishra	
4:25 pm onwards	Valedictory Function	

Keynote lecture is of 30 min.
Invited lecture is of 25 min.
Oral Presentation is of 4 + 1 min.
There will be 3 parallel sessions (DNA, RNA, and Protein) in each day, and joining links for the sessions are provided with the respective schedule.

ABSTRACTS

Biodiversity & its Conservation (BC)

Environment Technology (ET)	
ET-01	Study of Solar Flare Index with Cosmic Ray Intensity Variations during SC 20 to SC 24 Ashok Kumar Jyoti, Meera Gupta, Jagjeet Kaur Saluja
ET-02	An Overview of Nanotechnology in Monitoring and Controlling Air and Water Pollution Bharti Sahu, S.K. Jadhav, Keshav Kant Sahu
ET-03	Constructed Wetland Model Using Macrophytes for Treatment of Wastewater Garima Madhariya, Pramod Kumar Mahish
ET-04	Algae as a Boon for Environment and Industries Neha Toppoa, V. Shanthi
ET-05	Impact of Ecotourism on the Socio-Economy of Villages in and Around Protected Areas of Chhattisgarh Praneetha Paul
ET-06	Designing of Low-Cost Homemade Instrument to Measure Mechanoluminescence Property of Phosphor Material Ram Krishna, Vikas Dubey, N Kumar Swamy
ET-07	Developmental Toxicity of Cypermethrin in Zebrafish Richa Shahwal, Arunima Sur, Arpita Srivastava
ET-08	Vermicomposting: An Effective Option for Recycling Organic Waste Shubhi Chhabra
ET-09	Hand Sanitizer: A Boon or a Bane? Sonal Singh Shrivas
ET-10	A Review on Fungal Laccases: The Green Catalyst and its Environmental and Commercial Benefits Srishti Pandya, Priya Sutaoney, Veenu Joshi
ET-11	Bio-brick: Environment Friendly and Sustainable Building Material Ananya Sharma, Keshav Kant Sahu, S.K. Jadhav
ET-12	Plant Based Air Purifier Neha Upadhyay, Keshav Kant Sahu, S.K. Jadhav
ET-13	Health Risks due to Consumption of Heavy Metal Contaminated Vegetables Sadhana Jaiswal
Ethnomedicine (EM)	
EM-01	Ayurveda and Ethno Medicine Shama A. Baig
EM-02	Activity of Phytoconstituents as Immunomodulatory Agent Devwati, Sanjay K. Bharti
EM-03	Diversity and Use of Ethnomedicinal Plants in Mahuatoli, Jashpur District Sangeeta Yadav, Lata Sharma
EM-04	Ethnomedicine: an Aboriginal Culture for Improvement of Quality of Life Harsha Rani Sahu, Chuman lal, Kuleshvari Dewangan, Sonam Soni, Shekhar Verma, Trilochan Satapathy
EM-05	Medicinal Approach of Plants in Covid-19: A Review Mahima Sinha, Shriram Kunjam
EM-06	Ethnomedicinal Plants used by Tribes of Korba District, Chhattisgarh India: Review

	Shubhangi Yadu, Suneeta Patra
EM-07	Medicinal Plants from Selected Region of Southwest Bastar District of Chhattisgarh (INDIA) with Respect to Ethnomedicine Chanchal Badhai
EM-08	Bioactive Molecule Present in Ashok Tree (Saraca asoca): A Review Vaishnavi Rasekar, Sanyogita Shahi
EM-09	Qualitative Analysis of Phytocompounds Present in *Radermachera xylocarpa* Roxb. Ex. *K. Schum* Swati Pandey, Shubha Diwan
EM-10	Phytochemical Analysis and Antibacterial Study of *Boerhaavia diffusa* L. Root Extract Shaikh Ameeruddin, Sarita Das
EM-11	Possible Uroprotective Role of Some Medicinal Plants Collected from Ganjam District, Odisha, India Sangeeta Rani Tripathy, Sarita Das
EM-12	An Overview on Ethnomedicinal Properties of *Moringa oleifera* for Management of Sickle Cell Anaemia Daneshwar Prasad, Shama A. Bag, R. Shrivastava
EM-13	A Review on Ethnomedicinal Herbs in the Management of Major Endocrinological disorder develops due to Adapting Sedentary Lifestyle Vijeta Bhattacharya, Subodh Dubey
EM-14	Phytochemicals Analysis of Leaf Extract of Plant *Cinnamomum tamala* and their Biological Effect on Mosquito Larvae Ankita Tiwari, Hemant Kumar, Kuleshwar Sahu
EM-15	Traditional Medicinal Plants as a Fulcrum against Drug-Resistant Tuberculosis Shivendra Singh Dewhare
EM-16	Anti-biofilm activity of medicinal plants: A review Damini Netam, Madhu Manikpuri, Veenu Joshi
EM-17	Ethnomedicinal Practices in Various Tribal Group of India Ankita Bhoi
Microbial Technology (MT)	
MT-01	A Report on Wild Mushroom Diversity and Distribution in Pt. Ravishankar Shukla University Campus, Raipur, Chhattisgarh Srishti Verma, Kamlesh Kumar Shukla
MT-02	Study of Fungal Endophytic Characters Isolated from Four Medicinal Plants in Chhattisgarh Aditi Gupta, Kamlesh Kumar Shukla
MT-03	Preparation of Soy based Yoghurt using Lactobacillus Spp., Extraction and Assessment of Alpha Galactosidase Enzyme Activity V.S. Jedhe, S.D. Adole, A.Y. Dawande, Y.S. Banginwar
MT-04	Evaluation of the Use of Different Solvents for Phytochemical Constituents and In-vitro Antifungal Activity of *Desmodium gangeticum* (L.) DC. from Narayanpur, Bastar, Chhattisgarh Tinki Kanoje, K. Sharma, J.N. Verma
MT-05	Survey and Isolation of Follicolous Necrotic Fungi From Certain Legume Crops Soni Rashmi Devi and Diwan Rupinder
MT-06	Survey of Allergy Causing Aeromycoflora and its Allopathic Treatment in Raipur City Shahla Khan, V.K. Kanungo, S.K. Jadhav

MT-07	Studies the Effect of Submerged Non-Static and Static Batch Cultivation Approaches for Producing Biomass and Exopolysaccharides of *Pleurotus ostreatus* Nagendra Kumar Chandrawanshi, Sarita Waradkar, Deepali Koreti, Anjali Kosre , SK Jadhav
MT-08	Partial Purification and Chacterization of Antibacterial Compounds from Endophytic Fungi K. Kavitha, M. Prakash
MT-09	Biodiversity of VAM Fungi in the Rice Field of Durg District Amit Kumar Sahu, Shama A. Baig
MT-10	Studies on Morphological and Cultural Aspects of Oyster Mushroom (*Pleurotus* spp.) Sahu Hemshikha, Diwan Rupinder
MT-11	Studies of Iron Supplementation and Effect on Biological Efficiency in *Pleurotus florida* Anjali Kosre, Deepali, SK Jadhav, Nagendra Kumar Chandrawanshi
MT-12	Mineral Fortification and its Impact on Mycelial Biomass and Metabolites of *Calocybe indica* Deepali, Anjali Kosre, SK Jadhav, Nagendra Kumar Chandrawanshi
MT-13	Identification of Endophytic Fungi in *Curcuma caesia* Roxb. Surbhi Pandey, Bhaskar Chaurasia
MT-14	Microbial Technology: An Updated Recapitulation Ashok Kumar Banjara, Harsha Rani Sahu, Chuman Lal, Kuleshvari Dewangan, Sonam Soni, Shekhar Verma, Trilochan Satapathy
MT-15	Production optimization and Purification of Siderophores by *Pseudomonas juntendi* isolated from Western Ghats Shailen S. Jadhav, V. Shirishkumar, Supanekar
MT-16	Screening, Quantification and Profiling of Macro Fungal Mycelial Vitamins from Aqueous Hot Extracts of Selected Wild Basidiomycetes Mushrooms S. Siva Durga
MT-17	Isolation and Screening of Pullulanase Producing Microorganisms Nupur Patel, Anjali Padhiar
MT-18	Novel Approaches for Developing New Antibiotics Neha Chopra, Subodh Dubey, Priyanka Keshri, Divya Niranjan
MT-19	Microbial Tannase: production, characterization and applications Bhavi Kesharwani, Dharini Netam, Priya Sutaoney, Veenu Joshi
MT-20	Diversity of endophytic fungi isolated from Costus speciosus Wasim Akram, Shriram Kunjam
Alternate Source of Energy (AE)	
AE-01	Rice Straw as a Potential Feedstock for Bioethanol Production Dristi Verma, Suraksha Thorani, Shubhra Tiwari, S.K. Jadhav
AE-02	Analysis of Effective Chemical Pretreatment Method of Deoiled Rice Bran for Bioethanol Production Esmil Beliya, S.K. Jadhav
AE-03	Microalgae as an Alternative Source of Energy Yogita Lokhande
AE-04	Optimization of pH and Temperature for Efficient Bio-Hydrogen Production from Lignocellulosic Waste Mona Tandon, Sailesh Kumar Jadhav, Kishan Lal Tiwari

AE-05	Second Generation Biofuel–A Sustainable Alternative to meet Global Energy Crisis Jai Shankar Paul, Monika Vaswani, Khushbu Khawase, Nisha Gupta, S.K. Jadhav
AE-06	Electricity Generation from Starch Based Wastewater Using Microbial Fuel Cell Technology: Impact of Ionic Strength and Substrate Concentration Preeti Singh Parihar, S.K. Jadhav
AE-07	Application of Recombinant Lipase in the Biocatalytic Activity of Waste, 2T Hydrocarbon Oils, Edible Oil & Biodiesel Ajaj Ahmed, Gautam Kumar Meghwanshi
Herbal Technology (HT)	
HT-01	Screening of Antioxidant Activities of Whole Plant and Parts Extracts of Hygrophila Spinosa *T. Anderson* Dhananjay Tandon, Ashwini Kumar Gupta
HT-02	Assessment of Antioxidant and Antimicrobial Potential of *Murraya Koenigii* Based Biogenic Silver Nanoparticles Anita Bhoi, Manju Rawat Singh, S. Keshavkant
HT-03	Phytochemical Screening and Characterization of Green Synthesized Silver (Ag) Nanoparticles from *Urginea indica* (Roxb.) Kunth in Rainy Season Uday, Shriram Kunjam
HT-04	Preliminary Phytochemical Analysis and Characterization of Green Synthesized Copper Nanoparticles in *Tinospora cordifolia* (Miers.) Swati Agrawal, Satish Kumar Sen
HT-05	Survey of Medicinal Plants of Family Fabaceae in Mainpur Block of District Gariaband, Chhattisgarh Gulab Chand, V.K. Kanungo
HT-06	Analysis of Anti-Uropathogenic Activity of *Calotropis Gigantea* Extracts Arpita Srivastava, Arunima Sur, Kush Kumar Nayak
HT-07	Investigation of Phytochemical Analysis of Eight Medicinal Plants from Wardha District. (MS). India A.B. Jadhao
HT-08	A Miracle Seed of Diplocyclos palmatus (Shivlingi) Nikita Mishra, Ujjwala Supe
HT-09	Survey of Medicinal Plants Around Keonchi Village in Amarkantak Mountain Range of District-Gaurelapendramarwahi, Chhattisgarh, India Sarvesh Kaushik Patel, V. K. Kanungo, M.L. Naik
HT-10	Bio-active Sugar Molecule Present in Our Daily Needs: A Review Amber Chopra, Sanyogita Shahi
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Infectious Disease Drug Discovery & Development: Threats Challenges & Opportunities

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Abstract

Infectious diseases are responsible for more than 14 million deaths each year.Despite of significant advancements the world health organization predicts more than 13 million deaths in 2050 attributed to infectious diseases. Every day 30,000 children die from an infectious disease that could be prevented or treated.The problems of infectious diseases are further aggravated due to constant appearance of drug-resistance and emergence of more-virulent strains of pathogens. Intensive and sustained efforts to apply modern pharmaceutical drug discovery/development tools are desperately needed in order to rapidly advance new drug candidates into the clinic. New drugs are needed, especially to cure *multidrug-resistant*, *difficult-to-treat* infectious diseases and target *hard-to-kill* pathogens.

Rapid advancements in bioinformatics, genomics, proteomics and metabolomics along with availability of fully annotated genome databases for the pathogens have generated unprecedented opportunities for new drug discovery for infectious diseases.Highly precise technologies for structure elucidation, genome sequencing, expression profiling, targeted gene disruption, *in vitro* cell cultures of pathogens, cell biology and bio-imaging have provided powerful tools to understand pathogens' biology and pathogenesis of infectious diseases. Discovery of large number of validated chemotherapeutic targets and rapid identification of novel/unique molecular & biochemical pathways in the pathogens with systems biology networks including molecular pathways analysis tool have been the driving forcesfor precise target-based drug design. A multidirectional multidisciplinary drug discovery paradigm has been employed for discovery of new anti-infective drugs. This paradigm includes, screening of large-random & targeted compounds libraries through molecular-target based and cell based phenotypic models, application of new anti-infective drug leads with unique pharmacophore structure to probe the targets and identification of novel targets, optimization of efficacy, toxicity and ADME properties of new leadswith computational and medicinal chemistry approach, molecular functional and structural

characterization of druggable targets; development of target-based high throughput screening (HTS) assays, construction of transgenic cell lines of pathogens with controlled expression of reporter proteins and development of clinically relevant preclinical models for advancement of optimized anti-infective drug leads. The multidirectional multidisciplinary anti-infective drug discovery paradigm has accelerated the pace and sharpens the precision for discovery and development of new anti-infective drugs with improved safety and efficacy profiles.

Crop Response and Adaption to Extreme Temperature under Changing Climates

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Abstract

Temperature stress is becoming the major concern for plant scientists worldwide due to the changing climate. The difficulty of climate change is further added considering its precisely projecting potential agricultural impacts.Temperature stress has devastating effects on plant growth and metabolism, as these processes have optimum temperature limits in every plant species. Heat stress can have adverse effects on plant morphology, physiology, and biochemistry during all stages of vegetative and reproductive development. The study showed that each centigrade degree rise of temperature would cause a drop in production of all of the crops, led by a plummeting yield in corn of more than 7%, wheat of 6%, and a drop in soybeans of 3%, and rice 3.2%. That means in the next 30 or 40 years, if global temperature rises 3°C we are talking about 15-20% loss of wheat yield just from temperature alone. A study showed that each degree rise in temperature would cause a drop in production of the world's main food crops. The growth and development of plants involves a countless number of biochemical reactions, all of which are sensitive to some degree to temperature. Consequently, plant responses to HT vary with the extent of the temperature increase, its duration, and the plant type. Worldwide, extensive agricultural losses are attributed to heat, often in combination with drought or other stresses. Low temperature (LT) or cold stress is another major environmental factor that often affects plant growth and crop productivity and leads to substantial crop losses. Chilling stress results from temperatures cool enough to produce injury without forming ice crystals in plant tissues, whereas freezing stress results in ice formation within plant tissues. Plants differ in their tolerance to chilling (0-15ºC) and freezing (<0ºC) temperatures. Both chilling and freezing stresses are together termed low temperature or cold stress: the damage due to cold stress can range from chilling injury and freezing injury to suffocation and heaving. Physiological processes of plants are largely affected by the alteration of surrounded environmental temperature. The ability of plants to cope with extreme temperature is a complex process and is determined by environmental factors and also largely determined by the genetic capability of the plant. Under temperature

stress, plants evolve two types of responses, one is long-term response that falls under (evolutionary, phonological, and morphological adaptations) and the other is short-term (avoidance or acclimation) response. Plants exhibited several physiological changes including alteration in leaf orientation, change in composition of membrane lipids, or increase the transpirational cooling. Leaves of plants are very labile to temperature, and under stress condition, leaves closed the stomata, increased the stomatal, and in vascular bundle, xylem vessels become larger to avoid heat stress. Therefore, a complete understanding of physiological and molecular understanding or crop responses and tolerance to extreme temperature is essential. However, there is still a need for greater evidence for the climate smart agronomic approach in different agroecological environments. It is especially important to understand the trade-offs between food security, adaptation, and mitigation in current and future socioeconomic and climate scenarios. More research is needed to demonstrate that adaptation strategies do not become maladaptive. The role of an appropriate monitoring and evaluation framework and indicators of climate smartness that can be easily measured becomes very important.

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Malaysian Natural Product as Anti-Uterine Fibroids Potential

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Abstract

Uterine fibroids are noncancerous tumors of the uterus. These fibroids grow within the muscles of the uterus, on the outside of the uterus, hang in the uterine cavity or very rarely form within the cervix. Uterine fibroids form in the childbearing years of a woman's life and if it grows too large will become a problem. Uterine fibroid is regulated by several growth factors, which caused an excessive menstrual bleeding and miscarriage. It contributes to the most hysterectomy cases, a surgery which results in complete removal of uterus. Our studies have found that several natural products from Malaysia including several species of medicinal plants and stingless bee propolis, effectively reduced the tumor volume in *in vivo* model and significantly triggered apoptosis in *in vitro* model using uterine fibroids malignant cells. In this paper, we will elaborate the findings of two medicinal plant species, *Orthosiphon stamineus* Benth and *Labisia pumila* as potential anti-uterine fibroids. We also report on the phytochemical content of both plant and described the correlation with anti-uterine fibroids, both in vitro and in vivo model.

Aquaculture - As an Environment Friendly Technology for Food and Nutritional Security in India

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Abstract

"Krushito Naasti Durbhiksham" is the moto with which the erstwhile Imperial Council of Agricultural Research was established on 16 July 1929. The moto was to enhance food production for the growing and hungry population. Ensuring food and nutritional security was the next step. Vedic literature provides the earliest written evidence of agriculture in India which shows agriculture in India might have started during this period (1500-500 BCE) whereploughing, irrigation and growing fruit and vegetablehas been recorded. An Indian Sanskrit text,believed to be 2500-year-old, called Bhumivargaha mentions that the Indian agriculture was classified into 12 types: Urvara (fertile), ushara (barren), maru (desert), aprahata (fallow), shadvala (grassy), pankikala (muddy), jalaprayah (watery), kachchaha (contiguous to water), sharkara (full of pebbles and pieces of limestone), sharkaravati (sandy), nadimatruka (watered from a river), and devamatruka (rainfed). Thus, production of food through cultivation is a tradition in India.

History of fish as food might be dated even further back to age of hunting. Man used to catch animals and fish from the wild for satisfying his hunger. Probably this was started even before fire was discovered by man. The evidence comes from the practice of eating raw fish and shellfish in Japanese and Chinese ethnic and civilized societies, even today. The Indus valley civilization shows some evidence of using fish as food. Chanakyas "Artha Shastra" mentions (300 BCE) about fish being rendered poisonous during war times. Traditional fish culture by growing fish and shellfish in tidal inundations (deep water paddy fields) of Kerala's Pokkali, Bheris of West Bengal and Khazan of coastal Karnataka has been recorded.

Today, India ranks second in the world in fish and shellfish production both from its natural resources and cultivation practices. The captured fish/shellfish accounts for 55% of the total fish/shellfish production and the culture sector accounts for the remaining 45%. The fish/shellfish production sector contributes to 14.16 million metric tonnes (2019-20) with a 1.07 % share to the GDP of India. Indian coastline offers a potential fishable shoreline of

over 7500 km along the maritime states where over 4000 fishing villages (14.5 million fisherfolk) cater to the needs of the capture fisheries sector. Rivers and canals with a combined length of 195,000 km contribute to the freshwater resources. Lakes, reservoirs, ponds and tanks provide an area of 5.3 million ha that can be explored for enhanced production of fish and shellfish.

Fish and shellfish food are the rich sources of quality protein, amino acids and unsaturated fatty acids which are essential for good health and immunity. Though India is the 2nd largest contributor to the world's fish/shellfish production, per capita consumption of fish/shellfishis about 5 kg which is only a third of world average (16 kg). Protein malnutrition is the major health-related problem in the developing world. Awareness among the common people was the moto behind the recognition of November 21st as the "World Fisheries Day" that paved way for the initiation of the concept of "Blue Economy". Govt of India initiated several missions and programs for enhancing fish production. "Pradhan Mantri MatsyaSampada Yojana", popularly known as PMMSY is one of those steps for encouraging aquaculture which is destined to be a major contributor for the quality protein production.

Fish of different kinds are consumed world over which provides, on an average, 18g of fat (mostly poly unsaturated), 22g of protein rich in many vital amino acids and vitamins apart from many micronutrients in every 100g serving. Fish food compensates for many nutrients that are absent in plan-based food items. This very fact makes fish as an important food element for a healthy growth, development, and reproduction not only for man but for even the animals. India is the second largest producer of fish with aquaculture contributing to almost half of the production of 14.16 million tons. Andhra Pradesh tops the list with a production of 4.17 mt, followed by west Bengal (1.78 mt). The country is showing a steady growth in the fisheries sector at an annual 8% while the aquaculture sector showed a promising 10% during the year 2019-20.

The flagship project Pradhan Mantri MatsyaSampada Yojana (PMMSY) was launched for the period 2020-25 with an out lay of 20,050 INR aimed at strengthening the fisheries sector. This much emphasized project has the following major aims:

1. Enhancement of Production and Productivity
2. Infrastructure and Post-harvest Management
3. Fisheries Management and Regulatory Framework

Atma Nirbhar Bharat – in the fishery sector surely adds to the food security and nutritional security.

Keywords: Fish culture; Production; Nutrition; Protein; Species; Shellfish

CRISPR: Gene Editing and Beyond

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Abstract

CRISPR technology is an efficient alternative to other genome editing tools which can be customized as per specific needs.Multiple genes can be targeted using this technology.There is no need of separate enzymes. Tens of thousands of tailor-made gRNA have been created to lead them in to their targets. CRISPR allows scientists to create cell and animal models to accelerate research in to diseases such as mental illness, cancer etc. This is also being developed as rapid diagnostic tool.

Bio Analytical Tools for Research

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Abstract

Recombinant based drug development combined with monoclonal antibody technology has provided an avenue for developing highly pure targeted biologic therapeutics, in quantities that are adequate to meet market demand. As a result of these advancements, over 250 biologic molecules have been approved for therapeutic use, with sales in the global market reaching more than $100 billion. This emerging biotech sector requires unique bioanalytical tools to address the ever-challenging regulatory aspects entailing comprehensive characterization by sensitive and high-resolution bioanalytical methods covering all four structural levels of the biotherapeutic entity. During the development phase of biologics, full sequence coverage, purity assessment, quantification, and product identification is necessary. In addition, quite a few other critical features should be analysed, such as glycosylation, mutation, phosphorylation, sulfation, disulfide linkages, oxidation, deamidation, glycation, proteolytic clipping, and several others. Analysis of isomerization is another important requirement for their analysis because it might reveal immunogenic structural changes. Identification of host-cell impurities, aggregation, and determination of higher-order structures and isoforms are also crucial. Extensive characterization is also performed in the manufacturing phase and, where necessary, following significant process changes. Characterization of a biological product that includes the determination of physicochemical properties, biological activity, immunochemical properties, purity, and impurities by appropriate techniques is necessary to establish relevant specifications.

The analytical needs also depend on the actual application; for example, high throughput is a prerequisite during clone selection, and increased sensitivity is important during product release. To attain such levels of characterization, orthogonal bioanalytical methods should be applied including size exclusion liquid chromatography, capillary electrophoresis and mass spectrometry. New analytical technology and modifications to existing technology are continually being developed and should be utilized when appropriate.

Keywords: Recombinant; Bioanalytical; Biologic therapeutics; Immunogenic; Capillary electrophoresis

Sweet Talkers: The Role of Benign Root Microbiome in Plant Defense and Health

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Abstract

My rhizosphere biology research is focused on understanding the biological significance of root exudation. Though root exudation clearly represents a significant carbon cost to the plant, the mechanisms and regulatory processes controlling root secretion are just now beginning to be examined. Root-root, root-microbe, and root-nematode communications are continuous occurrences in the rhizosphere, but due to the underground nature of roots, these intriguing interactions have largely been overlooked. My laboratory's research is taking a multidisciplinary approach by interfacing plant biology and chemistry to unravel the underground communication process.

Eucalyptus camaldulensis (River Red Gum): A Natural Reservoir of Bioactive Compounds with Potential Anti-Cancer, Antibacterial, and Antioxidant Efficacy with Cytocompatible Properties

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Abstract

Extract of *Eucalyptus camaldulensis* leaf was partitioned into aqueous and ethanol fractions by precipitation followed by sedimentation-based technique and profiled for phytochemical components. Ethanolic and aqueous fractions demonstrated anti-cancer activity against oral squamous cell carcinoma (CLS-354) with cellular apoptosis at 400 and 800 µg/mL, respectively. In addition, antimicrobial evaluation yielded inhibitory concentrations of 16–64 and 158–316 µg/mL, and bactericidal concentrations of 32–64 and 316–>2528 µg/mL for ethanol and aqueous fractions, respectively. Antioxidant activities evaluated using DPPH and ABTS assays showed IC50 values of 7.07 and 65.67 µg/mL, and 17.96 and 201.3 µg/mL for aqueous and ethanol fractions. Total phenolic content of 9.04 ± 0.26 and 3.58 ± 0.04 GAE/mg fraction, and flavonoid content of 2.07 ± 0.02 and 3.37 ± 0.05 QE/mg fraction were recorded for aqueous and ethanol fractions. At subinhibitory concentrations fractions significantly ameliorated H_2O_2–induced toxicity by 8–23 and 15–83%. Nitrite production reduced by 4–17 and 3–14 µM following fractions treatment. The fractions showed bioactive properties, with oxidative stress amelioratory effects, and could be a potential source of preservatives and functional food additives.

Nano-Nutraceuticals for Real-Time Imaging and On-Chipmicrofluidic Device to Capture"Cancer Stem Cell": Promises of Precision Nanomedicine

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Abstract

Capture and characterization of circulating tumor cells (CTCs) as well as circulating cancer stem cells (CSCs) holds immense potential in cancer management in aiding and confirming the early cancer diagnosis for effective treatment planning. Prognosis using less or non-invasive methods than biopsy, would be more beneficial to patients. This study focuses on the design of two microfluidic devices using polydimethylsiloxane (PDMS) for efficiently capturing cancer cells as well as cancer stem cells using surfaces modification with anti-EpCAM antibodies. These devices also enabled on-chip characterization of captured cells for expression analysis of multiple stem cell markers (survivin, CD44 and CD133) on a single device. Our results show the applicability of these simple, less cumbersome, easy to fabricate devices in cancer diagnosis that aid in CTCs and CSCs capture and characterization. This is the first ever attempt to combine anti-cancer therapeutic effects of emerging anticancer biodrug bovine lactoferrin (bLf), and multimodal imaging efficacy of Fe_3O_4 nanoparticles (NPs) together, as a saturated Fe_3O_4-bLf. For cancer stem cell specific uptake of nanocapsules/nanocarriers (NCs), Fe_3O_4-bLf was encapsulated in alginate enclosed chitosan coated calcium phosphate (AEC-CP) NCs targeted (Tar) with locked nucleic acid (LNA) modified aptamers against epithelial cell adhesion molecule (EpCAM) and nucleolin markers. The nanoformulation was fed orally to mice injected with triple positive (EpCAM, CD133, CD44) sorted colon cancer stem cells in the xenograft cancer stem cell mice model. Apart from the promising anti-cancer efficacy and the exceptional tumor targeting ability observed by multimodal imaging using near-infrared (NIR) imaging, magnetic resonance imaging (MRI) and computerized tomographic (CT) techniques, these NCs also maintained the immunomodulatory benefits of bLf as they were able to increase the RBC, hemoglobin, iron calcium and zinc levels in mice.

Research Innovation, Patents and Commercialization

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1. Introduction of the Session Agenda

The Agenda of the session is on sharing strategies for augmentation of Research & Innovation activities, new perspectives/methods in building capabilities among the concerned stakeholders that is sustainable and encourages innovations across sectors, identification of IP generation, IP monetization, IP portfolio management, enforcement and the exchange of best practices in the field of IP, with an aim to inculcate a culture of intellectual property creation, protection, to leverage and commercialize their intangible creations and significance of productive collaboration between Academia-Industry-R & D Organizations for achieving a progressive IP landscape.

2. Objective of the Training Program

Innovation refers to creating more effective processes, products, and ideas, it could mean implementing new ideas, improving services or creating dynamic products. It can act as a catalyst that can make your business grow and can help you adapt in the marketplace. In today's knowledge economy, R&D and commercial activities are becoming increasingly global and borderless, and the securing of Intellectual Property (IP) protection is becoming an extremely important issue worldwide. IP protection is a key factor in promoting foreign investment and technology transfer, as well as for boosting a nation's industrial development led by knowledge economy.

3. What is Intellectual Property?

- Any product of human intellect that is intangible but has value in the marketplace.
- Product of human imagination, creativity, and inventiveness.
- Legal rights granted by Govt. for a limited period in exchange of public disclosure of inventions
- Intended to encourage the creators and the authors in their creative pursuits.

4. Types of Intellectual Property

5. Significance of Innovation and IPR Generation

- Drives Economic Growth and Competitiveness
- Strong and Enforced IPR Protects Research interests and Consumers
- Helps Generate Breakthrough Solutions to Global Challenges
- Encourage Innovation and Reward Entrepreneurs
- Creates and Supports High- Paying Jobs
- Source of recognition
- Provides incentive for new creations.
- Ensuring the availability of the original products
- Protect Your Niche
- Start up a new company
- These incentives encourage innovation, which assures that the quality of human life is continuously enhanced.

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Microbial Solubilization of Metals from Electronic waste (E-waste)

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Abstract

It is believed that biotechnology is one of the most promising technologies in metallurgical processing. For many years, bioleaching has been used for the solubilization of metals from ores. Bioleaching is useful for treating ores with low concentrations of metals; it is also simple and cheap to operate. It has been successfully applied toward the leaching of metals from ores, though it has not yet been commercially applied toward the recovery of metals from printed circuit boards (PCB). Several authors have recently published studies on the bioleaching of metals from electronic waste. The aim of the study was to formulate microbial consortium for solubilization of metals from waste PCB and evaluate its efficacy. For this purpose, a microbial consortium from bauxite and pyrite ore samples was obtained using a simple 'top down' approach. Essentially, printed circuit boards (PCB) were obtained and used as representative samples of e-waste. Various concentrations (1–5%) of PCB powder were subjected to bioleaching, and the effects on metal solubilization, changes in pH and concentration of ferrous iron produced were assessed. It was observed that a maximum of 96.93% Cu and 93.33% Zn was solubilized by microbial consortium from 10 g/L of PCB powder, whereas only 10.26% Ni was solubilized from 30 g/L of PCB powder. For lead, only 0.58% solubilization was achieved from 20 g/L of PCB powder. An analysis of the precipitate formed during bioleaching using scanning electron microscopy with energy dispersive X_ray analysis revealed the presence of Tin (59.96%), Cu (23.97%), Pb (9.30%) and Fe (5.92%).

Deeper Insight into Safeguard of Biodiversity: An Updated Review

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Abstract

The aim of this present work is to explore the various methods applicable to safeguard the biodiversity. In a precise and scientific manner biodiversity is broadly categorized into genetic diversity, species diversity, and ecosystem diversity. These include different breeds of animals, flowers, desert, forest as well as marine ecosystem etc. These are the real wealth of the world. Both natural as well as manmade reasons are responsible for the disturbances in the ecosystem that in turn many ways making harm to the world. Rapid growth in industry that make chemical pollution, construction work, urbanization, deforestation, mining as well as transportation that causes both light or noise pollution etc are the major cause for disturbances in an ecosystem. Various methods that can preserve our ecosystem includes, restoration of forest by plantation and making awareness among people for preservation of forest and wild animals, stop use of plastics and allied products, respect local habitats, use of e-motor vehicles and making appropriate legislation by the regulatory body or government will be useful for the conservation of diversity.

Keywords: Biodiversity; Deforestation; Mining; Conservation; Awareness; Safeguard

Temporal Pattern in Foraging Activity of Little Cormorant, *Microcarbo niger* at Madku Dweep, District Mungeli, Chhattisgarh, India

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Abstract

This study was designed to evaluate the foraging activity of ecological important bird species the *Microcarbo niger* (Little Cormorant). In current work we observed the effect of "photoperiod" and "time of the day" on daytime foraging activities of *Microcarbo niger*. The most applied foraging actions of *Microcarbo niger* were recorded for two repetitive days each for the period of long days (March and April 2021) and short days (December 2020 and January 2021). One-way ANOVA (by SPSS 16.0) was used to detect the effects of "photoperiod" and "time of the day" on daytime foraging pattern in order to the frequency of foraging techniques. The rhythms in daytime foraging activities were estimated by means of Cosinor rhythmometry at 24 h and 12 h. The present study clarified that the *Microcarbo niger* frequently applied three main techniques *viz*., diving, striking and head and neck dipping, on which both the diving and striking were the most employed practice while the head and neck dipping was less employed practice during foraging.

Keywords: Foraging Activity; Little Cormorant; Madku-Dweep; Photoperiod; Wetland

Phytosociological Study of Achanakmar Tiger Reserve Mungeli District in Chhattisgarh State

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Abstract

Achanakmar, Amarkantak biosphere reserve was declared as biosphere reserve in 2005. This is the first biosphere reserve of Chhattisgarh state. The conserved area of the Achanakmar wild life sanctuary is located in the Mungeli district. Mungeli was made district in January 2012. The study region located at the junction of hill range of Madhya Pradesh and Chhattisgarh. It is spread between 800 15′ and 840 20′ East of longitude and 170 46′ and 240 5′ North of latitude. The total geographical area of biosphere reserve is 3835.51 sq km The typical Monsoon climate of the reserve has three distinct season summer (March-June), rainy (July-October), winter (November-February). May and June are the hottest months while December and January are the coolest month of the year.

During present study survey of ethnomedicinal herbs used by tribal people of Achanakmar region was undertaken. The phytosociological study conducted in mixed forest area of different sites of Achhankmar region *viz*., Lamani, Jalda, Chhaprwa, Shivtarai, Kewachi. We have collected information of ethnomedicinal herbs in this area and its use.

Phytosociological analysis of ethnomedicinal herbs was based on the data collected from the sample plots study area. Quadrates of $1m \times 1m$ for herbs. Total 40 species has been collected and classified form this study region. Therefore present phytosociological study such as density, frequency, and abundance were influenced by the climatic, anthropogenic and biotics stresses prevailing at the study sites. The present study will be very important role in documenting the area conserving the traditionally knowledge of tribal people regarding the use of ethnomedicinal plants.

Keywords: Biosphere; Climatic; Conserving; Density; Traditionally

Importance of Flowering Plants in Rituals of Shree Jagannath Temple in Puri, Odisha, India

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Abstract

Flowers are usually offered to glorify God as they gladden the mind and contents of our soul. In mythological view, "The man, who in a state of purity offers flowers unto the deities, finds that the deities become gratified with him and afford affluence upon him". Therefore, flowers are abundantly used in different rituals of deities in temples. These cultural practices are more scientific, which are less studied or documented. Hence, the present study is carried out to document and validate the uses of different flowers in the different cultural practices and daily rituals of Shree Jagannath temple, Puri. The data were collected and recorded by undertaking regular visits to the temple through questionnaires and interviews of the relevant priests and service providers. About 33 flowering plant species with various cultivars of 26 genera and 19 families are identified to be used in daily and annual cultural practices. Flowers belonging to Oleaceae, Asteraceae, Rubiaceae and Apocynaceae are majorly used for different attires of the deities. But there are some plants like *Mangifera indica* L. of family Anacardiaceae, used to make a special temple dish on special occasions and another flower of *Saraca asoca* (Roxb.) Wild. of family Caesalpiniaceae, is offered as medicines. From this present study, it is evident that flowers are not only used to ornate charm but also have significant role in different ritual practices in temples, which may be based on some scientific basis that could be further explored. Extensive traditional use of flowers requires their nurture and also contributes in biodiversity conservation.

Keywords: Deities; Flowering Plant; Rituals; Shree Jagannath temple

Stingless Bee and Flowering Phenology at Backyard Garden

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Abstract

Stingless bee *Trigona iridipennis* is unique because the honey produced by it has many medicinal properties as compared to other apis species and therefore, it fetches high price. The biodiversity and floral phenology of the backyard was studied in relation to the foraging activity of stingless bees *Trigona iridipennis*. A survey was carried out to identify predominating bee-flora resources, their blooming period which serve as nectar and pollen sources to stingless bees. The study area is situated in Raipur district of Chhattisgarh in north eastern India between the latitude 21.2455 and at the longitude 81.599 with an altitude of 298.15 m (978.18 ft.).

Astareaceae, Liliaceae, Cucurbitaceae, Solanaceae, Portulacaceae, Aizoaceae, Brassicaceae, Malvaceae, Umbelliferae, Apocynaceae, Cyperaceae, Graminae, Lamiaceae, Acanthaceae, Convolvulaceae are the 14 families visited by stingless bees across sites. Herbs are predominated among the plants visited by the stingless bees, followed by shrubs. The monthly percent abundance of bee was 25, 46, 43, 23, 11, 7, 5, 5, 5, 6, 6 and 10 during January, February, March, April, May, June, July, August, September, October, November and December respectively correlated with the floral calendar. Highest bee flora flowering was recorded during January to April, therefore, this period considered as honey flow period.

Majority of the plants visited by the bees were cultivated species. From present study it can be concluded that honey flow period was month from January to May and dearth period from July to September. February and March months were the most suitable time for honey harvesting. The results of this study guide the bee keepers in determining areas suitable for *iridipennis* culture. Environmental variables like climate, temperature, humidity and rain fall, greatly affect the bee flora and their pollinators. The extensive knowledge about local floral calendar is a key for successful beekeeping and play vital role to make profitable entrepreneurships.

Keywords: Bee Keeping; Floral Phenology; Honey Flow Period; Stingless Bee; Pollinator

Study of Aeromycoflora of Sugar Mill Area of Kawardha City

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Abstract

During present course of investigation biodiversity and seasonal variation of aeromycoflora of sugar mill area of Kawardha city was studied monthly, to check seasonal variation each of which was sampled *via* plating method and were analyzed microscopically. Samples were collected monthly from December 2018 to November 2019 to determine seasonal variation of these fungi. The identification of the mycoflora was done with key given by Alexopolus and Mims. Total fifteen species belonging to five genera were isolated and identified. The fungal diversity resembled marked variations. The most common genera identified are *Aspergillus, Penicillium,* and *Fusarium* were found in moderate occurrence, whereas *Curvularia*, and *Rhizopus* were of rare occurrence and irregularly distributed .

Keywords: Aeromycoflora; Biodiversity; Fungal diversity; Seasonal Variation; Plating Method

Biodiversity and its Conservation: With Special Reference to Medicinal Plants Conservation in Chhattisgarh

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Abstract

Biodiversity word was coined by W.G. Rosen in 1985. Biodiversity refers to the variety of living organisms within a given area including all the different plants, animals and microorganism, the gene they contain and the ecosystem of which they form a part. Biodiversity can be divided into genetic diversity, species diversity and ecosystem diversity. Biodiversity is measured in three terms alpha, beta and gamma diversity, these terms were described by Whittaker in 1972. Chhattisgarh state (India) which is situated in Vindhyanchal hill region and Deccan plateau in Central India. 7.8 million indigenous and tribal communities earn their livelihood from these forests and biological resources. Medicinal plants can be conserved through medicinal plant conservation area. Medicinal Plant conservation area refers to such a forest area where medicinal plants of great importance are preserved in their natural habitat. In these areas, plantation, collection, harvesting, etc are restricted while measures like water conservation, soil conservation, and research studies are allowed. These areas are managed by all local people in the biosphere in such a way that the present generation is benefited and the needs of the future generations are preserved. After the selection of medicinal plant protection area, the work of assessment of vegetation found in those areas and preparation of herbarium of the species will be done by the experts. So, that conservation can be done by assessing the availability and quantity of medicinal plants of endangered and commercial importance found in these areas. It urgently needs scientific attention for the better management of its natural resources and heritage.

Keywords: Biodiversity; Conservation; Forest; Medicinal Plants

Diversity of Macrophytes in Khamgada Dam of Pathalgaon Block, Jashpur, Chhattisgarh

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Abstract

Water is part of life, we can't survive without Water. Water is the Elixir, symbol of life and an essential unique universal solvent needed by living organism and without it, life is not possible on this planet. It acts as a media for chemical and biological metabolic reactions and also acts as an internal and external medium for several organisms. Macrophytes are most common aquatic plants. Macrophyte plants play important role in ecosystem of dams. The macrophytes to absorb nutrient in large quantities can be utilized for wastewater treatment. The Khamgada dam is situated near of Raja Ama village of block Pathalgaon of Jashpur Chhattisgarh. The latitude of dam is 22º26'38.9'' and longitude is 83.4º43'4'' which receives water from a local river and irrigates the large area of Pathalgaon. The diversity of Macrophytes in khamgada Dam of Pathalgaon Block, Jashpur Chhattisgarh was observed in this study. Total 25 macrophytes were found in this dam. Present study shows seasonal diversity richness in monsoon followed by summer and winter due to variation in temperature and high density. *Hydrilla verticillata* can be used as a better bio-filter.

Keywords: Diversity; Ecosystem; Macrophytes; Vegetation

Maiden Reporting of Golden Yellow Flowering *Butea monosperma* near Ambagarh Chowki in Rajnandgaon district, Chhattisgarh (India) and analysis of Genetic Variability using RAPD

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Abstract

Flowering in the plant, a golden yellow colour in the district of Rajnandgaon, near Ambagarh Chowki, was discovered for the first time. *Butea monosperma* (Lam) Taub Syn *B. Frondosa* is the name of the plant. The facility is located at 20° 49'19.1"N, 80° 44' 45.8"E. Observation and morphological traits was studied on-site. There were three-foliate leaves, a golden yellow bisexual flower with silky silvery wings and elliptical keel petals, and an olive green calyx. Assessment of genetic variability of reported plant was carried out by RAPD. Decamer oligonucleotides was used to perform RAPD analysis on the genomic DNA isolated from the leaves. Using two decamer primer similar RAPD was detected in between yellow and red palash. In future research, will also trying to detect polymorphism using ten decamer primers.

Keywords: *Butea monosperma*; Golden Yellow; Primer; RAPD; Trifoliate

Morphological and Molecular Evidence for Species of Parasites Recovered from Poonch district, India

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Abstract

Freshwater fish *Schizothorax richardsoni*, *Crossocheilus latius*, *Tor putitora*, *Schizothorax progastus*, *Garra gotyla*, *Cyprinus carpio*, and *Mastacembelus armatus* were screened for infection from district Poonch, Jammu and Kashmir, India. The recovered parasites belong to helminthes i.e., Monogenea, Digenea, Acanthocephala and Nematodes. They were diagnosed by PCR and sequencing of 18S and ITS region of ribosomal DNA and mitochondrial Cox1 gene regions. The phylogenetic tree obtained in the study strongly validates them and the results confirm their systematic relationships, and taxonomy in India.

Keywords: Parasites; Nematodes; *Tor putitora*; Diagnosed

To Study of Fish Diversity Various Ponds in Chhura Block Dist. Gariyaband CG

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Abstract

Fauna diversity is unique itself, especially the aquatic creatures that live in a certain habitat, such as fish, in which a lot of diversity is found in the Chhura forest area of Gariaband were naturally occurring ponds, Rasela pond, Kansinghi pond, Bhaismida pond Chhura pond and Kharkhra pond showed the good richness of different species. Some parameters pH, water depth, dissolved oxygen, helped in giving the size and growth of fishes. Present paper study of fish diversity habitat ecology to various ponds in Chhura Block dist. Gariyaband, CG. The study of fish diversity in chhura different Ponds collection of specimens, photograph, and interview of fisher capture man, local market area. A total of 44 species were seen, that belong to different 5 orders and 14 families. Approximately are 70% of the fish landings in the total catch in chhura area pond. These three well-known major carps of high cultivable and some exotic fishes and minor carps were also observed in the reservoir. They were *Hypophthalmichthtys molitrix* and *Cyprinus carpio* which were thriving very well. Among minor and medium sized carps *Labeo bata*, *Labeo calbasu*, *Cirrhinus reba*, *Labeo boga*, *Puntius ticto*, *Puntius sophore*, and *Puntius chola* were also observed.

Keywords: Diversity; Fish species; Ponds diversity; Population ecology

A Short Review on Tolerance of Heavy Metals by Fungal Endophytes Isolated from Plant Growing in Industrial area

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Abstract

Heavy metals are a general term which applied to the group of metals and metalloids and it has more wide range of atomic diversity. Almost all metals have their harmful effect on the plants some shows the basic need for the plants, but some heavy metals are shows very toxic effects on the plant growth when their concentration goes beyond or low concentration to the permissible limits because all metal is not needed for the plant growth and they show the toxicity for the plant growth. Recent studies show this heavy metal contaminated area brings changes in metabolism, physiological and biochemical changes and lower the biomass generation and their reductions. A number of the microbes are found to require nutrients for their existence through the interaction with plants which might be harmful (parasite) or beneficial to the host. The species of fungi that reside within the living plant tissue without causing the symptoms of disease in their host which is known as the fungal endophytes. They are the major member of the endophytes population and they may enter through the root, leave, and stems. Many recent studies found that every plant has at least one or more endophytes also these studies show that these endophytes are helpful in plant growth and provide biotic and abiotic protection and enhance the biodiversity of the plants. Therefore, the future perspective of plant development we also use and develop these fungal endophytes. Through the development of endophytes, we enhance the capability of the plant metabolism and increase the biomass and the diversity of the resistant plants, and use this plant for the area of the toxic heavy metals and increasing the rate of the tolerance capacity of the plants for heavy metals. We have to develop such kind of fungi which has the capacity to diverse the risk associated with metals and metalloids by many chemical modifications and through the mechanism such through the uptake and transformation. Through the production of metal resistance plants, we use this plant for the detection of the concentration of the metals and toxicity effect in plant and this plant will be helpful for many medical industries.

Keywords: Atomic diversity; Biodiversity; Endophytes; Metalloids; Transformation

Biology and impact of savage population of Nile Tilapia (*Oreochromis niloticus*) in the Yamuna river (India)

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Abstract

Yamuna river is a major river of the India, rising from the Himalayan Mountain system. It originates from Yamunotri in the district of Uttarkashi in Uttarakhand. Its total length of around 1376 kilometers and is the longest right bank tributary of Ganga river. The Nile tilapia, *Oreochromis niloticus*, is an African freshwater cichlid and one of the world's most important food fishes. In India, tilapia (*Oreochromis niloticus*) was introduced in 1952, with a view to filling up unoccupied niches, such as ponds and reservoirs. These traits mean that Nile tilapia often out competes native species in areas where it has been introduced. The Nile tilapia has been intentionally spread across the world as an aquaculture food fish. Sometimes confused with the Blue tilapia (*Oreochromis aurea*), the Nile tilapia has escaped aquaculture facilities to warm water river systems and lakes . It is a hardy fish which tolerates a wide range of environment therefore well suited for aquaculture. It is not surprising that this becomes the third most commonly introduced fish species all over the world. The dominating percentage of exotic fish species should be noticed. These exotic fishes have been identified as one of the most ecologically detrimental of all fresh water invasive fish species. To sustained the habitat for indigenous fishes, effort should be made to alter the condition of riverine water.

Keywords: *Oreochromis niloticus,* Exotic Fish, Yamuna River

An Overview of Global Biodiversity Change with Reference to Biodiversity Loss

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Abstract

Global biodiversity change the very known and one of the most burning environmental issues of the present time. Inspite of the the various components we are discussing the two important components of biodiversity change - one is biodiversity alterations and the other is biodiversity loss. Here we briefly assess the impacts that modern humans and their ancestors had on biodiversity and discuss the recent declines and the changes in biodiversity. We evaluate the direct pressures on biodiversity change, change in habitat, overexploitation, the exotic species, pollution, and climate change. We discuss the root causes, such as demographic growth and resources used, and review existing scenario projections. We identify successes and impending opportunities in biodiversity policy and management, and highlight gaps in biodiversity monitoring and models. Finally, we have discussed how the ecosystem conceptual framework can be used to identify undesirable biodiversity change and to distribute conservation efforts.

Keywords: Extinctions; Species; Abundance; Range; Land-Use; Climate

Soil Protozoa of Rice Fields of Durg District

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Abstract

Soil is the most edaphic factor of the earth in which plants and other soil organism like protozoa grows. Protozoa constitute a very small fraction of microfauna, biomass wise, but are much more important, functionally. This is the first extensive study of soil protozoa of rice fields soil of Chhattisgarh. In the present study, the soil samples collected from rice fields were analyzed for their physico-chemical characteristics and types of protozoa. Total 11 protozoa were recorded. Out of which 04 genera of rhizopods and 07 genera of ciliates were observed during the study period. The density, % frequency and abundance with important value index have been calculated. The heights species diversity were found for the Rice field of Teligundra and lowest species diversity was found for the rice field of Rounda.

Keywords: Microfauna; Physico-chemical analysis; Protozoa; Rice field diversity

Molecular Detection of ESBL Producing Genes in *E. coli* Isolates from Lion, Tiger and Leopards of Chhattisgarh

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Abstract

A total of 57 faecal samples collected from captive lion, tiger and leopards from 03 zoos were processed for isolation of *E. coli*. Based on characteristic colonies and biochemical tests, isolates were presumptively identified as *E. coli* which were confirmed by expression of 16S rRNA gene. Overall antibiogram of *E. coli* isolates revealed highest sensitivity towards ceftriaxone-tazobactum while highest resistance was observed against norfloxacin (87.72%). Norfloxacin was the most resistant antimicrobial against isolates from lion and tiger while cefpodoxime was most resistant antibiotic against isolates of leopard. A total of 19 isolates were found to be presumptive ESBL producers (33.33%) on ESBL agar. A total of 12 (21.05%) isolates were found to harbour ESBL producing genes blaTEM and blaCTX-M. Highest prevalence of ESBL producing *E. coli* by m-PCR was observed in MBZ (57.14%) while it was lowest in KPZ (15.00%). Highest prevalence of ESBL by molecular method was observed in leopard (41.67%) while it was lowest in tiger (11.54%).

Study of Solar Flare Index with Cosmic Ray Intensity Variations during SC 20 to SC 24

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Abstract

Cosmic rays come from the centre of galaxies and supernovae explosions, and they reach the Earth's surface from all directions, where they are detected by ground-based neutron monitor stations with varying cut-off rigidities. The climate of the Earth, as well as the average land-ocean temperature, is changing on a daily basis. The Earth receives its life from the Sun. Coronal mass ejections, solar wind plasma discharges, and solar proton events are examples of many phenomena. Solar radio bursts (radio blackouts), the formation of sunspots, solar flares, and the emission of solar flux all have a significant impact on the Sun-Earth climate. It is observed that Sunspot number and grouped solar flares are highly positive correlated [C(t) ≈ 0.818] during the period January 1966 to December 2014. High degree of anti-correlation [C(t) ≈ -0.684] (CRI Oulu–SFI), [C(t) ≈ -0.693] (CRI Moscow – SFI) and [C(t) ≈ -0.710] (CRI Rome – SFI) observed during same period. During SC 21 ascending phase correlation is high [C(t) ≈ -0.872] (CRI Oulu – SFI), [C(t) ≈ -0.849] (CRI Moscow – SFI) and [C(t) ≈ -0.853] (CRI Rome – SFI). Same way during SC 22 ascending phase correlation is high [C(t) ≈ -0.855] (CRI Oulu – SFI), [C(t) ≈ -0.843] (CRI Moscow – SFI) and [C(t) ≈ -0.846] (CRI Rome – SFI). For other solar cycle correlation between CRI-SFI is found to be weak. During investigation maximum anti-correlation coefficient observed [C(t) ≈ -0.8996] (CRI Oulu – SFI), [C(t) ≈ -0.8832] (CRI Moscow – SFI) and [C(t) ≈ -0.8867] (CRI Rome – SFI) and Time-lag is 0 month for all the stations observed in the year September 1986 to October 1996 (SC22) for CRI -SFI. For whole investigation period (SC20 to SC 24) average Time-lag observed corresponding to maximum correlation is 0 to 14 months for CRI-SFI.

Keywords: Climate; Coronal mass ejections; Cosmic rays; Radio blackouts; Sunspot

An Overview of Nanotechnology in Monitoring and Controlling Air and Water Pollution

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Abstract

Environmental pollution is one of the serious issues facing nowadays as result of increasing population and its modernization. The day-to-day increasing population is contributing towards the deterioration of our natural resources. Other than anthropogenic sources, natural calamities like volcanic eruption, lightning also contribute towards the damage in the overall atmosphere. We need some potential technology that is able to monitor as well as detect various contaminants from air, water and soil. The life-threatening effects of pollution has led to the improvisation of efficient strategies to combat it. Nanotechnology offers a wide range of capabilities and technology. Nanotechnology is the branch of science dealing with materials having any of the dimension in nanoscale range. In recent years, nanotechnology is applied for combating the ill-effects of pollution. Nanotechnology is the latest and promising methods used in the world in this regards via production of nanosensors, nanocatalysts (nanostructured catalysts as air purifier in automobiles), nanocoatings. Nanotechnology is also used to control water pollutants via nanofilters, nanoparticles, carbon nanotubes. The various nanomaterials are employed in waste-water treatment, soil remediation, and used in various kind of biosensors. The current review focuses on the latest application of nanotechnology in controlling or neutralizing the ill-effects of pollution.

Keywords: Air pollution; Nanomaterials; Nanotechnology; Water pollution; Wastewater treatment

Constructed Wetland Model Using Macrophytes for Treatment of Wastewater

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Abstract

In contrast to specialised wastewater treatment technologies, constructed wetlands are a unique choice. The current trend is to simulate basic subsurface constructed wetlands in order to increase the complexity of the constructed wetland system and thus improve the effectiveness of the wastewater purification process. This new wetland was created using a hybrid system that was designed to enhance the potency of general constructed wetland (subsurface horizontal and subsurface vertical flow). Constructed wetlands are created in a more controlled environment to use natural processes such as wetlands, plants, soil, and microbes to remove contaminant from wastewater. The plant is an important component of constructed wetlands. Macrophytes assist to balance out and oxidise dregs by forming the basic segment of a wetland. The purpose of this study is to first determine the diversity of macrophytes in Durg area, then treat wastewater of rice million effluent with 6 macrophyte. After treating wastewater test the effluent of hybrid system in various parameter DO, TDS BOD, COD, pH, conductivity and temperature and find out *Eichhornia* macrophyte in wetland system has ability to 95% BOD and 65% COD evacuation than that without the plant.

Keywords: Horizontal subsurface flow system; Macrophytes; Wastewater Treatment; Wetland, Vertical flow system

Algae as a Boon for Environment and Industries

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Abstract

Algae is a single or multicellular photosynthetic organism. Algae is found in both types of waters freshwater and marine water. There are different types of algae present in environment such as Dinoflagellates, Cyanobacteria (blue-green algae), and Diatoms. Dinoflagellates are commonly found in marine water but it can also grow in freshwaters. Some of Dinoflagellates are endosymbionts of marine animals and play an essential role in biology of coral reefs. Diatoms are unicellular organisms and found in marine waters, its shells are made up of silicon. Cyanobacteria is mostly found in freshwater and contains specialized organelles such as leucoplasts, etioplasts, chloroplasts. Algae contains three main components lipid, fat, proteins which are used in commercial products formation. Extraction of lipids from algae are done by using certain methods such as Folch method, Bligh and Supercritical insitu transesterification etc. Determination method for triacylglycerol using MALDI time-of-flight mass spectroscopy, EST linear ion trap-orbitrap MS and HNMR scpectroscopy. Algae is used for production of bio-ethanol, biogas, bio-hydrogen, biodiesel and bio-oil, in food industries algae is used in production of single-cell proteins, pigments, bioactive substance, pharmaceuticals and cosmetics. The present review is prepared for enlightening on application of algae as food, fuel and also for providing some commercially available algae products.

Keywords: Algae; Cyanobacteria; Diatoms; Dinoflagellates; Photosynthetic

Impact of Ecotourism on the Socio-Economy of Villages in and Around Protected Areas of Chhattisgarh

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Abstract

Community-based ecotourism is widely recogn ised as a preferable approach for successful wilderness management. The same is emphasised in the 2018 National Policy for Ecotourism in Forests and Wild Life Areas. In this context, the current study was done to analyse the impact of ecotourism on the socio-economics of communities in and surrounding Chhattisgarh's Protected Areas. The study sites include Achanakmar Tiger Reserve, Udanti-Sitanadi Tiger Reserve, Kanger Valley National Park, and Barnawapara Sanctuary. Questionnaires were distributed to villages in the core and buffer zones of Tiger Reserves, as well as inside the protected area and ecological zone of the National Park and Sanctuary, to collect primary and secondary data. The survey sample size was calculated using the Krejcie and Morgan (1970) approach. The data was analysed based on the current socio-economic conditions of the villages, the extent of community participation in ecotourism firms, and the extent of government handholding of such enterprises, as all of the study sites have a significant quantity of tourism operations. The findings found that rainfed agriculture and labour were remained the most common types of employment, with most people owning less than one acre of land and being beneficiaries of FRA or forest patta holdings. Most villages have basic facilities of drinking water, mostly solar electricity, anganwadi and primary school but health is a major setback, The majority of them are either illiterate or have only received a primary education and are unaware of EDCs (Eco development committees) their functioning, management, and benefits, despite the fact that the analysis reveals a good to moderately good relationship status with forest staff. However, local communities' ongoing expectation of being handled by the government, as well as a general lack of excitement for community entrepreneurship, were obvious. Overall, the study concludes that ecotourism has had only a minor positive impact on local populations' socioeconomic conditions.

Keywords: Ecotourism; Ecological zone; Entrepreneurship; National park; Socioeconomic

Designing of Low-Cost Homemade Instrument to Measure Mechanoluminescence Property of Phosphor Material

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Abstract

Demand of luminescence measuring setup increased due to development of wide range of material producing luminescence. These materials are a good candidature in display and lighting application. This paper covers basic concepts and designing of mechanoluminescence detection homemade setup. The light detection system comprises of a photomultiplier tube (PMT) in combination with suitable detection filters. The luminescence stimulation system comprises of a heating element and an optical stimulation unit. It is claimed that this is the home made and low-cost setup for the mechanoluminescence detection spectroscopic technique.

Keywords: Handmade Mechnoluminescence instrument; Optically Stimulated Luminescence; Low-cost; Luminescence; Thermoluminescence

Developmental Toxicity of Cypermethrin in Zebrafish

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Abstract

Cypermethrin is the most common toxicant present in freshwater aquatic systems. It is used for controlling pests of both indoor and outdoor systems. Cypermethrin is a type of pyrethroid insecticides which is used in forestry, homes, agriculture etc. In the present study, developmental toxicity of Zebrafish embryos has been studied thoroughly and investigated the CYP exposure effects on the apoptosis induction in zebrafish. To study the developmental toxicity, zebrafish embryos of 4-h post-fertilization were exposed to different cypermethrin concentrations until 96 h. Various morphological abnormalities like the body curvature was observed at highest concentrations. Antioxidative enzymes activities, i.e., superoxide dismutase and catalase of zebrafish larvae were induced in a concentration dependent manner. Further the toxic effects of cypermethrin investigated on fish by acridine orange staining. Intensity of Quantitative fluorescence showed a dose-dependent increase in apoptosis signal. The results demonstrate that oxidative stress was induced by Cypermethrin and showed apoptosis. Developmental toxicity of cypermethrin investigation using zebrafish embryos was helpful in understanding the various mechanisms of cypermethrin exposure and also suggested that Zebrafish serve as an ideal model for toxicity testing of environmental contaminants.

Keywords: Acridine orange; Antioxidative biomarkers; Cypermethrin (CYP); Acetylcholine esterase developmental toxicity; Zebrafish

Vermicomposting: An Effective Option for Recycling Organic Waste

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Abstract

Vermicomposting is a method that uses earthworms and microorganisms to help stabilize active organic materials and turn them into a high-quality compost. It is a sustainable alternative to chemical fertilizers that is high in NPK, micronutrients, and beneficial soil microbes. Most organic items, such as food preparation wastes and leftovers, scrap paper, animal manure, agricultural crop residues, organic byproducts from industry, and yard trimmings, can be consumed by earthworms. Home gardening, landscaping, turf grass, viticulture, use in potting soil for the horticultural sector, and agriculture are just a few of the uses for vermicompost products. Vermicomposting can also help with waste problems and produce an excellent manure; in addition, vermicomposting prevents inorganic compounds, polymers and metals in untreated waste-based organic fertilizer to harm the soil on direct application.

Keywords: Compost; Earthworm; Organic waste; Microorganism

Hand Sanitizer: A Boon or a Bane?

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Abstract

With the widespread emergence of Covid-**19** as a pandemic and declaration of lockdown across the nations worldwide, hand hygiene is universally adopted and the use of hand sanitizers is promoted to prevent human-to-human transmission of infection. The two alcohol-based hand sanitizers are widely accepted namely; Ethanol (**60-95%)** and Isopropyl alcohol (**70-91%)**, and one non-alcohol-based- Benzalkonium chloride (**0.2%** w/w). These sanitizers when prepared and used with correct formulations have proven to be effective against SARS-CoV-**2.** According to WHO (**2020** reports), not only human-to-human contact can cause infection, but the virus can remain until **3** hours in aerosol, **4** hours on the copper surface, a day on cardboard and wooden surfaces, and up to **3** days on plastic and stainless steel. Therefore, hand, as well as surface sterilization, has become a necessity to avoid infection. With the ease in technology and the need for proper sanitization, a contactless hand disinfection system with an automatic sensor has been developed which avoids direct contact and prevents cross-contamination. During the initial pandemic days, overconsumption of hand sanitizers led to a shortage which further provoked people to blindly follow various DIYs on YouTube channels to prepare sanitizers at home. These formulations weren't as per WHO guidelines and lacked expertise, therefore considered unsafe for children and may even lead to various infections of the skin, vomiting, cough, etc. Furthermore, shortage also led to adulteration of various toxic chemicals such as methanol which have harmful effects. Studies reveal that the sudden announcement of lockdown (across India) led to an immediate cessation of alcohol supplies, which misled people to consume this alcohol and caused deaths among persons who were alcohol dependent. As per various reports we can conclude that people need to be more aware while using any hand sanitizers and should keep them away especially from children. Proper sanitization even after vaccination is a must.

Keywords: Benzalkonium chloride; Ethanol; Hand-sanitizer; Methanol; Surface sterilization; Sanitization

A Review on Fungal Laccases: The Green Catalyst and its Environmental and Commercial Benefits

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Abstract

Laccases represent a family of the largest subgroup of blue multicopper oxidases (MCO) widespread in multiple natural sources including plants, fungi, bacteria and animals that catalyse the oxidation of a variety of aromatic and non-aromatic substrates by reducing molecular oxygen to water. Owing to their broad substrate specificity they are suitable candidates in various industrial and biotechnological applications. Amongst all the sources of laccase, fungal laccases are widely studied and are the main source of the enzyme in biotechnological sectors and therefore are regarded as "Green Tool"/ "Green Catalyst" in biotechnology. Fungal laccases are produced by different genera of ascomycetes, some deuteromycetes and mainly basidiomycetes. All fungal laccases have average molecular weight ranging between 60 and 70 kDa with a total of 520-550 amino acids. Moreover, they have an average optimal reaction temperature of 55°C and an acidic isoelectric point of around pH 4.0. Its optimisation can solve problems of finding optimal working conditions. Apart from its traditional applications in bioremediation and waste water treatment, laccases have a variety of less studied and novel applications, such as bio-fuel, biodegradation, biosensors, fiberboard synthesis, dye degradation, food product stabilisation, pesticides, and in the textile and pharmaceutical industries for the preparation of anti-cancer and anti-oxidant hormonal drugs. This review deals with the novel approaches toward lesser-known applications of fungal laccase especially in terms of environmental applications and the problems related to their implementation as well as the structural features, mechanism of action, production, optimization and future prospects of fungal laccases including its shortcomings and advantages related to availability of laccase, large-scale production and cost-efficiency.

Keywords: Fungal laccase; Future environmental prospects; Laccase production and optimization; Industrial and biotechnological applications; Structure and mechanisms

Bio-brick: Environment Friendly and Sustainable Building Material

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Abstract

India is land of agriculture, and is home to a diverse range of agricultural crops. This generates a huge amount of agro-waste around 350 million tones/year, that needs to be disposed. At the same time, with increasing urbanization and development the demand of raw materials like bricks increases rapidly. Researchers from IIT Hyderabad and KIIT Bhuvneshwar , introduces the alternative material with use of agro waste, “Bio-bricks”, a brick made from using agriculture waste like paddy straw or sugarcanes molasses etc. Bio-brick is eco friendly brick which is sustainable and cost effective than conventional bricks. It act as good sound and heat insulator, also it has low density that making it more economical for construction industry. Predominately due to negative carbon footprint, it emerges out as potential use of agro-waste management. So basically this study concerns the use of agricultural waste that meets the need of developing construction industry, design and construction of bio-bricks, its uses in various areas of structures and benefits along with its limitations. Taking consideration to all the advantages of bio-brick, proper awareness among public should be propagated and more initiatives should be taken to promote the application of bio-bricks, so that our contribution would minimize the air pollution to some extent.

Keywords: Agro-Waste; bio-brick; Conventional; Sustainable

Plant Based Air Purifier

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Abstract

The Air Quality Index is very poor nowadays and it is causing serious health issues. Many plants like Snake Plant have the property to work as natural air purifier. IIT Roopar's startup company have used air purifying plants and developed a living plant based air purifier "Ubreathe life" that purifies air in the indoor space. The technology used is the 'Urban Munnar Effect' along with the pending 'Breathing Roots' to amplify the Phytoremediation process of plant. It removes air pollutants inside the room and increasing the Oxygen level. It uses HEPA filter, Charcoal filter and UV disinfection fitted inside a wooden box. The tested product shows AQI drops from 311 to 39 in 15 minutes in a 150 sq. ft. room. So it is very useful in removing pollutants inside the workplace or home by using plant. Taking in concern the increase in pollution and Covid-19 scenario it acts as a good air purifier in indoor space. Since the pollution is increasing with each passing day, therefore there is a need of plant based air purifier.

Keywords: Air Quality Index; Phytoremediation; Pollution

Health Risks due to Consumption of Heavy Metal Contaminated Vegetables

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Abstract

Vegetables provide carbohydrates, proteins, vitamins, iron, calcium, and other nutrients to the diet, making them a necessary component. Due to its simple availability, disposal concerns, and shortage of fresh water, industrial or municipal wastewater is mostly used for irrigation of vegetable crops, mostly in urban areas. The use of wastewater for irrigation results in a large build-up of heavy metals in the soil. It contaminates the soil and has an impact on the quality and safety of food. Vegetables absorb heavy metals and store them in large amounts in both edible and non-edible sections, causing clinical issues in animals and humans who consume them. Although some heavy metals, such as Cu, Fe, and Zn (and even Cr (III)), are necessary for metabolism, they can be harmful in high doses. Many other heavy metals and metalloids (for example, As, Pb, Cd, and Hg) are toxic and categorized as non-essential for metabolism and other biological functions. Excessive intake of dietary heavy metals can lead to a variety of major health concerns. Furthermore, eating heavy metal-contaminated food depletes several critical minerals in the body, leading to lowered immune systems, embryonic development retardation, poor psychosocial behaviour, malnutrition-related impairments, and a high prevalence of upper gastrointestinal cancer. The current study focuses on the impact of using wastewater to irrigate vegetable crops.

Keywords: Contamination; Heavy-metal; Irrigation; Malnutrition; Wastewater

Ayurveda and Ethno Medicine

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Abstract

Ayurveda is a Sanskrit word "Ayur" meaning life and "Veda" meaning science or knowledge. It means knowledge that tells us about our lifestyle. It imparts knowledge about the cause of disease and cures it by natural medicine including the therapies which balances the body, mind, spirit with the surrounding environment. Ayurveda originates in the Atharvaveda and Rigveda and is based upon the principles of trigunas (sattva, rajas, tamas). Ethnomedicine or traditional medicines are practiced by various ethnic groups or indigenous peoples. Ethno medicine is the use of various plant parts, practices, beliefs and is concerned with the cultural interpretations of health and disease. The use of plant parts traditionally for health is gaining importance and popularity but scientific documentation, safety and effectiveness of ayurvedic drugs should also be maintained. Ayurveda, Ethno medicine and traditional knowledge of ethnic groups has proven useful to the study of modern pharmaceuticals based on plant parts. Ayurveda trigunas and dosas (vata, pitta and kapha) are balanced by the use of various medicinal preparation correlated with Ethno medicine. Knowledge of Ayurveda in preparation of traditional medicine will be a boost to modern medicine. Ayurveda and Ethno medicine have a common traditional platform which can be used for the preservation of this knowledge.

Keywords: Ayurveda; Diseases; Ethno medicine; Health; Traditional medicine

Activity of Phytoconstituents as Immunomodulatory Agent

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Abstract:

Immunomodulators are drugs that affect the immune system by either strengthening immunological defences to improve the body's response against infections or external injuries, or suppressing abnormal immune response generated by host defence mechanism. Immunoadjuvants can also help the immune system act on non-immune targets, resulting in a better immunological response. Plant components, such as leaves, bark, and seeds, contain pharmacologically active moieties that can be used to discover semisynthetic medicines from natural products. Some important phytoconstituents as immunomodulators are Tulsi (*Ocimum sanctum*), Satavari (*Asparagus racemosus*), Bahera (*Terminalia belerica*), Kalmegh (*Andrographis paniculata*), Giloy (*Tinospora cardifolia*), Turmeric (*Curcuma longa*), Ginger (*Zingiber officinalis*), Punarnava (*Boerhavia diffusa*) etc. Thanks to the development of chromatographic techniques who have confirmed the medicinal properties of these plants with regard to the substances present. According to COVID-19 pandemic studies, those with strong immunity had a greater recovery rate against COVID-19. Ayurvedic and medicinal plant items have therapeutic characteristics that can be used to treat infections and other diseases. These botanical plants, which are cheap, having minimum toxicity, can be found almost anywhere in the country. It has the potential to boost immunity in the fight against pandemic and other infectious diseases, as well as play a key role in making India and the world more fit and healthy.

Keywords: Ayurvedic; Chromatographic techniques; Diseases; Immunoadjuvants; Immunomodulators; Phytoconstituents

Diversity and Use of Ethnomedicinal Plants in Mahuatoli, Jashpur District

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Abstract

Here, a survey was conducted in different sites of Jashpur district. Finally we assessed to which extent medicinal plants are vulnerable because of collection and habitat destruction. There are many tribal communities live together, which have good traditional knowledge for conservation strategies of medicinal plants in the district. The diversity of endemic and indigenous medicinal plants has contributed to a great extent for practice of traditional medicinal therapy by local tribal communities**.** Due to the diverse habitat and geographical conditions in Jashpur, it is harbors to wealth of medicinal plants**.** Plant diversity reveals the knowledge of different variety of plant species in their natural environments. The focus of study notes that in the district several plant species belonging to different families were used as 'herbal healers' for many diseases. Although only a few of plant species used for specific human consumption while many more play important roles in natural ecosystems and the services they provide and rare species are more likely to own unusual traits that might be useful within the future.

Keywords: Ecosystem; Jashpur; Mahuatoli; Plant diversity; Species diversity

Ethnomedicine: an Aboriginal Culture for Improvement of Quality of Life

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Abstract

This review aims to explore the beneficial effects and improvement of quality of life by the use of ethno medicine. Now-a-days with the advancement of scientific knowledge and research, plant derived phytoconstituents are interestingly recognized as a useful candidate for effective treatment in various disorders. Many traditional healers have long been using this approach to treat a large number of disorders in tribal areas of many states. In the current scenario the drug development process is strongly focused on plant based lead compounds those target particular receptors or proteins of the organism using many models including high throughput screening (HTPS) approaches. Many plant derived compounds such as vinca alkaloids like vinblastine, vincristine, taxol, d-tubocurarine, cardiac glycosides like digoxin, digitoxin are already in use for human beings. Herbal based therapies are universally accepted and believed to be safe and effective with less adverse effects. Many herbals used by traditional healers in the treatment of various dreadful diseases since a long time have not yet been scientifically validated. There is a need to explore these compounds scientifically after evaluating their safety and effectiveness for the benefit of society.

Keywords: Ethno pharmacology; Ethno medicine; Phytochemical; Scientific validation

Medicinal Approach of Plants in Covid-19: A Review

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Abstract

The Corona virus malady 2019 (COVID-19) pandemic has caused a worldwide happening of disease. Considering true, numerous treatments modalities are well-thought-out, together with ancient medicines, that has been wide used throughout the past pandemic outbreaks. During this review we have a tendency to square measure discussing the various ways for management of SARS CoV-2 infection by reducing its morbidity in patients as an adjuvant to fashionable medical care. Republic of India has the exclusive distinction of its own recognised ancient drugs, ie. Ayurveda, Yoga, Unani, Siddha and medical aid (AYUSH), a system supported definite medical philosophes and represents the way of achieving a healthy life style with typical ideas on the hindrance of diseases and promotion of health. There square measure several healthful plants endemic to Republic of India and employed in the Indian systems of drugs that are rumored as anti-viral with immunomodulatory and anti-allergic/anti wheezy activities. Some habitually used common Indian healthful plants for exploring COVID-19 are: *Tinospora cordifolia* (Giloy), herbaceous plant (turmeric), *Ocimum sanctum* (Tulsi), *Phyllanthus emblica* (Amla), flower *sativa* (Black cumin), genus *Cinnamomum verum* (Dalchini), white pepper (Black pepper), etc. Flavouring drugs is taken into account one in all the choice approaches within the treatment of COVID-19. A complete of thirty-nine flavouring medicines were known as terribly seemingly to attractiveness to COVID-19 patient. The National Health Commission & Ministry of Health has declared the employment of flavouring drugs (*Tinospora cordifolia*, *Ocimum sanctum*, *Piper nigrum*, monocot genus *officinalis*) as a treatment for COVID-19. Whereas there's no drugs for COVID-19 as of currently, it's imperative to require preventive measures like practising self hygiene, social distancing and boosting immunity. Whereas these flavouring medicines won't cure or forest all the contagious disease they will each improve general patient well-being and provide them a chance to individualize the therapeutic approaches.

Keywords: COVID-19; Flavouring Medicines; SARS CoV-2

Ethnomedicinal Plants used by Tribes of Korba District, Chhattisgarh India: Review

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Abstract

Medicinal plants are plants that have the potential to treat diseases. India has a long history of using medicinal plants and herbal medicines to treat illnesses. For the majority of our population in rural and tribal areas, medicinal plants are the only viable health-care option. Ethnomedicine refers to the study or comparison of traditional medicinal plants. Chhattisgarh is also known as "The Land of Tribes" and "Herbal State". Among northern half of the state is the Korba district located which is home to many tribal communities such as the Pahadi Korwa, Gond, Raj Gond, Kawar, Birhore, Bhaiyana, Binjwar, and Dhanuhar, etc. Traditional techniques of curing various human diseases by utilising a variety of plant species from various families are still used by the tribes. These herbs are frequently used to treat nausea, diarrhoea, ringworm, ear ache, gastrointestinal problems, stone, diabetes, infertility, blood pressure, fever, cough, cold, snake bite, jaundice, cancer and other ailments. In the therapy of various health disorders, a total of 94 species from 46 families were documented. The Fabaceae and Euphorbiaceae families were the most common in the survey. The most commonly utilised component in the preparation of medicine was roots. The primary goal of this study was to gather data and accurately document medicinal herbs used by tribes.

Keywords: Diseases; Ethnomedicine; Medicinal herbs; Traditional techniques; Tribes

Medicinal Plants from Selected Region of Southwest Bastar District of Chhattisgarh (INDIA) with Respect to Ethnomedicine

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Abstract

People have been employing medicinal plants to treat diseases since the ancient period. The conservation of plant and animal biodiversity, as well as folklore knowledge information, is important in the Bastar region. The findings given in this research are an attempt to report the diversity and therapeutic value of medicinal plants readily available in the district of Dantewada, Sukma, Chhattisgarh, India. During the 2019-2020, significant field surveys were done. Traditional healers and some of the older personnel documented the ethnomedicinal uses. It was discovered that there are only a few people that use medicinal plants in their daily lives. It was clearly seen that the Bastar region has significant potential for the production of therapeutically important plants, but on the other hand, most people are unaware of the present plant species' potential. It is therefore recommended that the optimum utilization of available important medicinal plants should be done with the help of providing knowledge to the rural people regarding their neighbour medicinal flora and the steps towards the conservation of the biodiversity and ethnic information about the traditional and holistic uses of the medicinal plants should be done. The loss of ethnic information is also a concern, as without adequate documentation, the great holistic knowledge would be lost.

Keywords: Biodiversity; Conservation; Ethnomedicines; Medicinal plants; Therapeutically

Bioactive Molecule Present in Ashok Tree (*Saraca asoca*): A Review

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Abstract:

This paper describes the different bioactivities: antibacterial, antioxidant etc. of extract of different part of *Saraca asoca*. From ancient Indian different plant parts (bark, flower and leaves) was used for their medicinal values. The Ashoka tree is not only a sacred and traditional plant in India, and are often used healing properties. The leaves and flowers of the Ashoka tree are commonly used to treat itching, ulcers, eczema, psoriasis, dermatitis, scabies, and inflammation. It is also used to treat fever, female genital problems, diabetes, and other conditions. The presence of Alkaloids, Flavonoids, Glycosides, Saponins, Phenols, Steroids, Tannins, and Triterpenoids is responsible for this. This review is based on collection of journals which belongs to Pubmed, Elesvier, Springer, and other reputed international and national journals from the year 1990 to 2020. The present review confirms of photochemical, antibacterial, antioxidant and other microbial activities of all plant extract of *S. asoca*.

Keywords: Ashoka tree; Bioactivity; *Saraca asoca*

Qualitative Analysis of Phytocompounds Present in *Radermachera xylocarpa* Roxb. Ex. K. Schum.

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Abstract

Plants are a rich source of secondary metabolites and these exhibit beneficial effects on human health. The present study is conducted to investigate different phytocompounds present in the leaf and stem extracts of *Radermachera xylocarpa*. Extraction of phytocompounds was done using two solvents namely methanol and water. The preliminary screening revealed the presence of tannin, saponins, cardiac glycosides, terpenoids, steroids, triterpenoids, alkaloids, and flavonoids in aqueous extract of leaf and methanolic extract of leaf and stem. Glycosides were found to be absent in both extracts of leaf and stem. Further studies on the properties of these metabolites would enlighten the potential of this plant to be used in the extraction of industrially important metabolites.

Keywords: Medicinal plant; Phytochemical profiling; Phytocompounds; *Radermachera xylocarpa*; Secondary metabolites

Phytochemical Analysis and Antibacterial Study of *Boerhaavia diffusa* L. Root Extract

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Abstract

Boerhaavia diffusa L (Punarnava) is a valuable medicinal plant that is high in Rotenoids, Flavonoides, Boeravione A, Punarnavosides, Vitamins A, B, C, E, lignans and sterols. It belongs to the family Nyctaginaceae family. Punarnava is used to treat nephritic syndrome, urinary tract and bladder diseases, convulsions, abdominal pain, splenomegaly, tissue inflammation as well as other diseases. The herb's anti-spasmodic, anti-microbial, and anti-inflammatory properties, aid in the prevention of bacterial infections in the urinary system, lowering inflammation and pain while urination. As a result, the present study was designed to examine the content of several phytochemicals in *B. diffusa* root extract using both qualitative and quantitative analysis, as well as their bioactivity using different antimicrobial assays. *B. diffusa* roots were collected from the Bhanja Bihar campus area, dried in the shade and powered. It was then extracted with methanol in a soxhlet system. The extract was then concentrated, dried, and kept at 4°C until needed. The extract was found to include a variety of bioactive phytocompounds that were responsible for their demonstrated bioactivity. The antibacterial activity of *B. diffusa* root extract was outstanding against gram-positive and gram-negative clinical isolates of uropathogenic bacteria. As a result, more research is being conducted to determine the specific roles of these phytocompounds on uropathogens at a molecular level.

Keywords: Antibacterial; Antimicrobial; *Boerhaavia diffusa;* Bioactivity; Inflammation; Phytochemical analysis; Uropathogens

Possible Uroprotective Role of Some Medicinal Plants Collected from Ganjam District, Odisha, India

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Abstract

Tropical weather of Ganjam makes it richer in medicinal flora. These medicinal species are in use for variable urogenital issues without any scientific validation. Present study is an attempt to evaluate phytochemicals and antimicrobial potential of ethnomedicines for the future medicinal prospects. According to surveys, traditional herbal practitioners frequently prescribe the leaves of *Abutilon hirtum*, root of *Calotropis procera*, stem of *Tinospora cordifolia* and corn silk of *Zea mays* against a list of urinary problems like dysuria, kidney stone, UTI, uremia, stone in urinary bladder etc. Present study aims at scientific reasoning behind the effectiveness of these uroprotective phytomedicines. This involves correct identification of species, collection of required plant parts from the habitat, powdering of air-dried parts, preparation of their methanolic extract and storage at 4℃ for further experimental purposes. The standard absorbance curve is plotted by taking gallic acid and rutin as standard solutions for TPC and TFC to calculate the total phenol and flavonoid content. Wild shrub, *Abutilon hirtum* has rich phytocompounds like alkaloid, carbohydrate, flavonoid, glycoside, phenol and tannin in leaves. Root of *Calotropis procera* constitute glycoside, carbohydrate, phenol, tannin, terpenoid. Stem of *Tinospora cordifolia* has saponin, terpenoid in addition to carbohydrate, glycoside, and phenol. Corn silk of *Zea mays* possess alkaloids, traces of carbohydrate and glycoside, phenol, saponin and tannin. Effectiveness of these drugs can be measured by quantifying the phenol and flavonoids. Study of antimicrobial potential of these drugs against uropathogens like *Escherichia coli, Proteus vulgaris, Staphylococcus aureus, Pseudomonas aurogenosa, Enterococcus faecalis* may open doors for large-scale acceptance of these phytomedicines by general public which had been till date localized knowledge.

Keywords: Antimicrobial; Ethnomedicine; TPC; TFC; Uroprotective phytocompounds

An Overview on Ethnomedicinal Properties of *Moringa oleifera* for Management of Sickle Cell Anaemia

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Abstract

The villagers and people of India have confirmed the ethnomedicinal usefulness of plants by using them as primary therapies for a variety of diseases. Plant medicinal values have grown as a result of the COVID-19 epidemic. Traditional healers have used medicinal plants to cure a range of diseases, including jaundice, anaemia, diabetes, leprosy, and sickle cell anaemia, since ancient times. *Moringa* has been shown to have potent antioxidant, anti-anaemic, anti-aging, and anti-sickling properties. As per various research, *Moringa* plant (leaves, flower, seed, bark, and latex) are enriched with several compounds such as glycosides [malonates, flavonoids (quercetin, kaempferol)], elements such as zinc, calcium, iron, vitamin C, and amino acids, which have a high antioxidant effect and are helpful in the management of sickle cell anemia. *Moringa oleifera* is effective in the therapy of sickle cell anaemia as well as the development of ant sickling drugs.

Keywords: Antioxidant; Ethnomedicine; Medicinal plants; *Moringa oleifera*; Sickle cell anaemia

A Review on Ethnomedicinal Herbs in the Management of Major Endocrinological disorder develops due to Adapting Sedentary Lifestyle

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Abstract

Sedentary lifestyle has become a major public health concern in recent years. Despite being connected to a variety of chronic health disorders; the sedentary lifestyle appears to be becoming more prevalent in many countries. Sedentary behaviour, in general, can contribute to endocrinological disorders. Sedentary behaviour, in general, can contribute to endocrinological disorders. The endocrine system is a system of glands and organs that is found all over the body. The major job of the endocrine system is to control a wide range of physiological activities by releasing hormones. Hormonal imbalance occurs when the function of endocrine system is altered. For the management of major endocrinological disorder many ethnomedicinal herbs are used. This main aim of this work is to focus on traditional herbs that target the endocrine glands. In addition, a number of traditional herbs have been discovered to be useful in the treatment of major endocrine disorders such as diabetes, hypertension, thyroid disease, and PCOS. In this review article we provide a brief introduction of sedentary lifestyle, followed by a discussion on endocrine system, hormones secreted by endocrine glands, and major disorders of endocrine glands. The ethnomedicinal herbs that can be easily targeted on endocrine glands for the treatment and management of hormonal imbalance are also discussed. We than present and discuss the ethnomedicinal herbs that can be easily targeted on endocrine glands for the treatment and management of hormonal imbalance.

Keywords: Diabetes; Endocrine glands; Endocrinological disorders; Ethnomedicinal herbs; Hypertension; Sedentary

Phytochemicals Analysis of Leaf Extract of Plant *Cinnamomum tamala* and their Biological Effect on Mosquito Larvae

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Abstract

Worldwide mosquitoes are one of the vectors that transmit vector-borne diseases such as dengue, malaria, and yellow fever which cause high mortality rates in individuals. A variety of chemical approaches were applied for the control of mosquitoes but unfortunately, long-term exposure to chemicals shows an adverse effect on the environment as well as the health of the individual. To reduce this problem plant-based method is highly applicable. Secondary metabolites and plant extracts were used as biological tools to control mosquitoes. In our study, we evaluate that the biological effects of leaf extract of *Cinnamomum tamala* (Indian bay leaf) in various concentrations on the developmental stages of larvae of mosquitoes. Bioassays for the larvicidal effects of these extracts at various concentrations with the time of exposure were evaluated. Mortality data were calculated by finding LC50 values through probit analysis. The toxic effects after 24h and 48h were evaluated, at significant exposure to the LC50. The leaf extract from *Cinnamomum tamala* demonstrated greater efficiency for larval control. The low LC50 value indicates a better toxicant dose/concentration for larvicidal activity. This research reported that without using any kind of special solvent (chloroform, ethanol, methanol, etc.), only double distilled water extract shows a highly cost-effective alternative for larvae control because the mortality percentage increased significantly.

Keywords: *Cinnamomum tamala*; Larvicidal activity; Mortality percentage; LC50; Phytocompounds, Probit analysis

Traditional Medicinal Plants as a Fulcrum against Drug-Resistant Tuberculosis

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Abstract

Mycobacterium tuberculosis, the causative agent of tuberculosis (TB) has been known since ancient times. According to the World Health Organization (WHO) 2019, about 1.4 million people have died from tuberculosis (TB) worldwide, demonstrating the disease's severity. The majority of these instances were reported from South Asian countries (44%), followed by African countries (25%), and countries in the Western Pacific (18%). Earlier attempts to control or cure the disease had failed miserably. Surprisingly, even the most current medicinal treatment program (DOTS) had failed to eliminate this disease. Various factors have been suggested as possible causes for the inability to treat tuberculosis. One of the most important reasons is that TB patients around the world follow an incomplete drug treatment plan. Drug-resistant strains such as Multiple Drug-Resistant tuberculosis (MDR-TB), Extremely Drug-Resistant tuberculosis (XDR-TB), and, more recently, Total Drug-Resistant tuberculosis (TDR-TB) arise as a result of partial drug treatment (TDR-TB). The Discovery of drug-resistant strains has resulted in renewed efforts to identify potential new drugs compounds from a variety of sources, which may assist the treatment of tuberculosis. Globally, a consensus is forming around the idea that traditional medicinal plants could offer us the breakthrough we need to treat tuberculosis. Although anti-tuberculosis activity, in the form of crude extracts has been reported from various plant families, Asteraceae and Fabaceae, together constitutes the major percentage of anti-tuberculosis studies. As a result, identifying, isolating, and studying the pharmacological action of bioactive chemicals for tuberculosis treatment is important.

Keywords: Asteraceae; Bioactive chemicals; Drug-Resistant; Fabaceae; Medicinal plants; *Mycobacterium tuberculosis*

Anti-biofilm Activity of Medicinal Plants: A Review

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Abstract

Biofilm is a microbial community of bacteria that adhere to a surface and are encased in a self produced extracellular polymeric substance. The formation of these static communities and their natural resistance to antimicrobials are the reasons for many persistent and chronic infections of bacteria. According to the various reports 80% of the bacterial infections in human are biofilm-associated, frequently being caused by *Escherichia coli, Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa.* The Chemical therapy for these infections is unsatisfactory for various reasons including toxicity, ineffectiveness and drug resistance. Therefore, to address this situation new alternatives have been proposed. Drugs which are extracted from natural sources are major interest, and so the study is mainly focused on various medicinal plants and its compounds anti-biofilm activities. In recent year plants have been exploited for the search of new drug that can lead to further medicine development. Various plant extracted substances are being studied for possible application in medical field includes crude extract of stems, barks, root, leaves, essential oils, and other compounds isolated from any of these sources. Compounds such as phenols, terpenoids, eugenol extracted from bark of *Cymbopogon nardus,* ellagic acid extracted from pomegranate (*Punica granatum*) shows dose dependent inhibition of biofilm in bacteria like *S. aureus* and *E. coli,*. Different methodologies have been reported for the bacterial biofilm growth and detection. The crystal violet staining method has been reported for the detection of biofilm growth, both in case of treated or untreated culture. Elucidation of extract on pre formed biofilm has also been done. In this review, we have described various probable strategies to investigate the anti-biofilm effect of plant products which can be further use in treatment of biofilm generated infections.

Keyword: Anti-biofilm; Biofilm; Drug resistant; Plant extract

Ethnomedicinal Practices in Various Tribal Group of India

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Abstract

Ethnomedicine is a part of Medical Anthropology. Medical anthropology studies the correlation between human health, and their culture. It has knowledge and understanding about its therapeutic activity, the origin, cause, treatment, and prevention of disease. This knowledge is not only related to herbs and plants but also magical-religious activities that have special significance. There are 75 types of PVTGs residing in India, which have different medical systems. This article is based on secondary data which describes treatment, prevention, diagnosis of diseases from plant parts such as root, leaf, fruit, and flower which are being used by Tribal groups of India. Tribal groups have always been dependent on nature and forest for their livelihood, in which medicinal dependence is prominent. Their priority for treatment has always been ethnomedicine. For the treatment of tuberculosis, paralysis, mental diseases, animal bites, and especially gynaecological diseases like menstrual irregularities, anemia, problems related to childbirth, abortion, etc., they give priority to traditional healers and ethnomedicine. It is also true that the use of ethnomedicine and magical-religious activities by the tribes has reduced due to the activeness of modern medical institutions like primary health centres, community health centres, and workers like Mitanin, A**NM** nurses, Anganwadi workers. Modernity is having a special effect on their lives, Due to this, their traditional knowledge regarding medicine and health is getting destroyed. It is necessary to document their traditional knowledge related to medicine. It is essential to preserve the traditional knowledge of the tribes, several initiatives have been taken by the government like Biological Diversity Act, Traditional Knowledge Digital Library.

Keywords: Ethnomedicine; Traditional knowledge; Anemia; Treatment

A Report on Wild Mushroom Diversity and Distribution in Pt. Ravishankar Shukla University Campus, Raipur, Chhattisgarh

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Abstract

Tropical regions are prominently rich in biodiversity especially diversity of macrofungi. Mushrooms are known as macrofungi, when they bear a peculiar fruiting body which are either hypogeous or epigeous in nature and can be easily picked by hand. Hence, they occupy a special place in fungi world. Over 140,000 of mushroom species have been reported throughout the world but still much more exploration is needed to unearth the rest. As we know mushrooms are necessary part of our planet because they are recyclers, and the fruiting bodies are important source of food and medicine for many animals including humans. The aim of this study is to explore the diversity of mushrooms from Pt. Ravishankar Shukla University Campus which will help to understand the mushroom diversity pattern in central India as well as ecological association of plants and fungi. A total of 55 wild mushrooms were collected and documented. They belong to a total of 3 orders and 10 families according to their morphological characters and ecological distribution. The majority of mushrooms belong to the order Agaricales and family Agaricaceae. This is the preliminary study on documentation of wild mushrooms from Raipur district of Chhattisgarh and it will be used as a reference databases for future research work in this area.

Keywords: Chhattisgarh; Diversity; Macrofungi; Mushroom

Study of Fungal Endophytic Characters Isolated from Four Medicinal Plants in Chhattisgarh

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Abstract

Endophytic fungi are plant based fungi that are associated with healthy internal plant tissues. They are ubiquitous in plant species and interaction between endophytes and host promotes the plant growth, defense mechanism against the pathogens and endophytes also adapt the mechanism as their host plant. Endophytes have the potential to produce secondary metabolites and enzymes which were utilized in pharmaceutical, agriculture, food, textile industries. They are highly diverse in tropical regions. Chhattisgarh state belongs to the tropical forest which is recognized as an herbal state. This state has a high diversity of medicinal plants with their pharmaceutical importance. The four medicinal plants selected, are *Careya arborea*, *Adina cordifolia*, *Acacia catechu* and *Swertia chirayita*. These plants have several medicinal properties which help in stomachache, diarrhoea, dysentery, ulcer, gastric problem, constipation, treating piles, skin diseases, and preventing against various types of diseases. It is estimated that every plant species contain endophytic fungi. These plants were explored for endophytic fungi and diverse types of fungus were isolated from four medicinal plants. These endophytes have different characteristics based on their colour of mycelia, growth pattern, form, margin, elevation, septation, pigment production. These endophytes might produce secondary metabolites with diverse biological activities such as antibacterial, antifungal and antioxidant activity.

Keywords: Antibacterial; Diarrhoea; Endophytes; Growth pattern; Pigment

Preparation of Soy based Yoghurt using *Lactobacillus* Spp., Extraction and Assessment of Alpha Galactosidase Enzyme Activity

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Abstract

Fermented soy yoghurt has many advantages over non-fermented. Fermentation reduce undesirable pathogens and improve product flavor. It also helps to replenish the intestinal flora and useful for the people having lactose intolerance. Soy yoghurt is made by fermenting soymilk with bacteria *Lactobacillus* Spp. and *Streptococcus* Spp. The sugars present are fermented into lactic acid which causes the formation of curd. The formation of acid lowers the pH about 4.0, which restrict the growth of food poising bacteria. The present study was conducted to isolate *Lactobacillus* spp. form *Dinsha* (*kadhi*) *dahi*, crude dahi, dosa batter and sorghum flour on MRS agar media. Lactic acid bacteria were isolated and identified. Soyamilk extracted from 12 h cold water soaked soybean grains. 400 mL soymilk was prepared from 500 gm soybean. Soymilk was converted into soy yoghurt by inoculating isolated *Lactobacillus* spp. and then incubating it for 72h at 37°C. Soymilk does not have lactose but have other sugar such as stachyose and raffinose. The enzyme responsible for degradation of raffinose and stachyose present in soymilk was α- galacosidase. It was extracted by centrifugation process at 10,000 g and assayed by using p-NPG as substrate. At different time interval, i.e., after 6 h, 12 h, 18 h and 24 h, the pH was also detected and maximum acid production was obtained after 24h. The study thus helps to demonstrate the use of lactic acid bacteria from fermented foods to produce soymilk yoghurt.

Keywords: α- galacosidase; Fermentation; *Lactobacillus*; *Streptococcus*; Soyamilk

Evaluation of the Use of Different Solvents for Phytochemical Constituents and *In-vitro* Antifungal Activity of *Desmodium gangeticum* (L.) DC. from Narayanpur, Bastar, Chhattisgarh

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Abstract

Infectious diseases represent a major problem to health and they are one of the leading source of morbidity and mortality worldwide. Despite the significant progression in human medicines, infectious diseases caused by microorganisms such as fungi are still a major threat to public health. In the present investigation qualitative screening of phytochemical and *in-vitro* antifungal activity of different non-polar acetone, chloroform and petroleum ether solvent together with aqueous extracts tested at different concentration were prepared from leaf extracts of *Desmodium gangeticum* (L.) DC. (Family: *Fabaceae*) against six different pathogenic fungal strains were compared with generally used antifungal agent like amphotericin- B antibiotics using poison food technique. Results of phytochemical screening revealed the presence of, phenols, alkaloid, reducing sugar, tannins, terpenoids, flavonoids ,saponins, fixed oils, fats and anthraquinone in different solvents. In Potato dextrose agar medium (PDA) a significantly higher mean of GI % was reported for *A. niger* (91.55 ± 0.44) in acetone extract at 1000µl concentration, which did not statistically significantly differ from GI % of amphotericin- B antibiotics (87.55 ± 1.77) for all six fungal strains. Although, lowest growth inhibition % was observed from *T. viride* in chloroform extracts. Effect of fungal strains and different concentration of extracts on growth inhibition percentage of tested fungi were significant at $p<0.001$ level. A consistent increased and better growth inhibition in acetone was observed against *A. niger* compared to antibiotics though statistically non-significant was examined. The results of this screening showed that different extracts showed different extent of antifungal activity against all test fungi.

Keywords: Antifungal activity; Poison food technique; Phytochemicals; SPSS analysis

Survey and Isolation of Follicolous Necrotic Fungi from Certain Legume Crops

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Abstract

Legumes are important source of protein, starch, oil minerals, vitamins and health protecting compounds from the beginning of human history. It is mostly used for therapeutic purposes and is known to posses antihypertensive and antidiabetic properties. A survey was made periodically from November 2012 to March 2013 to the collect infected leaves of 10 leguminous crops viz. *Cajanus cajan, Dolichos lab-lab, Vigna radiata, Vigna mungo, Glycine max, Lathyrus sativus, Pisum sativum, Pisum arvense, Lens culinaris*, and *Trigonella foenum-graecum.* The samples were collected from five different locations of Raipur, sites included Indira Gandhi Krishi Vishvavidyalaya, Raipur, two villages Jora and Bhatagaon, farm house and kitchen garden, Kushalpur. The symptoms on leaves showing dark brown, circular regular, necrotic and chlorotic spots. Total 17 pathogens have been isolated from these crops namely *Cladosporium sphaerosporium, Colletotrichum dematium, Alternaria chlamydospora, Alternaria raphani, Alternaria chlamydospora, Fusarium semitectum, Corynespora cassiicola, Glomerella cingulata, Alternaria citri, Alternaria raphani, Alternaria tenuissima, Cladosporium sphaerosporium, Alternaria alternata, Cladosporium sphaerosporium, Alternaria raphani, Phoma crysanthamicola,* and *Alternaria citri. Alternaria* was observed to be a dominant fungal pathogen in pulse crops. Disease severity ranged from moderate to severe. *Alternaria sp.* appeared as circular colony, greyish white and blackish green in colour, with maximum radial size in *Alternaria citri* and minimum in *Alternaria chlamydospora. Cladosporium sphaerosporium* exhibited dark grey in colour with similar radial size in both *Glomerella cingulata, Fusarium semitectum* produced fluffy growth off white in colour and *Colletotrichum dematium* showed brownish in colour. Pathogenicity test was proved by Koch's postulate. Conidial sizes were recorded using micrometry. *Alternaria raphani* and *Alternaria alternata* showed the largest and smallest conidial size respectively in both original and pathogenic characters.All *Cladosporium spp*. were found to have similar conidial size in both. Conidia of *Glomerulla cingulata*, and *Colletotrichum dematium* were found to be of largest and smallest size respectively.

Keywords: Survey, Disease intensity, Pathogenicity, Conidial size, Legume crops

Survey of Allergy Causing Aeromycoflora and its Allopathic Treatment in Raipur City

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Abstract

Raipur is a capital of Chhattisgarh and also an industrial and commercial hub of the state. Air pollution poses serious problems to human health in the city. Fungal spores are abundant in the nature and have their involvement in many of the serious allergic diseases. Fungal spores are known as one of the important biopollutants causing allergic manifestation in human beings. The knowledge of airborne fungal spores causing allergic diseases in Raipur city is a prerequisite for proper diagnosis and treatment of allergic disorders. In present study an attempt has been made to survey 3 indoor and 3 outdoor sites of Raipur city. Study was conducted in monthly interval by using Petriplate method. The results of the study indicated the presence of 10 allergy causing aeromycoflora in both indoor and outdoor sites. There were 3 dominating allergy causing aeromycoflora were noted. Survey of 100 hospitals was done and the information was collected from 100 doctors with the help of Questionnaire in Raipur city. The study revealed the occurrence of 11 Allergic diseases and amongst them the allergic rhinitis, allergic asthma and vaginal candidiasis as dominant allergic diseases. The Allopathic drug used for the treatment of Allergic diseases were noted as oral antihistamines, topical steroids, corticosteroids and decongestant while Vaginal candidiasis is usually treated with antifungal medicine. Study concluded that Fungal spores are one of the major contributors of allergic diseases in Raipur city and the largely used allopathic drugs are Mondeslor, Montelukast, Cetirizine, Levocitirizine, Caspofugin and Butoconazole.

Keywords: Allergic diseases; Allergic rhinitis; Fungal spores; Petriplates; Vaginitis

Studies the Effect of Submerged Non-Static and Static Batch Cultivation Approaches for Producing Biomass and Exopolysaccharides of *Pleurotus ostreatus*

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Abstract

The submerged batch cultivation is the most widely used method for mushroom mycelium production. The production of bioactive compounds from mushrooms has been influenced by various physical parameters, including static or non-static conditions, pH, temperature and nutrient source. *Pleurotus* species are edible mushrooms appreciated for their nutritional properties and various bioactive compounds such as polysaccharides, proteins and peptides. The present study aimed to optimize the production scale-up of biological significance components such as biomass and exopolysaccharides. This study successfully evaluated batch static and non-static submerges cultivation for different incubation periods for biomass and exopolysaccharides production from *P. ostreatus*. This study revealed that biomass and exopolysaccharides production gradually increased with incubated periods in batch submerged cultivation systems. The extracted exopolysaccharides from a non-static and static culture containing carbohydrates and phenol showed highly efficient antioxidant capacity. This study concludes that the batch submerged non-static techniques more suitable method for the production of nutraceutical potential biomass and exopolysaccharidess for other pharmaceutical and health enrich product developments instead of synthetic components.

Keywords: Biomass; Exopolysaccharides; Efficient antioxidant; Mushroom mycelium; Non-static cultivation

Partial Purification and Chacterization of Antibacterial Compounds from Endophytic Fungi

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Abstract

Endophytes are microbes, which may reside in the living plant tissues without causing any injury or disease to the host. Most of the endophytes are capable of producing active metabolites and some compounds possess medicinal value. In the present study, the fungal endophytes were isolated from the plant samples, its antibacterial activity was determined and the bioactive substance was characterized. A total of 11 endophytic fungi were isolated from plants obtained from Palar river basin which were arbitrarily named as EF1- EF11. The antibacterial assessment by agar well diffusion showed that EF 10 possesses a very good antibacterial activity against *Staphylococcus aureus* (22 mm), *Klebsiella pneumoniae* (24 mm), *Bacillus coagulans* (25 mm), *Escherichia coli* (21 mm) and *Pseudomonas aeruginosa* (20 mm). Molecular taxonomic studies were carried out to identify the potential strain and the antibacterial compound was partially purified using column chromatography. Spectral and phytochemical analysis of the active fraction showed the presence of alkaloids and flavonoids.

Keywords: Antibacterial compound; Endophytic fungi; Palar river basin

Biodiversity of VAM Fungi in the Rice Field of Durg District

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Abstract

Mycorrhiza term was taken from Greek language meaning – Fungus root, was coined by a German Forest Pathologist A.B. Frank in 1885. Arbuscular mycorrhiza is a mutualistic association between fungi and plant roots. Over 90% of vascular plants of world flora form VA Mycorrhiza. Mycorrhiza increases the absorptive surface of root resulting in increased uptake of water and nutrients from the soil. The fungus translocates phosphorus, nitrogen, calcium and amino acids, and increased translocation of Zn, Na and other minerals to the hosts. The association helps to improve the tolerance of host plant towards biotic and abiotic stress. As the staple food of Chhattisgarh is rice and is commonly known as "Bowl of Rice", biodiversity of VAM fungi associated with rice plants is explored in Purai of Durg district. The study reveals presence of VAM spores of Genus *Glomus, Acaulospora* and *Gigaspora.* Rice fields of Durg district were screened for VAM spores in their rhizospheric soil. 22 types of different spores were recovered and the rice varieties were of 9 types. All the VAM fungi isolated are purified, multiplied and morphologically characterized on the basis of colour, wall layer and size.

Keywords: Abiotic; Biotic; Mycorrhiza; Spores

Studies on Morphological and Cultural Aspects of Oyster Mushroom (*Pleurotus* spp.)

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Abstract

Pleurotus mushrooms are rich in moisture, protein, carbohydrate, crude fiber and has very less content of fat. They are exceptionally high in folic acid which cannot be produced in the body. They are rich in vitamins like Thiamin (B1), Riboflavin (B2), Niacin (B3), Folic acid (B9), Ascorbic acid and micronutrients such as Se, Zn, Fe, Mg, K, Ca, Na etc. They are good source for lovastatin. During September and October 2021, two species of *Pleurotus viz Pleurotus florida*, and *Pleurotus eous* were grown in mushroom spawn lab, Indira Gandhi Krishi Vishvavidyalaya. *Pleurotus eous* also known as pink oyster mushroom, due to its brilliantly pink color in young stage, but at mature stage pink color fades too as they enlarge. Gills present on hymenium, caps curly and thin, stipe bare and too small. Spore print light pink. Favourable cultivation period for the species is between April to September. *Pleurotus florida* had white, broadly spaced gills, even margins in young stage, stipe become too small in age. Spore print white. Favourable cultivation period for the species is between June to February. For isolation, *Pleurotus florida* and *Pleurotus eous* were cultured on potato dextrose agar medium (PDA) and pure cultures were maintained on PDA slants incubated at 26˚C + 2 and 5.5 pH .*Pleurotuse ous* showed white colored mycelium in 3-4 days, after 6-7 days turned light pink and covered entire surface of the culture plate in 15-20 days. *Pleurotus florida* mycelium appeared in pure white color after 3-4 days, and showed cottony appearance after 10 days of growth.

Keywords: Gills; Mycelium; Spore print; Stipe

Studies of Iron Supplementation and Effect on Biological Efficiency in *Pleurotus florida*

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Abstract

The biological accumulation of minerals in mushrooms is highly species-specific. A variety of macro fungi grown on different substrates, concentrations of elements can vary widely and their accumulation capacity may differ even a thousand times from species to species. Oyster mushrooms, known as edible mushrooms, have been popular due to their nutritional value and ability to accumulate essential elements in *Pleurotus* species, including having ligninolytic basidiomycetes grown commercially to produce edible fruiting bodies. Concerning these facts, the present study was undertaken to assess the influence of iron ($FeSO_4$) supplementation on *Pleurotus florida*, analyzed the biological efficiency of the fortified fruiting body, yield, and metabolite profile such as protein, lipid, carbohydrate, and antioxidant activity. The study suggested that iron supplementation influence the production of fruiting bodies, their bioactive compounds and their antioxidant capacity. The produced iron-enriched fruiting body has enormous applications such as functional food, which is used as a prominent dietary supplement instead of synthetic food. The iron-enriched nutraceutical and pharmaceutically essential products are significant for human health, thus allowing them to fight against malnutrition.

Keywords: Antioxidants activity; Edible mushroom; Enriched fruiting body; Ferrous sulphate; Protein

Mineral Fortification and its Impact on Mycelial Biomass and Metabolites of *Calocybe indica*

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Abstract

Minerals are essential for the proper growth and development of the human body. The deficiency of these minerals is the cause of various abnormalities and diseases in human health. A fortification is an alternative approach for enhancing nutrients and minerals in food crops. Mushrooms are well known for their bioaccumulation potential in this mode, they may be suitable for mineral fortification. Compared to other food crops, the mushroom is highly nutritious and contains various medicinal properties. Submerged cultivation of mushrooms has been widely appreciated for producing high biomass and a variety of metabolites such as proteins, carbohydrates, lipids, and enzymes. *Calocybe indica* is also known as milky white mushroom or "Dhuth Chatta", it is a wild edible mushroom that originated in India. The present work aims to optimize the mineral concentration for obtaining fortified mycelium of *C. indica* with maximum growth rate, metabolites, and bioactive compounds. In this study, *C. indica* was cultivated in submerged conditions containing different mineral concentrations, obtained biomass estimated for metabolites contents. The result showed that mineral supplementation in submerged cultivation influenced mycelium growth and metabolites production. It observed that the mineral supplementations enhance mycelium's biomass and metabolites contents up to a specific mineral concentration. Thus, fortified mushrooms can be a good option as a functional food, develop nutraceuticals and utilize to treat mineral deficiency-related diseases.

Keywords: Bioaccumulation; Bioactive compounds; Functional food, Nutraceuticals, Submerge cultivation

Identification of Endophytic Fungi in *Curcuma caesia* Roxb.

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Abstract

Endophytic fungi are plant associated fungi which are rich in genetic diversity. *Curcuma caesia* which belongs to family Zingiberaceae, possesses siginificant medicinal value. In this study, *C. caesia* plant has been selected for the isolation of endophytic fungi. These fungal isolates were further studied for the identification of bioactive molecules of medicinal importance. Scientific methods could help to validate its traditional use and opens the door for a potential drug in the near future. It has been observed that endophytes are good antibacterial agents for future biotechnological applications. In the present work, this fungi was isolated from the surface sterilized living tissue and placed in a medium for tissue culture and produce no harm to the host plant. The vital role of endophytic fungi could open a new era for different area of biotechnology.

Keywords: Biotechnology; *Curcuma caesia*; Endophytic fungi; Zingiberaceae

Microbial Technology: An Updated Recapitulation

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Abstract

Modernization in terms of microbial technology could involve the use of microorganisms in the production of food, alcoholic beverages, antibiotics, organic acids etc. Nevertheless, the present expedite of new food and antibiotic production is due to the rapid incorporation of biotechnological techniques that allow the rapid identification of new molecules and microorganisms or even the genetic improvement of known species. Today, what is urgently needed is the exploration of new microbes and novel genes for solving some of the major challenges of the 21st century with particular reference to sustainable agricultural development, the environment and human health. Microbial technology describes the production and use of economically important bacteria, yeast, mold and viruses and reviews the technologies associated with microbial metabolism products. Animalcules (microorganism), the different activities and functions of these organisms were identified after approximately 200 years later while performing fermentation, understanding diseases in humans and animals and in agriculture. The genetic modification of *Escherichia coli* in the 1970s allowed the production of artificial insulin, which was the first product obtained from recombinant DNA technology and was approved by the United States Food and Drug Administration in 1982. Microbial technology uses the microbial organisms or their derivatives and microbiological system, to manufacture or modify product or processes for specific use. The asset are development of genetically engineered plants with internal resistance to drought, frost, insect pests and infestations, development of novel biomass product as foodstuffs.

Keywords: Animalcules; Antibiotic; Microorganisms; Microbial technology; Recombinant DNA

Production Optimization and Purification of Siderophores by *Pseudomonas juntendi* Isolated from Western Ghats

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Abstract

Siderophores are synthesized by various bacteria to tackle iron deficiency in soil. *Pseudomonas juntendi* was isolated from soil collected from Satara region of Western Ghats. The bacteria produced catechol type Siderophore. Organism produced 33µM amount of siderophore in 48 hrs at 28^0 C. Production was studied in different media and in Glycerol medium showed maximum production. Similarly, pH 7.0, temperature 28^0 C and no added iron (0 $\mu g l^{-1}$) were found to be optimal parameters for siderophore production. Siderophores were assayed by quantitative CAS shuttle assay. Using amberlite XAD-2 resin different purification protocols were compared for purification of siderophore by *Pseudomonas juntendi*.

Keywords: Amberlite XAD-2; *Pseudomonas juntendi*; Siderophores

Screening, Quantification and Profiling of Macro Fungal Mycelial Vitamins from Aqueous Hot Extracts of Selected Wild Basidiomycetes Mushrooms

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Abstract

Mushrooms are wide diversified macro-fungus with fleshy, distinctive fruiting body or sporophores or basidiocarp, that may be hypogeous or epigeous, can be seen through naked eye and to be picked by hand. Mushrooms are well documented as source of nutrients as well as biopotential compounds beneficial to mankind. The nutritional attributes of mushrooms like carbohydrates, proteins, fibre content has been extensively experimented rather the studies on vitamin composition of wild mushrooms are scanty. Macro fungi are important sources of vitamins such as Vitamin A, Vitamin B_1, Vitamin B_2, Vitamin B_{12}, Vitamin C.Vitamin D is rare and Vitamins E and K have also been reported. Vitamins also influence the bioactivity of mushrooms. Decrypting the content of Vitamin A, B_1, B_2, and C of the mycelia of some mushroom fungal isolates of Alagarhills, Madurai, and Tamil nadu. 8mm mycelia agar plugs taken from the growing edge of 7 days old culture in Potato Dextrose Agar plates were transferred to broth and incubated statically at room temperature (28±2ºC). After 28 days, the mycelial growth and biomass production were noted. The vitamins A, B_1, B_2, C were quantified from the mycelial hot water extracts. Vitamin A content in mushrooms ranges from 1.8 ± 0.11 to 11.8 ± 0.36 mg/g. Vitamin B_1 content in mushrooms ranges from 0.0523 ± 0.005 to 0.73 ± 0.11 mg/g. Vitamin B_2 content in mushrooms ranges from 0.17±0.02 to 0.77 ± 0.01 mg/g. Vitamin C content in mushrooms ranges from 0.07±0.05 to 0.81 ±0.02 mg/g. Vitamins play a key role in mushrooms as they ascertain value added health benefits of mushrooms. The future perspective of the study is intended to characterize the bioactivity imparted by vitamins of mushrooms and the proposed nutritional and health benefits.

Keywords: Mushroom; Mycelial; Vitamins

Isolation and Screening of Pullulanase Producing Microorganisms

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Abstract

In the country like India, agro-waste is generated in huge amount containing starch as major ingredient which upon recycling helps to produce other marketable products. Today, saccharification of starch is mainly carried out using amlyase enzyme but it is time consuming process. To overcome the problem, pullulanase enzyme play an economical important role as it carries out saccharification of starch in short period of time with high yield of glucose or maltose. In the present study, pullulansae producing microorganisms were isolated from various soil as well as food waste in enrichment medium supplemented with 1% starch, glucose and sucrose respectively. Total 57 bacterial strain, 10 fungal strain and 5 actinomycetes were isolated which were qualitative screened for pullalanase enzyme using plate screening method on pullalan agar medium. Among selected isolates 8 bacterial culture shows clear zone of pullalan utilization, which were further quantitatively screen for pullalanase enzyme in liquid medium using pullulan as a substrate. Bacterial culture (NP 8) gave maximum pullulanase production of 32.66 U/mL after 24 hours of incubation.

Keywords: Amylase; Pullulan; Pullulanase; Saccharification

Novel Approaches for Developing New Antibiotics

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Abstract

Antibiotics are an essential part of modern medicine. The creation of antibiotic-resistant mutations among bacteria appears to be unavoidable, and after a few decades, the antibiotic's potency will be reduced, and the antibiotic will be phased out of general use. The usual approach to dealing with this issue has been to release new antibiotics that kill resistant mutants. Antibiotics such as penicillin, erythromycin, and methicillin are used to treat infectious infections. However, these antibiotics are becoming less efficient as bacteria develop more resistance to them. Natural products are microorganism, plant, and animal metabolites. These natural compounds have been used to make lead molecules, which have been used to make a variety of synthetic medications. Actinomycetes can create a wide range of bioactive compounds, which have been used to treat a number of human infections. Bacteriophages have been found to be antibacterial in animals and could be useful in the treatment of some infectious disorders. Another option is to develop new antibiotics that target non-multiplying bacteria, which could lead to medications that limit the emergence of antibiotic resistance and improve patient compliance by reducing antibiotic therapy duration. With one exception, these new discovery techniques have resulted in medicines that are in preclinical research but have not yet entered clinical trials. For the time being, the bulk of novel antibiotics on the market will most likely be structural mimics of existing antibiotic families or new compounds, both natural and artificial that are evaluated against live growing bacteria in the traditional fashion.

Keywords: Antibiotics; Bacteriophages; Clinical trials; Erythromycin; Penicillin

Microbial Tannase: Production, Characterization and Applications

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Abstract

Microbial tannase have been known for their immense industrial and environmental applications. These enzymes belong to the family of esterase's catalysing the hydrolysis of tannin producing gallic acid, gallolyl ester and glucose. They are synthesized by various microorganisms' *viz*., yeast, fungi and bacteria. *Lactobacillus planatarum* is one of the prominent bacterial species involved in production of tannase, apart from these several species of fungi viz., *Rhizopus* and *Aspergillus* are also known for synthesizing this enzyme. Tannins are ubiquitously present in plant kingdom moreover effluents of tannery industries are already laden with major amount of tannic acid. Hence, microbial tannase are usually employed in digestion of tannins decreasing the environmental pollution. These enzymes are produced *via* both submerged fermentation and solid state fermentation using several microorganisms. Production of tannase enzyme involved tannic acid, glucose, malts, fructose and gallic acid as a carbon source; however, agro-industrial wastes are also employed in industries for low cost production of enzyme. Tannase exhibited pH and temperature optima of 4.0-8.0 and 30-70°C. These enzymes have immense industrial applications in food and feed industries and are also utilized as clarifying agents in fruit juices, they are also considered as ecologically significant enzyme because of their applicability in waste water treatment. The current review incorporates the microbial sources of tannase, optimization, properties and industrial applications.

Keywords: Tannase; Submerged and solid state fermentation; Waste water treatment; *Lactobacillus*; *Aspergillus*; Gallic acid; Tannic acid

Diversity of Endophytic Fungi Isolated from *Costus speciosus*

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Abstract

Fungal endophytes are the microorganism which inhabitant the plants without causing harm to host plant in return fungal endophytes gives multiple benefits to their host. In this study we are using *Costus speciosus* Koen. (Keu, Crape ginger) to isolate endophytic fungi, this plant is used in our traditional system of treatment because of having multiple pharmacological activities. By isolation through PDA solid based media we have identified 3 species of *Aspegillus* and 1 of *Fusarium* from the leaf of *Costus speciosus* in continuation screening of endophytes is also going on through the stem and underground parts of plant. Fungal endophytes show multiple complex interactions with their host. These has been found in several studies that fungal endophytes provide natural compound which help host plant in many ways in terms of natural bioactive, in survival in stress condition and also helpful for humanity in production of commercial products like medicine, beverages, confectionaries, textiles and leather also.

Keywords: *Costus speciosus* Koen. (Keu, Crape ginger); Diversity of endophytic fungi

Rice Straw as a Potential Feedstock for Bioethanol Production

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Abstract

The demand for energy and the reason for atmospheric devastation is increased enormously because of the consumption of fossils like coal and oil which releases carbon dioxide thus supporting the greenhouse gas effect. The increased usage of fossil fuels in recent years has resulted in their depletion, raising concerns about environmental safety. Bioethanol is the best fossil fuel replacement because its qualitative elements are comparable to diesel and gasoline. The use of lignocellulosic materials is a good choice as a feedstock for ethanol production considering their incredible accessibility, renewability, sustainable energy, and their increased ethanol yields in the global energy matrix. During the rice processing process, the by-product which is removed during rice harvesting is Rice straw. This demonstrates the possibility of using such waste materials for further processing, particularly in the production of bioethanol. The main objective of this study was to explore the potential of rice straw for bioethanol production with *Saccharomyces cerevisiae* and optimization of parameters like pH, temperature, incubation period, nutrients etc. which affects the fermentation process. Quantitative estimation was done by Jones reagent and qualitative estimation was done by specific gravity method. The highest bioethanol was investigated over 24-72 h of incubation period at pH of 7-9 and different temperatures of 30°C, 35°C and 40°C. The highest bioethanol obtained was 9.5±0.49 at 24 h, so by optimizing different fermentation conditions a low-cost, efficient bioethanol can be produced.

Keywords: Bioethanol; Fermentation; Lignocellulosic; Rice straw; Specific gravity

Analysis of Effective Chemical Pretreatment Method of Deoiled Rice Bran for Bioethanol Production

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Abstract

Today's world shifted their focus on an alternative source of energy due to increasing demand and the depletion of fossil fuel. In this context, biofuel plays an important role. Bioethanol is one of the eco-friendly energy source which isused in transportation sector. It can be produced from carbohydrate substrate through microbial fermentation. To maintain food security, bioethanol can be obtained from second generation lignocellulosic substrate. Bioconversion of agricultural biomass into fermentable sugar can be hindered by their complex crystalline structure, to overcome this problem various pre-treatment methods are used. Pre-treatment strategy hydrolyse the complex rigid structure of lignocellulosic component of substrate. In this study, chemical pretreatment methods (acid and alkali) were used to pretreat Deoiled rice bran (DORB) for bioethanol production by *Zymomonas mobilis* MTCC 92 through fermentation process. Before fermentation DORB was pretreated with different concentration of acid and alkali. Fermented sample was distilled and produced bioethanol was estimated by Specific gravity method. The maximum amount of bioethanol of 9.54±0.03 g/L and 10.67±0.01 g/L was produced by acid and alkali pretreated DORB by *Zymomonas mobilis* MTCC 92 respectively. In this study, pre-treatment strategy showed wonderful results, it enhance the bioethanol production. Chemical pretreatment is an effective approach to increase the yield of fermentable sugar to enhance bioethanol production.

Keywords: Bioethanol; Fermentation; Deoiled rice bran; Pretreatment

Microalgae as an Alternative Source of Energy

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Abstract

There are two types of energy sources replenishable and non-replenishable. In which replenishable is the kind of energy source which is reproducible such as wind, thermal energy, solar energy and non-replenishable is available in a limited amount such as natural oil, coal etc. Biofuels are non-fatal, easily accessible, sustainable fuels received from renewable or replenishable sources. Nowadays, Algae can be utilize to produce biofuel. It also called algae fuel or third generation biofuel. It will become the most vital biofuel source in the near future because algae can be grown approximately everywhere and does without need of fertile land or food crops. Algae are the microorganisms that are grow in aquatic environments and use light and carbon dioxide to generate biomass as plant. There are two kind of algae, macro-algae and micro-algae. Microalgae appear to be the only source of renewable or replenishable biodiesel that is capable of fulfilling the global demand for vehicle fuels, which is increasing day by day. Microalgae can be converted to bio-oil, bioethanol or bio-methane via thermochemical and biochemical techniques. Microalgae are theoretically a very profitable source of biodiesel. Algae are among the most rapidly growing plants in the earth, and nearly 50% or more of their weight is oil. This lipid oil can be used to generate biodiesel for cars, trucks. Other fuels such as fossil fuel increase the concentration of carbon dioxide in atmosphere, and the potential for significant greenhouse gas-mediated climate shift. The biofuels produced from microalgae is mainly carbon neutral. The carbon dioxide emitted from burning biofuel is supposed to be neutral as the carbon was taken out of the atmosphere when the algae biomass grew. Hence, biofuels from microalgae do not enhance carbon level in the atmosphere.

Keywords: Bioethanol; Microalgae; Pollution

Optimization of pH and Temperature for Efficient Bio-Hydrogen Production from Lignocellulosic Waste

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Abstract

Hydrogen is a cleanest source of energy carrier and for its production from biomass is one of the important sources. Biomass includes agricultural crops and their waste as by-products, wastes from industries, food processing, aquatic plants, algae and urban waste. Bio-hydrogen obtained from biomass has potential to become an important sustainable transportation fuel in the near future. Biomass such as lignocellulosic material such as agricultural and industrial wastes which are available abundantly as well as environmental friendly. They are cost-effective and rich in carbohydrate. This research paper includes optimization of pH and temperature on bio-hydrogen producing capacity and their effect on bacterial growth.

Keywords: Bio-hydrogen, Dark fermentation; Lignocellulosic biomass

Second Generation Biofuel-A Sustainable Alternative to meet Global Energy Crisis

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Abstract

In the 21st century, the world is cladding a global energy crisis due to the limited availability of fossil fuels. Moreover, the use of fossil fuels has raised a worldwide environmental concern in the past few decades due to its non-renewability and emission of greenhouse gases (GHGs). Second-generation biofuels are produced from plant biomass and are regarded as 'carbon neutral' biofuels because they do not contribute to CO_2 rise in the atmosphere. Due to the renewable nature and GHGs mitigation properties of bioethanol, it has become a favourable alternative to fulfil the energy requirements. Currently, lignocellulosic feedstocks hold great potential for their utilization for bioethanol production. Unlike 1G biofuels, 2G biofuels do not lead to food-vs-fuel conflict as they are produced from non-edible agro-waste residues. The recalcitrant lignocellulosic biomass requires efficient pretreatment strategies to ease enzymatic saccharification for the hydrolysis of cellulose into fermentable sugars. Therefore, before the enzymatic saccharification, physical and chemical pretreatment is performed to reduce the compactness, rigidity, crystallinity and polymerization of the lignocellulosic biomass to facilitate the cellulose saccharification via enzymatic pretreatment. The current study aimed to produce 2G biofuel (bioethanol) from lignocellulosic feedstock 'rice husk' using *Klebsiella oxytoca* ATCC 13182 via simultaneous saccharification and fermentation (SSF). Out of the various pretreatment strategies analyzed, physical pretreatment via grinding, chemical pretreatment via alkaline hydrolysis and enzymatic saccharification (biological pretreatment) via cellulase enzyme at previously optimized fermentation conditions (pH 7 at 36°C and 48-72 hours respectively) favoured maximum bioethanol production (47.98±1.25 g/L) with 63.97% sugar conversion efficiency. The current study highly recommends the consumption of abundantly available agricultural by-products for biorefinery under green technology.

Keywords: Agricultural by-products; Bioethanol; Lignocellulosic feedstock; Pretreatment; Rice husk; Second generation biofuels

Electricity Generation from Starch Based Wastewater Using Microbial Fuel Cell Technology: Impact of Ionic Strength and Substrate Concentration

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Abstract

Increasing global energy demands and over consumption of non-renewable resources have led to the search and use of a renewable and cost-effective source of energy. Microbial fuel cell (MFC) is a bioelectrochemical device that can directly convert energy stored in chemical bonds of the substrate to electricity utilizing microorganisms as biocatalyst. In the present study, the effect of ionic strength and substrate concentration on electricity generation and reduction in starch content in dual-chambered, salt bridge containing MFC employing raw starch-based wastewater was evaluated. Five dual-chambered MFCs were constructed and an anode compartment was inoculated with *Pseudomonas aeruginosa* as biocatalyst. The study aimed to seek out the impact of concentration of substrate and of the addition of NaCl, which is administered for effective MFC performance. The results have shown that 250 mg/L substrate concentration and 20 g/L of NaCl-fed MFC has the highest power density and MFC voltage. Utilizing starch wastewater for bioelectricity generation from the MFC technique is considered as a feasible and sustainable approach.

Keywords: Bioelectricity; Green Energy; Ionic Strength; Microbial Fuel Cell; Starch Wastewater

Application of Recombinant Lipase in the Biocatalytic Activity of Waste, 2T Hydrocarbon Oils, Edible Oil & Biodiesel

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Abstract

Lipase catalyzes the hydrolysis and synthesis esters of glycerol and long chain fatty acids, but only microbial lipases are commercially important. The application of lipases utilized in organic syntheses, bioremediation, biodegradation, and biodiesel. This paper describes how to interact lipase (supernatant) 2T hydrocarbon oil and waste hydrocarbon oil and edible oil. Lipases have more oil dispersion and biocatalytic activity. Bacteria have a prominent property that they breakdown and remove nutrients and organic material in waste water so this type of study is more significant. This study will be beneficial for the future that oil dispersion which is beneficial for hydrocarbon oil eating bacteria they come in contact with oil they eat it, producing the byproduct carbon dioxide and water. This type of study is unique, which is unique as well as cost-effective, as it requires the least number of lipase enzymes for oil dispersion, as olive oil is known to be a substitute for lipase, which results in hydrolysis of the oil. Along with this, the activity of the lipase enzyme also increases, it is an eco-friendly process. Biodiesel is a monoalkyl ester. Biodiesel is a currently good substitute for diesel. Lipases which act as a biocatalyst, undergoes various reaction such as hydrolysis, esterification, transesterification, and interesterification by lipase enzyme. FAME (fatty acid methyl esters) is also known as biodiesel and biodiesel has great potential as alternative biodiesel fuel.

Keywords: Lipase enzyme; Biosurfactant; Oil dispersion; Synthesis

Screening of Antioxidant Activities of Whole Plant and Parts Extracts of *Hygrophila spinosa* T. Anderson

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Abstract

The herbal medicines are considered as healthier substitute for conventional and therapeutic drugs. Medicinal plants can be potential source of antioxidant compounds. The present study deals with assessment of antioxidant activity of *Hygrophila spinosa* T. Anderson (Family Acanthaceae). Hexane, ethyl acetate, methanol, and water were used to extract the entire plant and its parts. Ferric reducing power assay, DPPH inhibition, and DMPD inhibition assays were used to assess antioxidant activity. Qualitative and quantitative phytochemical analysis was done. The highest percentage yield was observed in the leaf aqueous extract. The assays for DPPH and DMPD were carried out in a time-dependent manner. The inflorescence aqueous extract has recorded highest reducing power capacity. Methanol and aqueous inflorescence extracts had the highest scavenging effect against DMPD radical in the shortest amount of time. The *H. spinosa* whole-plant aqueous extract scavenged the DPPH radical more effectively in less time. The content of terpenoids were highest in the ethyl acetate extract of the inflorescence; phenol in the aqueous extract of the leaf; and flavonoid in the aqueous extract of the inflorescence.

Keywords: Antioxidant activity; *Hygophila spinosa*; Solvent extraction

Assessment of Antioxidant and Antimicrobial Potential of *Murraya koenigii* Based Biogenic Silver Nanoparticles

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Abstract

Nanoscience is emerged as a promising approach, applied in various field of science and technology. Biogenic synthesis is an ecological technique for producing eco-friendly, cost effective and well-characterized metallic nanoparticles using plant extracts. Among others, synthesis of silver nanoparticles (AgNPs) obtained significant consideration due to its wide applicability. In present study, biogenic synthesis of AgNPs was done using *Murraya koenigii* leaf extract. The bioactive components of *Murraya koenigii* plays important role in reduction and stabilization of AgNPs. After addition of leaf extract with silver nitrate (1 mM, 90 ml) solution, the color of the solution turned brown, which is the indicating feature of AgNP synthesis. To characterize the synthesized AgNPs UV-Visible spectroscopy and dynamic light scattering was used. Results exhibited the absorbance peak at around 422 nm in the UV-visible spectroscopic investigation, and dynamic light scattering measured the particle size at around 51 nm. Furthermore, antioxidant as well as antibacterial properties of synthesized AgNPs were also investigated. To investigate the antioxidant activity superoxide dismutase, catalase and total antioxidant activity (1,1-diphenyl-2-picrylhydrazyl assay) was done. Enhancement in antioxidant activities was observed with increase in concentrations of AgNPs. Moreover, well diffusion method was used to test antibacterial activity of synthesized AgNPs against *Escherichia coli* and *Staphylococcus aureus*. Zones of inhibition against test microorganism revealed antimicrobial efficacy of AgNPs, which widen with raise in concentrations of AgNPs. In conclusion, AgNPs synthesized using *Murraya koenigii* leaf extracts indicated marked antioxidant and antibacterial activities in a dose dependent manner.

Keywords: AgNPs; Antimicrobial activity; Antioxidant activity; DPPH; *Murraya koenigii*

Phytochemical Screening and Characterization of Green Synthesized Silver (Ag) Nanoparticles from *Urginea indica* (Roxb.) Kunth in Rainy Season

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Abstract

In modern age we are facing many different problems in which, antimicrobial resistant is a serious issue which is responsible for many new diseases. This problem can be overcome by using plant-based medicines or nanomedicines instead of chemical drugs. Green synthesis of Nanoparticles is a non-toxic, eco-friendly and cost-effective method in which plant extract act as reducing and capping agent and forms stable and shape-controlled nanoparticle. *Urginea indica* is a rare and endangered Indian medicinal plant which is used traditionally to cure various problems like respiratory disorders, skin problems, intestinal worms, arthritis, tumors, male sterility, psoriasis, whooping cough, gout, edema, chronic cough, pulmonary troubles, swellings, expectorant and cardiac tonic etc. since very long. The therapeutic property of this plant is due to presence of various secondary metabolites. In this study the seasonal phytochemical analysis of *Urginea indica* (Roxb.) Kunth is done by making its bulb extract in aqueous, methanol and acetone and it was found that it has saponins, flavonoids, glycosides, phenolics, terpenoids and steroids, in which aqueous extract of bulb was further used for synthesis of Silver (Ag) Nanoparticles which was confirmed by UV-Vis spectrophotometer.

Keywords: Kunth; Nanoparticles; Phytochemicals; Secondary metabolites; Silver (Ag); *Urginea indica* (Roxb.)

Preliminary Phytochemical Analysis and Characterization of Green Synthesized Copper Nanoparticles in *Tinospora cordifolia* (Miers.)

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Abstract

In this paper qualitative phytochemical analysis and green synthesis method of copper, nanoparticles in *Tinospora cordifolia* is focused. Green synthesis method of nanoparticles is less toxic and Copper is cost-effective, more stable and also eco-friendly than the other metals. *Tinospora cordifolia* is considered for its pharmacological and biological properties. The leaf part of this plant is used and made into powder form which is successively extracted in different solvent such as acetone, methanol and aqueous. This extract is firstly used for the preliminary phytochemical screening, which showed the presence and absence of phenol, glycoside, flavonoids, steroid, terpenoid and saponin with their solvent. The aqueous extract was further used for copper nanoparticle synthesis where the aqueous extract was mixed with 0.1 M $CuSO_4$ solution in a fixed ratio to make Cu nanoparticles, colour change in the solution was the indication for synthesis of Cu nanoparticles which were characterized by FTIR (Fourier transform infrared spectroscopy) where functional groups are found to be present on the surface of copper nanoparticle.

Keywords: Copper; Green synthesis; Nanoparticles; Phytochemical analysis; *Tinospora cordifolia*

Survey of Medicinal Plants of Family Fabaceae in Mainpur Block of District Gariaband, Chhattisgarh

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Abstract

Chhattisgarh has a forest area of 44% with rich biodiversity. A very diverse type of tribal community is found in different districts of the state. The Gariaband district in Chhattisgarh has a forest cover of 50.41%. The study site Mainpur block in Gariaband district is covered by dense forest. Mainpur block is populated by tribals. The major tribal groups found in the block Mainpur are the Gond, Kamar, and Bhunjiya. Tribals of the area rely mainly on the plants for their livelihood and health security. In present investigation an attempt has been made to record the medicinal plants belonging to the Family Fabaceae. Out of 70 plant species, 14 plant species were identified to belong to the Family Fabaceae which included 5 trees, 5 herb, 2 shrub and 2 climber species. The most dominating species recorded was *Tephrosia purpurea* and the scarce distribution was noted for the species *Ougeinia oojeinensis*, rest of the medicinal plant species had indicated their moderate presence. The traditional knowledge of tribals regarding the use of plants as medicine was also documented.14 plant species of the family Fabaceae were noted to be used by tribals in treatment of 13 diseases. Findings of the study concluded that the medicinal plants belonging to the family Fabaceae has a great potential and could be used for their therapeutic value.

Keywords: Fabaceae; Medicinal; Tribal

Analysis of Anti-Uropathogenic Activity of *Calotropis gigantea* Extracts

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Abstract

The practice of Ayurvedic product in global market has been explored extensively in last decade and has drawn attention among scientific communities to validate the natural and herbal plant products for medical applications. Ayurveda "the science of life" is one of the ancient therapeutic practices encompassing numerous medical notions and assumptions which necessitate to authenticate scientifically for its wide acceptance by the conventional drug therapist. The mainstream scientist are taking effort seriously and trying to validate the mode of action of ayurvedic drugs with established approaches. The aim of the present work is to analyse anti-uropathogenic activity of the crude extract prepared from the plant *Calotropis gigantea.* Results obtained from the present work are quite promising and shown good anti-uropathogenic activity against some bacterial samples which were isolated form urinary tract infection (UTI) infected patients.

Keywords: *Calotropis gigantean*; Herbal plant; Uropathogens; Urinary tract infection

Investigation of Phytochemical Analysis of Eight Medicinal Plants from Wardha District (MS), India

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Abstract

The present article included a preliminary phytochemical analysis of eight ethnomedicinal plants from Wardha District (MS). The plants were for analysis such as *Abutilon indicum* L. (Swart), *Hyptis suaveolens* L., *Vitex negundo* L., *Physalis minima* L., *Tephrosia villosa* L. Pers., *Euphorbia hirta* L., *Cleome viscosa* L., and *Galphimia glauca* Cav. Investigations of phytochemicals were carried out by using ethanol solvent with help of Soxhlet extraction methods. The existence of numerous phytochemicals such as alkaloids, flavonoids, tannins, terpenoids, saponin, steroids, and cardiac glycosides is confirmed by a qualitative phytochemical study of these plants. The therapeutic properties of such plant species are influenced by the presence of phytoconstituents.

Keywords: Medicinal plants; Phytochemistry; *Hyptis suaveolens*; Alkaloids

A Miracle Seed of *Diplocyclos palmatus* (Shivlingi)

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Abstract

Shivlingi also known as *Bryonia laciniosa* or *Diplocyclos palmatus*, is a climber herb. Seed of this plant contains many phytochemical compounds which are medically beneficial. These seed looks like shivling of Lord Shiva. This plant belongs to the family cucurbitaceae and found in many regions like Chhattisgarh, Madhya Pradesh, Odisha, Uttar Pradesh, Jharkhand, Maharashtra etc. of India, it also found in other countries such as Nepal, South Japan, and Indonesia. Whole plant is used for medical issues especially seeds. Shivlingi seeds are used for treatment of infertility in male and female, it is also used for constipation, diabetes, weight loss, anti fungal, antibacterial, antipyretic, antioxidant, anti inflammation and uterine tonic. Now this plant is in endangered condition because people didn't pay much attention and people do not know value of this plant only a few people know its value. This plant contains very beneficial phytochemicals like Punicic acid, Glucomannan, Gonitothalamin, Flavonoid, saponin, phenolic acid, sugar. Its main compound is Bryonin. Seeds of this plant are taken with tulsi and jaggery by women of tribal area for conception or to treat infertility, it can also improve sperm count in male. This review study reports the power of seeds of Shivlingi.

Keywords: *Diplocyclos palmatus*; Infertility; Phytochemical Compound; Shivlingi

Survey of Medicinal Plants around Keonchi Village in Amarkantak Mountain Range of District Gaurela-Pendra-Marwahi, Chhattisgarh, India

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Abstract

Medicinal plants have been used for thousands of years to treat health disorders and to prevent severe diseases and epidemics. The harvesting methods and unregulated collection of medicinal plants and plant parts may reduce plant species richness and abundance, therefore the sustainable conservation of medicinally important plants is very essential. In this respect survey of medicinal plants and documentation of tribal knowledge may become very useful. With this objective, the survey of medicinal plant was conducted in the month of October 2021 in Keonchi village of district Gaurela-Pendra-Marwahi in the Amarkantak mountain range of Maikal hills of Central India. The study area is dominated by the tribal community. Major tribal community lives in the area are Kamar, Baiga, Dhanwar etc. Tribal communities of the study area are dependent on medicinal plants for their health security. In present survey of medicinal plants, a total of 25 medicinal plant species belonging to 19 families used in the treatment of 22 diseases were recorded. Documentation included individual and multiple plants and plant parts for the treatment of diseases found in the study area. The documentation also included the tribal knowledge of drug preparation from plant and plant parts and its administration method.

Keywords: Amarkantak; Epidemics; Keonchi; Medicinal plants

Bio-active Sugar Molecule Present in Our Daily Needs: A Review

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Abstract:

Carbohydrate is commonly known as sugar. Sugar is a instinctive constituent of all living things, which would include bacteria, fungi, plants, and placental mammals' milk, which encompasses molecules containing two to thirteen sugars (known as oligosaccharides). In ancient Indian in folk medicine, some ingredients like: honey, cane sugar**,** milk of different origin, etc. are used as home remedies for cold, cough, fever, acidity, skin diseases etc. Sugar is a versatile and indispensable functional food ingredient. Sugar is used to balance acidity, add bulk, as well as prevent spoilage, among other things, in addition to providing sweetness. But did you know that sugar is also used to make medication or even bioplastics for planes. Recently discovered COVID-19 medicine is also sugar based i.e. 2-deoxy-d-glucose. This review is for a short outline of some sugars with bioactive properties which are present in our daily needs, which is based on different international and national journals between years 1990-2020.

Keywords: Bioactive properties; Sugar

Plant Mediated Green Synthesis of Copper Oxide Nanoparticles

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Abstract

In recent years, nanotechnology has emerged as a major division of modern science. The synthesis of Copper oxide nanoparticles has attracted considerable attention because of its ample application. Various physical, chemical, and biological methods have been used to synthesize nanomaterials. Biological systems like microorganisms, bacteria, fungi, yeasts, viruses, and plants have been reported to synthesize various metal and metal oxide nanoparticles. Among these, plant-mediated synthesis approaches are found to be a more reliable and economical route to synthesize metal nanoparticles. However, the exact mechanism for the synthesis of nanoparticles using biological agents has not been devised yet. But it is believed that different biomolecules are responsible for the synthesis of nanoparticles. Plants possess components that can act as reducing, capping, chelating agents, and stabilizers for nanoparticle production. Aqueous extract of different plants were used to synthesize green nanoparticle which was an eco-friendly, easy and efficient convention. Green synthesis, characterization, and application of nanoparticles have become a vital challenge in nanotechnology. This overview summarizes the plant-mediated synthesis of copper oxide nanoparticles, characterization, and application of nanoparticles.

Keywords: Biological method; Copper oxide, Green synthesis; Nanoparticle

Medicinal Value of Mushrooms: A Review

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Abstract

Mushrooms are high in protein, along with vitamins, minerals, and antioxidants. These also provide a numerous health benefit. Mushrooms and fungi produce many as 100 medicinal functions, the much more noteworthy of which have been antioxidant, anticancer, antidiabetic, antiallergic, immunomodulating, cardiovascular protector, anticholesterolemic, antiviral, antibacterial, antiparasitic, antifungal, detoxification, and hepatoprotective effects. Mushrooms are a low-calorie, high-nutritional-value food. They've long been recognized as an essential component of any diet due to their high composition of health-promoting vitamins, minerals, and antioxidants. This review is based on a collection of journals from Pubmed, Elsevier, Springer, and other reputable international and national journals from 1985 to 2020. The current review confirmed the existence of numerous different biologically active compounds in innumerable mushrooms.

Keywords: Bioactivity; Mushroom

Evaluation of Dietary Phytochemicals in Prevention and Treatment of Colorectal Cancer- A Brief Review

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Abstract

Colorectal cancer is one of the high mortality rate causing cancer and third most common cancer among the men and women in the world. Unfortunately in present scenario medical treatments are not sufficient to combat colorectal cancer due to lack of effective therapy, chemo resistance and adverse side effects. According to preclinical studies, various dietary phytochemicals have exhibited chemopreventive effects on colorectal cancer by regulating different signalling pathways such as Wnt/β catenin, PI3K/Akt/mTOR, STAT1-STAT3,TGFβ/smad2 etc. Therefore, these pathways lay a foundation for drug discovery programs. Plant derived chemicals or phytochemicals are group of compounds which have health promoting and disease preventing properties. Phytochemicals attract attention as preventive and therapeutic agent in colorectal cancer due to their non toxic and chemopreventive nature. Various experiments have been done to extract and evaluate the phytochemicals from dietary foods. Microwave Assisted Extraction (MAE) and Ultrasonic Assisted Extraction (UAE) methods are widely used to extract bioactive compounds from plants followed by their purification through Thin Layer chromatography, Column Chromatography, HPLC etc. For the identification of their structures UV-Visible spectrophotometer, NMR and Mass Spectroscopy techniques are used. The extracted bioactive compounds then can be used on cancer cell lines or in animal model to elucidate the modulation of gene regulation and their effect on cancer. This review will provide a platform for research with the aim of identification of most studied plant derived bioactive compounds, their presence in foods and evaluation of therapeutic potential in prevention and treatment of colorectal cancer by targeting different signalling pathways.

Keywords: Chemopreventive; Colorectal cancer; Phytochemicals

Partial Purification of Anti Inflammatory Compounds *Hemigraphis colorata*

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Abstract

Hemigraphis colorata is used as wound healer for long time. In the previous study different extracts from the dried leaf of the plant was collected and evaluated for antioxidant, free radicle scavenging ability, Lypooxygenase (LOX) and Cyclooxygenase (COX) inhibition and wound healing ability. Ethyl acetate extract of leaf had shown significant antioxidant, anti-inflammatory and wound healing properties on cell culture model in our previous study. In order to purify the bioactive compounds with anti-inflammatory properties the ethyl Acetate extract was subjected to silica column and the fractions were collected. All fractions were checked for the antioxidant properties and the ability to inhibit the lipoxygenase and cyclooxygenase enzyme. Fractions showing inhibitory effects were checked for the number of compounds present in the fraction by TLC. Result of the total 10 fractions obtained from the Ethyl Acetate extract of *Hemegraphis colorata* leaves fraction number 5 & 6 had significant inhibitory effect on lipoxygease and cyclooxygenase enzyme. The fractions had two compounds which can be seen through TLC. The partial purification of the anti-inflammatory compounds from the *Hemegraphis colorata* leaves was achieved however further purification and characterization is needed to purify and identify the bioactive compound.

Keywords: Anti-inflammatory; Bioactive; *Hemegraphis colorata*

β-Glucan and its Anticancerous Effect: A Review

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Abstract

Mushrooms have been ingested for thousands of years in many regions for their health advantages and β-glucan has recently been discovered as the key active component. β-glucan is a natural polysaccharide made up of β-linked d-glucose molecule, found in the cell walls of bacteria, fungi like mushrooms and yeast, seaweed, and grains like barley and oats. β-glucan are biological response modifiers with immunomodulatory and health beneficial effects. They also offer other important therapeutic properties including antioxidant, cholesterol and glucose-lowering, anti-hypertensive, anti-inflammatory, anti-viral and antimicrobial effects and multiple β-glucan receptors have been discovered on the surface of immune cells. Furthermore, high β-glucan mushroom extracts have been proven to have direct cytotoxic effects on cancer cells, and are employed in the treatment of variety of cancers.

Keywords: Mushroom; β-glucan; Immunomodulatory

An Investigation on the Ethno-Gynecological Medicinal Erudition among the Kamar Tribes of Chhattisgarh

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Abstract

Gynecology is medicinal healthcare female reproductive systems, which refers to the internal and external sex organs and which facilitate in procreation of new iteration. Ethno-gynecology is a traditional custom of coping with female sexual health related problems by tribal communities, ethno-gynecology likewise gynecology concerns dealing with abortion, infertility, irregular menstruation and during labor and delivery. The present study has investigated the medicines and the ethno-medicinal erudition with regards to obstetrical and gynecological aliment among the Kamar tribes of Chhattisgarh. Research article is centered with primary and secondary data and facts, the study was conducted in Kesodar and Bamhani village of Gariyaband district of Chhattisgarh, primary data were collected with interview guide, non-participate observation and secondary data were collected with books, journals, article, newspaper and internet. A total of 45 traditional medicines were found and described in this study, demonstration of phytochemical and pharmacological properties of these plants have been also described based on previous research through secondary data. Traditional belief and interest for the ailment of obstetrical and gynecological problems had been reflected through present study as well as new information of medicinal plant and their uses were also discovered. Phytochemical and pharmacological properties will find out bioactive molecules of these medicines.

Keywords: Ethno-gynecology; Kamar tribe; Medicinal plants; Traditional erudition

Comparative Study of Essential Oils Extracted from Clove Basil Leaves (*Ocimum gratissimum*) using Hydro-Distillation and Solvent-Free Microwave Extraction

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Abstract

Solvent-free microwave extraction (SFME) and conventional hydro-distillation (HD) were used for the extraction of essential oils (EOs) from clove tulsi (*Ocimum gratissimum* L.) leaves. The comparison between SFME and conventional HD in terms of extraction time, yield, chemical composition, antioxidant, and antimicrobial activities of EO extracted from clove tulsi leaves. The composition essential oil analyzed by GC and GC-MS. The main fractions were found to be classified as phenylpropene, sesquiterpenes and monoterpenes. The major constituents were eugenol, germacrene D, β-ocimene, and caryophyllene. Their antioxidant activity were studied with the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method. The antimicrobial activity was investigated against five microorganisms: two Gram-positive bacteria (*Staphylococcus aureus* and *Bacillus subtilis*) two Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*) and one yeast, *Candida albicans*. The results indicated that the SFME method may be a better alternative for the extraction of EO from *O. gratissimum* because the yield of essential oil is 5 times greater than conventional HD method.

Keywords: Antimicrobial activity; Antioxidant activity; Clove tulsi (*Ocimum gratissimum*); Hydro-distillation

Development and Evaluation of Herbal Based Mouthwash for Antimicrobial Activity

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Abstract

Medicinal plants have phytoconstituents which have lots of properties like treating diseases, food supplements, dietary fibers and killing bacteria and microorganisms in the current scenario due to developing antibiotic resistance towards synthetic drugs, we are focusing on the use of the medicinal plant in place of marketed preparation antibiotics, Herbal products can be first choice for fighting with microorganism, but it will take some time to reach the gold standard of chlorhexidine (CHX). The poly-herbal extract was effective in its activity in the formulation containing 10% w/v concentration of extract. This extract is a suitable formulation, therefore, can be an effective yet safe and nontoxic alternative in treating dental plaque and associated disorders. This paper states that due to the extensive advantages of guava, maha-neem, tulsi, mint and green tea leaves as an antimicrobial agents, they can be used in herbal mouthwash formulations over the chemical ones. The Herbal mouthwash is easy to use and has a better after taste than CHX. Current study reported burning sensation with Listerine and showed brown staining and complained of bitter taste with CHX, it is advisable that clinicians safely prescribe the Herbal mouthwash to their patients. Within the study's limits, it can be concluded that, as an antiplaque and antigingivitis agent, the Herbal mouthwash is as effective as CHX and more effective than Listerine. Thus the results can be used as baseline data for future studies with similar study designs. Many more formulations are to be made to check for the most effective one.

Keywords: Herbal Mouthwash; Herbal Extract; Chlorhexidine

Natural Anti-inflammatory Phytoconstituents: A Lead for NHDDS

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Abstract

Inflammation has been identified as the biggest cause of death in today era, with more than half of all deaths being attributable to inflammation itself or inflammation-related disorders. Inflammation is linked to a variety of disorders, including cancer, cardiovascular disease, diabetes, obesity, osteoporosis, rheumatoid arthritis, inflammatory bowel disease, asthma, and CNS-related issues like depression and Parkinson's disease. To relieve pain and inflammation, NSAIDs, DMARDs, Corticosteroids, and Glucocorticoids are utilized; however they come with several side effects. Novel herbal medication delivery systems (NHDDS) have emerged to prevent the negative effects of currently existing pharmaceuticals. To cure inflammation, a variety of anti-inflammatory plants such as babachi, turmeric, and others are accessible worldwide. A number of herbal formulations including plant extracts or their bioactive ingredients are available, according to the literature, although they have been linked to bioavailability difficulties. To combat these issues, plant extracts or active constituents such as curcumin, piperine, boswellic acid, and others have been incorporated into NHDDS such as transdermal, liposomal, microsponges, nanoparticles, and others. The anti-inflammatory properties of NHDDS are described in this review.

Keywords: Anti-inflammatory; Curcumin; Inflammation; Piperine; NHDDS; Transdermal

Antifungal Plants: A Road to Treat Fungal Infections

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Abstract

Fungal infections are known to be contingent disease worldwide. They vary from superficial, localized skin conditions to deeper tissue infections to serious lung, blood or systemic diseases. Over 300 million people are infected with a deadly fungal infection around the world, with 25 million at high danger of dying or losing their sight. To combat the drug resistance, researchers are constantly working to solve the issues. Keeping in view of side effects of allopathic system; researchers are moving towards herbal drug formulations. Nature has been the vital source of therapeutics for thousands of years, and an impressive number of modern drugs were derived from natural sources. It also provides structurally diverse and biologically active secondary metabolites which can be used for the prevention and treatment of different ailments. Numerous antifungal medicinal plants or bioactive constituents are available globally and due to the lower side effects, we can fearlessly use them for long term treatment. Some of the antifungal medicinal plants are *Eugenia uniflora*, *Psidium guajava*, *Datura metel*, *Curcuma longa* etc. The present review aims to explore the plant, its extracts and their bioactive constituents to treat fungal infection.

Keywords: Antifungal; *Curcuma longa*; *Datura metel*; Herbal drug; Medicinal plants

Antidiabetic Effect of Aqueous Extract of *Withania coagulans* Flower

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Abstract

The study of well-known herbal medicine *Withania coagulans* is from shrubs Solanaceae Family which defines that it is naturally, systematically have thermodynamic potential and has antihyperglycemic activity and high potential, so it is an important and high-value medicinal plant. The flowering part of *Withania coagulans* is used for antidiabetic drugs. As it is found in natural form so does not have any side effects and is a more effective and safe alternative treatment for diabetes. Diabetes is a very serious rising health problem that is seen in our society. It mainly affects people from middle families for various reasons. Diabetes was the ninth leading cause of death an estimated 1.5 million deaths by diabetes. Approximately 700 herbs and shrubs are reported for their anti-diabetic activity out of which *Withania coagulans* is one of the best effective herbs. Alpha-glucosidase is a small intestine membrane-bound enzyme that catalyzes the hydrolysis of an oligosaccharide to absorbable monosaccharide i.e., Glucose thus this inhibition can suppress the postprandial hyperglycemia Based on the antidiabetic potential of *Withania coagulans* docking was investigated with alpha-glucosidase through molecular dynamics simulations and binding site residue responsible for inhibition. As coagulation property of *Withania coagulans* also helps in inhibiting insulin. A single oral administration of variable dose levels (100, 200 and 300 mg/kg b wt.) of the aqueous extract led to lowering of blood glucose as well as diabetic rats. In Acute treatment maximum reduction at glucose level is 52.02% at 300 mg/kg b wt. in the 6 hours and the same with the standard drug it will give a maximum 62.25% reduction of glucose level.

Keywords: Antidiabetic drug; Antihyperglycemic; Hyperglycemia; *Withania coagulans*

A Review on Plants and their Extracts having Antimicrobial Potential

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Abstract

Antimicrobials are used to treat microbial infection (cough, TB, malaria HIV/AIDS, coronavirus). Microbial infection is increasing day by day upto a large extent. The drug resistance arises as the antimicrobial medicines were not able to treat disease, due to developed resistance against microbial strains. Available formulations or antibiotics were now found to be less effective in current era. Combination of antibiotics with natural bioactive constituent may found to helpful in potentialting the effect of the antibiotic like ciprofloxacin with piperine etc. researchers now exploring the antimicrobial potential of the plant and their extracts. Various scientific studies have been conducted with few medical plants to study antimicrobial effect of plants. Herbal plants (tulsi, neem, ashwagandha, cinnamon, mint) contain some phytoconstituents (eugenol, azadirachtin, gallic acid, menthol) having antimicrobial activity. Preparations from herbal medicinal plants and their extracts are used as medicines against microbial infections. Antimicrobial plants may act by causing disintegration of cell membrane, microbes, membrane proteins destruction, disintegration of enzymes located on the cell membrane of microbes. The present review aims to explore the potential of plants and its extracts with antimicrobial activity. The antimicrobial activity of plants and their extracts have been used in pharmaceuticals and as food preservatives.

Keywords: Antimicrobial activity; Extracts; Infectious disease; Medicinal plants; Phytoconstituents; Resistance

Formualtion and Evaluation of Novel Herbal Drug Delivery System for Osteoarthritis

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Abstract

Osteoarthritis (OA) is major cause of chronic musculoskeletal pain and mobility disability. OA can be viewed as the clinical and pathologic outcome of a range of disorders that result in structural and functional failure of synovial joints. Present treatment of osteoarthritis consists of NSAIDS, Corticosteroid. But long-term use of these drugs causes side-effects such as kidney problems, stomach ulcers, and hypertension. To overcome these problems herbal delivery system is used i.e plants like *Piper nigrum*, *Curcuma longa* were selected. Because herbal drugs don't cause problems like modern drugs. These herbal drugs are incorporated in microsponges to overcome the problems related to herbal drugs like low aqueous solubility, pH sensitivity, etc. microsponges with piperine and different concentration of curcumin was prepared. It was concluded that high concentration of curcumin cause coagulation and stops microsponge formation. Microsponges with 20 mg curcumin and 3.75 mg piperine had best properties like production yield, % drug entrapment and microscopy. These microsponges were loaded into 1% carbopol gel, which is selected from different carbopol gels. 1% carbopol gel was selected because of it have beast spreadability and optimum pH. Final microsponges loaded gel was formed by adding 500 mg microsponges into 50 g gel. And stability study of this formulation shows no significant changes.

Keywords: Curcumin; Gel; Microsponge; Osteoarthritis; Piperine

Isolation and Screening of Antimicrobial Proteins and Peptides from Medicinal Plant

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Abstract

Plants used as traditional remedy for various diseases. Peptides and proteins with antimicrobial properties from plants are capable to replace some conventional drugs. Nowadays, application of these peptides to replace conventional drugs is of major concern due to increased drug-resistance of pathogens for these drugs. In present study, proteins have been isolated from the leaves of two plants viz. *Sphagneticola trilobata* and *Andrographis paniculata* using Tris HCl extraction buffer. Proteins were extracted by column chromatography. These peptides were analyzed for the presence of antimicrobial activity against *Escherichia coli* using agar well diffusion assay. Peptides from both selected plants shown clear ZOI (zone of inhibition) against *E. coli.* ZOI in case of *S. trilobata* were 8±0.30 mm, 18±0.33 mm and 20±0.15 mm for concentration of 50 µl, 100µl and 150µl respectively. Besides, ZOI for *A. paniculata* were 8±0.20 mm, 18±0.15 mm and 21±0.30 mm for 50µl, 100 µl and 150 µl respectively. Above findings can be helpful for modern drug formulation.

Keywords: Antimicrobial protein; Antimicrobial activity; Drug formulation; Well diffusion method

A Review on Antimicrobial Plants: A Patent Study

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Abstract

Antimicrobials are the agents which kill the growth of microorganisms and used to treat microbial infection (cough, TB, HIV, cold, flu and corona virus). Natural and synthetic drugs are available in market; synthetic drugs are now associated with high rate drug resistance; thus not able to treat infection. So, in today's era natural drugs mostly preferred over synthetic drugs. Herbal plants and their formulations are generally used in current screnerio. Antimicrobial plants like ashwagandha, tulsi, neem, onion, garlic, etc. having various phytoconstituents with their antimicrobial therapeutic actions may by acting with various mechanisms. Preparations from herbal extracts were also patented under patent offices. . Keeping in view, our study explores the patented plant, plant extracts and their formulations used to treat microbial infections.

Keywords: Antimicrobial activity; Antimicrobial plant; Resistance, Microbial infection; Patents

GC-MS Based Phytochemical Evaluation and Antimicrobial Activity of *Coptis teeta*

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Abstract

Our study aims to investigate the chemical constituent present in methanolic extract of *Coptis teeta* rhizome and pentadecanoic acid was isolated and characterized by IR, NMR, Mass and screened for antimicrobial activity. Methanolic extract of *Coptis teeta* was conducted for determination of phytochemical compounds against four strains of *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa* and *Escherichia coli*. GC-MS analysis was carried out for *Coptis teeta* with methanolic extract with the help of Clarus 500 Perkin Elmer gas chromatograph accoutred to a mass detector with a Dimethyl poly siloxane and a capillary column. By using preparative TLC and column chromatography pentadecanoic acid was isolated. The GC-MS analysis showed the presence of various phytochemicals. TLC and column chromatogram showed a significant spot in the methanolic extract for the active constituents. Pentadecanoic acid is seen in fraction 1 of column 1 which is characterised by IR, NMR, MASS spectroscopy and confirmed by docking studies. Pentadecanoic acid was isolated from *Coptis teeta* using GC-MS and studied its antimicrobial activity.

Keywords: Antimicrobial activity; *Coptis teeta*; GC-MS; Methanolic extract; Pentadecanoic acid

Screening for Anticancer Phytochemicals and Chemical Profiling of *Embelia ribes* by Liquid Chromatography Mass Spectrometry and Evaluation of Its Anticancer Potential by Nanomedicine

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Abstract

Embelia ribes, a traditional medicinal plant widely used in ayurvedic preparations; commonly known for its Krmighna i.e. antihelmentic property and also effective against various diseases. Limited literature is available on chemical composition of this plant. In the present study liquid chromatography mass spectroscopy was used to characterize the components of *E. ribes*. 10 gm of dried fruit powder of *E. ribes* was extracted with ethanol by hot percolation using soxhlet method for 6 hours and this extract was subjected to LC-MS analysis performed on G6550B Quadrapole Time of Flight (QTOF) binary LC system equipped with Dual Agilent Jet Stream Electrospray Ionization (AJS ESI) and separated using 0.1% formic acid and acetonitrile. The class of compound was deduced from METLIN database. A total of 520 compounds were found, out of 53 compounds were identified and reported through their mass. Through the literature it could be seen, out of 53 identified compounds, 16 possesses anti-cancer activity. The data not only revealed anticancer but also antioxidant, anti-inflammatory compounds. The major compounds reported belongs to phenols, isoflavones, flavanoids, fatty acids and are1-nitroheptane, Norvaline, 3-Hydroxyisovalerylcarnitine, Isobutyrylglycine, Quercetagetin, Delphinidin 3-O'glucoside, Penbutolol, Anacardic acid, *N*-Desmethyltamoxifen, 7,8,3',4'-Tetrahydroxyisoflavone, 8-Carboxymethyldihydro chelerythrine, Glutathioselenol and these compounds show anticancer activity on different cancer cell lines on the basis of literature survey. Nanotechnology is an intriguing way to treat diseases and *E. ribes* which contains variety of phytochemicals could be used to synthesize selenium nanoparticles. Ethanolic extract was used to synthesize selenium nanoparticles and their anti-cancer activity was evaluated on HeLa cell line which has shown cytotoxicity on cells. This concludes the various phytochemicals present in ethanolic extract of fruits of *E. ribes* has shown synergistic effect against cancer cell line.

Keywords: Anticancer; *Embelia ribes*; LC-MS; Nanomedicine; Phytochemicals

Cannabis (Marijuana): Pharmalogy and Effect

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Abstract

The present discussion focuses on pharmacology and effect of cannabis, it is one of the most widely used drugs all over the world. The pharmacology of marijuana is intended to introduce its mental and physical pharmacological effect. Marijuana is reported to contain more than 421 components and 60 pharmacologically active cannabinoids. The two best described cannabinoid are THC (tetra hydro cannabinol) and CBD (cannabidiol). Most of these phytochemicals are still unknown and also there effects. The main physical effect on body through marijuana is increasing cardiac effects. There are high levels of carboxyhemoglobulin in the circulating blood causing hypoxia and ischemia in organs. Marijuana has shown to cause negative effects in pregnancy. Marijuana transfer to new born baby through mother milk. They are also linked to development of certain cancer and cervical cancers. Marijuana can be detected from saliva, blood, urine, hair and nails. In blood plasma 95-99% of the THC are found. They are also used for detection different purposes like police investigation crime investigation and drug testing.

Keywords: Cannabinoid; Cannabidiol; Carboxy; Tetra hydro cannabinol

Formulation of Herbal Drugs as Novel Drug Delivery System Possess Best Therapeutic Efficacy

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Abstract

There are so many non-steroidal anti-inflammatory drugs (NSAIDs) which are used for treatment of pain and inflammation, but there is lot of problems associated with allopathic drugs on their long-term use. From ancient times, India is a hub of herbal drug delivery system which is a good and effective in therapeutic effect. Examples of plants used in osteoarthritis are *Pueraria tuberosa, Arnica montana, Equisetum arvense, Panax notoginseng, Sesamum indicum, Symphytum officinalis, Capsicum annuum* and *Cannabis sativum* etc. But here are some limitations that are also associated with the traditional herbal drug delivery system. Herbal drugs are highly sensitive to acidic pH, interferes with liver metabolism, poor absorption and solubility results in less or no therapeutic effects. Therefore, Novel Herbal Drug Delivery System (NDDS) is a best option to formulate the herbal formulations to overcome the problems which is associated with the allopathic system as well as to traditional herbal drug delivery system. In NDDS, there are number of option present which can be used to formulate the NDDS formulation like transdermal patch, liposome, noisome, micro particles and phytosome etc. There are lot of advantages of NDDS which are associated with less fluctuation in therapeutic index, by increasing its solubility, stability, pharmacological activity, sustained delivery and resistant to physio-chemical degradation. Hence, this can be concluded that in near future with proper research and study of herbal formulations it will give us best therapeutic efficacy with no or very less side effects.

Keywords: Herbal formulation; Herbal drugs; Therapeutic efficacy

Herbal Technology

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Abstract

Herbal technology is the recent branch of botany. In this technology use of various important plants that have bioactive constituents and used traditionally treat many disease. That technology used for human welfare in the technology covered mainly five area of branches medicinal plants,natural dyes, biopesticides, biofertilizer, and biofuels in the processing of herbal raw material various steps of processing follow like garbling, washing, parboiling leaching, drying after that cutting, aging, baking, stir-frying, fumigation, extraction in herbal drug technology various formulation are prepared by these method like polymeric nanoparticle, nanocapsules, liposomes, phytosomes, nanoemulsion, microsphere, transferosomes, ethasomes. In this technology various types of products are prepared like herbal drugs and pharmaceuticals, functional food, designer food bar and health drinks, cosmeceuticals, biocontrol agent, biopesticides.

Keywords: Plants; Herbal technology; Bioactive

Inhibition of *Salmonella typhimurium* Induced Pathogenesis in Host Cells by the Phytocompounds Derived from *Hemidesmus indicus* R.Br. Root Extract

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Abstract

Man had probably learnt the use of natural products for treatment of different ailments from animals because animals have the inherent property of using natural products to cure their diseases. For centuries, indigenous plants have been used against enteritis, but their molecular targets and mode of action remain obscure. *Salmonella typhimurium* causes gastroenteritis, a local infection in human by attacking the intestinal cells and a systemic infection in murine model by attacking the macrophages. So the present study was carried out to understand the effect of bioactive compounds i.e. phytosterol, fatty acids and glycosides present in chloroform fraction (CHI) and glycoside rich fraction (GHI), derived from *Hemidesmus indicus* on *S. typhimurium* induced pathogenesis in a human epithelial cell line (Int407) and murine macrophage cell line (P388D1). Bacteria sensitivity test was carried out with different concentration of CHI and GHI and optimum dose was fixed at 100 and 200 µg/ml for CHI and GHI respectively, which was safe on host cells (Int407 and P388D1 cell). Therapeutic activity of CHI and GHI was determined by using adherence and intracellular proliferation assay, neutralization assay, propidium iodide staining, Hoechst staining, immunofluorescence and transmission electron microscopy study.

The CHI treated bacteria had negligible cytotoxicity and were less potent to invade and proliferate intracellularly, whereas the GHI treated bacteria were less adherent and GHI precoating of host cells protected them from the ravaging activity of the wild virulent bacteria. Immunofluorescence and the transmission electron micrographs both confirmed the CHI treated bacteria were defective and smaller than the wild bacteria. Ultrastructure of Int407 and P388D1 cells infected with wild bacteria showed many ingested bacteria and characteristic *Salmonella* containing vesicles (SCVs), necrotic and apoptotic cells, whereas the host cells infected with CHI treated bacteria had normal morphology with few internalized bacteria but the typical SCVs were not observed under the TEM.

The results showed that the chloroform fraction (*H. indicus* root extract) rich in phytosterol and fatty acid and the methanol fraction rich in natural glycosides reduced the *S. typhimurium* induced pathogenesis cell cytotoxicity in both intestinal cell line (Int407) and murine macrophage cell line (P388D1). These defective rods may be used to prime immunity against *S. typhimurium.*

Keywords: *H. indicus*; *S. typhimurium*; Int407; P388D1; CHI and GHI

Ex Vitro Germination Response of *Buchanania lanzan* Spreng. Seeds (Chironji) as Influenced by Physico-Chemical Pretreatment Techniques

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Abstract

The pace with which forests are vanishing is alarming and it can no longer sustain the demand for timber, food and livelihood. Indigenous trees with considerable economic value are under severe threat of extinction. *Buchanania lanzan* Spreng (Chironji), a multipurpose tree native to the Indian subcontinent, is one such forest tree species. *B. lanzan* is a socio-economically important tropical fruit tree species, belonging to the family Anacardiaceae. Owing to the high nutritious value of its kernel and medicinal properties, the tree serves as an important source of economy to tribal communities inhabiting Indian forests. The seeds are the primary source of regeneration in *B. lanzan*, but due to the presence of a hard seed coat and endogenous seed-borne fungal assault, they exhibit poor germination frequency. Furthermore, the tree is facing a high risk of extinction because of the lack of its natural regeneration capacity and excessive exploitation from natural habitat. In this context, *ex vitro* seed germination studies were carried out in the present investigation. Seeds were subjected to various physico-chemical pretreatments and germinated on cocopeat in a greenhouse under controlled environmental conditions for an *ex vitro* field experiment. The different seed pretreatment involved mechanical scarification, acid scarification and hormone pretreatment. Maximum germination percentage and seedling growth attributes was observed in mechanically scarified seeds. Thus, the current study proposed an effective pretreatment seed germination approach as a feasible *ex situ* conservation measure for preserving *B. lanzan* genetic diversity while mass propagating the species.

Keywords: Chironji; *Ex vitro*; Greenhouse; Propagation; Scarification

Comparative Studies on Altered Responses in Biochemical Markers amidst *In Vitro* Raised Infected, Electro-exposed and Uninfected Musa spp. Grand Naine (AAA)

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Abstract

Banana, a valuable cash crop in India, severely damaged by the banana bunchy top virus (BBTV) and has become a major source of concern in recent years. Plant responses to biotic stress, such as viruses, are influenced in part by reactive oxygen species (ROS) defence mechanisms, which include enzymes like catalase (CAT), ascorbate peroxidase (APX), peroxidase (POX), and superoxide dismutase (SOD), as well as non-enzymatic molecules like proline and carotenoids, which provide protection from ROS by counteracting oxidative damage. Research was carried out in order to ascertain quantifiable changes in enzymatic and non-enzymatic activities of test samples that included *in vitro* raised BBTV-infected plantlets, pre- and post-exposure to electric current, as well as healthy (control) *Musa* spp. plantlets. In comparison to the control and electro-exposed test samples, infected samples had significantly higher levels of SOD, POX, LPX, and protein content while having lower sugar content. In electro-exposed samples, there was a significant increase in photosynthesis pigment while CAT activities were reduced. The results revealed quantitative differences between infected and healthy samples in biochemical components. Furthermore, the activities of electro-exposed plantlets were similar to those of healthy plantlets. As a result of the positive influence of electricity, exposure of BBTV-infected banana plantlets to electric current induced significant changes in biomarkers while reversing the detrimental effect of BBTV virus particles in infected plantlets and thus, leading towards healthiness.

Keywords: BBTV-infected; Electro-Exposure; Enzymatic; Non-Enzymatic; Reactive oxygen species

Comparative Study of Pollinating Insects of Two Species of *Rauvolfia* (Apocynaceae)

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Abstract

All species of *Rauvolfia* belongs to family apocynaceae have immense medicinal properties due to presence of different phytochemicals and alkaloids used to cure various human ailments. Amongst them *Rauvolfia serpentine* (Linn.) Benth., ex. Kurz have highest rank followed by *Rauvolfia tetraphylla* L. In present study, an investigation of pollinating insects of *Rauvolfia serpentine* and *R. tetraphylla* was carried out at Sadak Arjuni of Gondia district (M.S.). Several pollinating insects were found to be visiting the flower of both *Rauvolfia* species during different times and season of flowering period. Many pollinators species found on the experimental site were captured and collected for identification. Sampling was done twice in a week and three times a day. Two methods were used to collect insects such as ahand net, digital camera and eye observation. In *R. serpentine*, total 8 species of pollinating insects like butterflies and bees were observed. Pollinating insects of *R. Serpentine* belonged to 4 families of 2 orders, of which Lepidopteran species contributed the highest with 75.00% and Hymenopteran species with 25.00%. Whereas in *R. Tetraphylla* a total 35 species of pollinating insects such as butterflies, bees, ants and flies were observed. These belonged to 13 families of 3 orders, of which Lepidopteran species contributed the highest (60.00%) followed by Hymenopteran species (37.14%) and Dipteran species (2.86%). Due to overexploitation and lack of organised cultivation wild population of *R. Serpentine* and *R. tetraphylla* have declined rapidly and becomes threatened. Since the both species are cross pollinated and depends on insect pollinators so by conservation of pollinating insects we can conserve both *R. serpentine* and *R. tetraphylla*.

Keywords: Hymenoptera; Lepidoptera; Pollinators; *Rauvolfia serpentine*; *R. tetraphylla*

Coordinate PAL Gene Activity in Response to Agents That Induce Systemic Acquired Resistance (SAR) in *Cicer arietinum* (L.)

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Abstract

The outcome of any plant-pathogen i.e, *Cicer arietinum-Fusarium* interaction depends on complex cascades of attack, recognition & defense reactions at the plant-microbe interface. Within a minute of pathogen recognition, a variety of early events occur in the host such as, ion fluxes across the plasma membrane, cascade of phosporylation & dephosphorylation and release of reactive oxygen species. Immediately, these events are followed by a broad spectrum of metabolic modifications, that includes a] Stimulation of phenyl proponoid and fatty acid pathways b] Production of defence specific chemical messengers such as salicylic acid (SA) & jasmonic acid (JA) and accumulation of antimicrobial compounds & pathogenesis related (PR) proteins like phenylalanine ammonia lyase (PAL).The phenylpropanoid pathwayis considered to be one of the most important metabolic pathways because it leads to the synthesis of a large range of natural products in plants including lignin, lignans, flavonoids and anthocyanins. The first step towards the phenylpropanoid biosynthetic pathway is catalyzed by the enzyme phenylalanine ammonia lyase (PAL) which converts L-phenylalanine to trans-cinamic acid.

Keywords: *Cicer arietinum*; Defense mechanism; *Fusarium* sp.; Phenylalanine Ammonia Lyase (PAL); Systemic Acquired Resistance (SAR)

In Vitro Propagation of Kali Haldi and Clonal Fidelity Analysis of Regenerants

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Abstract

Curcuma caesia Roxb. Or kali haldi is an endangered rhizomatous herb with high medicinal and economic values. The rhizome of *C. caesia* is widely used in making the ayurvedic drugs in India. It possesses antineurodegrative, antidiabetic, antiulcer, smooth muscle relaxant, anticonvulsant, anxiolytic effect and cures metabolic disorders like leukoderma, asthma, piles, tumour, bronchitis, etc. The plant bears poorly germinated seeds, produces two-storage organs- rhizome and multiple root tubers too. Only rhizomes have medicinal-economic values and they also serve as propagules that result in a shortage of its planting material. Here we report a complete one-year production cycle of *C. caesia* which includes different stages of *in vitro* propagation i.e explants establishment, subculture cycles, rooting, followed by primary hardening and secondary hardening. Dormant shoot buds on rhizome served as explants for culture initiation on Murashige and Skoog's (MS) medium supplemented with several plant growth regulators and additives. Maximum bud break obtained on the medium containing 6-benzyladenine, kinetin, citric acid, adenine sulphate and indole-3-acetic acid (standard medium). Further shoot proliferation was performed on this standard medium during the subsequent subculture cycle. Maximum number of roots obtained on ½-strength MS containing indole-3-butyric acid. Well rooted plantlets were successfully transferred to the field after acclimatization. Clonal fidelity analysis of plantlets confirms the uniformity of *in vitro* raised plantlets of *C. caesia* with mother plant.

Keywords: Acclimatization; Benzyl-aminopurine; *Curcuma caesia* Roxb.; Endangered; Rhizomatous

Hydroponics: An Evolving Technique in Agriculture

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Abstract

Currently hydroponic cultivation is gaining popularity all over the world because of efficient resources management and quality food production. Hydroponics is a method of growing plants using mineral nutrient solutions without soil. In it the plants can be grown in a liquid nutrient solution with or without the use of artificial media. Commonly used mediums include expanded clay, coir, perlite, vermiculite and wood fiber. It is considered as aviable method of producing vegetables (tomatoes, lettuce, cucumbers and peppers) as well as ornamental crops such as herbs, roses and foliage plants. Hydroponics may be used in underdeveloped countries for food production in limited space. It is even feasible to grow hydroponically in areas of poor soil conditions such as deserts. There are various hydroponic structures *viz*. wick, ebb and flow, drip, deep water culture and Nutrient Film Technique (NFT) system with different operation techniques, benefits and limitations. Hydroponics shows several benefits like requires less growing time of crops than conventional growing round the year production, minimal disease and pest incidence and weeding. Leading countries in hydroponic technology are Netherland, Australia, France, England, Israel, Canada and USA. In India, the hydroponic industry is expected to grow exponentially in near future. To encourage commercial hydroponic farm, it is important to develop low cost hydroponic technologies that reduce dependence on human labour and have low startup and operational costs.

Keywords: Hydroponics; Nutrient Film Technique (NFT); Perlite; Vermiculite

Ageing Mediated Amendments in *Cajanus cajan* seeds

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Abstract

Seeds are regarded as genetic resources for growth and development of new plant life. During long term storage, seeds tend to deteriorate, even when stored under optimal conditions. However, ageing is an undesirable aspect of agriculture; it is a natural phenomenon which causes loss of intrinsic physiological quality, including germination ability, vigor and viability of seeds. According to an estimate, ageing-induced damages in seeds have been seen to result around 25% of annual loss in revenue, and affects food security. Major environmental factors causing damage in seeds kept under storage are the temperature and relative humidity. Ageing involves production of reactive oxygen species (ROS), which reacts with cellular components. In the present study, *Cajanus cajan* seeds were artificially aged (AA) to decipher the ageing associated damages. Artificial ageing is a simple, robust, time and temperature dependent method, for studying relationship of seed deterioration with respect to storage conditions (temperature, relative humidity and moisture) over short periods. In the present work, AA was performed by subjecting *Cajanus cajan* seeds to 42±1ºCtemperature and 100% relative humidity, for 24 hours. Various physiological parameters such as germination percentage, germination vigor, vigor index, radicle biomass, membrane stability index (MSI), viability, biochemical changes and random amplified polymorphic DNA (RAPD) analysis were performed. The results showed that prolong treatment led to decline in germinability, vigor, biomass, and viability of seeds. Physiological alterations were determined to be coincided well with damages at molecular level. Genomic template stability and band sharing index were seen to be in line with the levels of ROS in *Cajanus cajan*. Present study concludes that seeds are highly sensitive to AA treatment. Moreover, in addition to the physiological changes there are considerable alterations in RAPD profile to show that chromosomal damage and genetic mutation occurs due to ageing.

Keywords: Deterioration; Germination; RAPD; Reactive oxygen species; Seed storage

Brown Spot of Rice Still Prevailing Disease in the Rice Field of Madurai, Tamil Nadu

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Abstract

Rice (*Oryza sativa* L.) is one of the major crops cultivated in India. Madurai covers 60% of rice cultivation in two seasons. The age-old Bengal famine disease on rice brown spot (*Cochliobolus miyabeanus* formerly referred to as *Helminthosporium oryzae*) is still prevailing in the rice field of Madurai, Tamil Nadu. It occurs irrespective of rice variety in different seasons and affects coleoptile, leaves, leaf sheath, panicle branches, glumes, and spikelets. The disease severity in different rice fields was measured by a standard IRRI scale ranging from 4 to 8. This is an alarming issue on the fast emerging of this forbidden age-old disease in which the causal organism *Cochliobolus miyabeanus* has gained its virulence. Our disease survey results implicate the major disease progressiveness and its epidemic threat. Besides the mycotoxins secreted by these fungi, Helminthosporin may also induce cancer risk in animals. It's a need of an hour to control this disease either by chemical, or biological control method.

Keywords: *Helminthosporium oryzae*; *Oryza sativa*

Effect of Growth Hormone on *In Vitro* Regenration in *Nyctanthes arbor-tristis* L.

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Abstract

Nyctanthes arbor-tristis L., belonging to the family Oleaceae, is a woody small tree, with greenish white rough bark commonly known as Harishringi, Parijata etc. Leaves, flowers and seeds have antiviral, antimicrobial, immunomodulatory, antimalarial, and antifungal activities. Its immune stimulant property and other medicinal value have made this plant, topic of interest for researchers in this pandemic time. Propagation of *N. arbor-tristis* via seeds is very difficult to regenerate because of lower seed-setting and poor germination rate. Hence, *in vitro* propagation is one of the scintillating too mass propagate this species and to improve the quality of the plant. The objective of this study was to establish are liable protocol for *in vitro micro* propagation of *N. arbor-tristis* by using shoot apex and node as explant and its acclimatization and transfer into natural conditions. Nodal explant proved to be efficient for multiple shooting. Out of 3 auxins (IAA, IBA, NAA) used in Murashige and Skoog's media, NAA was found to be most effective. In present study low to moderate (1-2.5 mg/l), conc. of NAA in combination with high conc. (10 mg/l of BAP) proved to be highly effective for shoot regeneration. Low conc. of NAA i.e. 1mg/l in combination with high conc. i.e. 5 mg/l BAP also showed good response 90% of multiple shoot induction. Higher and moderate conc. i.e. 5 & 10 mg/l IBA in half strength MS was proved to be the most effective for root regeneration. Thus, the present investigation provides high and reliable protocol for in vitro micro propagation of N. *arbor-tristis* L.

Keywords: *In vitro* regeneration; Immunostimulant; Antimicrobial; *Nyctanthes arbor-tristis*; Micro-propagation; Plantlets

Studies on the Allelopathic Potential of *Casuarina equisetifolia* Needle Litter on Growth and Productivity of *Lycopersicum esculantum* Mill.

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Abstract

The primary aim of this study is to discuss the allelopathic potential of *Casuarina equisetifolia* needle litter (CNL) on the growth and productivity of *Lycopersicum esculantum* Mill. *Casuarina* is being cultivated by the farmers in the coastal districts of Tamil Nadu. In those areas, huge amount of litter was produced throughout the year. In order to reduce the labour cost and water requirement of the plant, the dry powder of CNL was mixed as basal mixture along with soil. The experiment is set up in a completely randomized block design (RCBD) with 10 treatments plus control and five replicates. After the plants attained maturity of growth, the plants per plot were removed from all treatments for the following parameters viz., seed germination percentage, Number of leaves per plant, root length, shoot length, leaf area and total chlorophyll were observed and recorded. Maximum amount of seed germination percentage and shoot length were recorded in T_5.Maximum root length, number of leaves and total chlorophyll were recorded in T_6. The present investigation concludes that the treatment T_5 and T_6has emerged as the maximum growth and productivity of tomato. Nitrogen fixed by the *Casuarina* shared to tomato crop to help the farmers to reduce the cost of application of nitrogen fertilizers. Hence the basal mixture of *Casurina* needle litter at optimum concentration (50 and 60%) can be suggested for commercial cultivation of vegetables like tomato. The higher concentration of CNL (T_8, T_9 and T_{10}) leads to the over dosage of nutrients can be affected the growth and yield.

Keywords: Allelopathic potential; *Casuarina equisetifolia*; *Lycopersicum esculantum*

An Overview on Gamma Oryzanol

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Abstract

Gamma oryzanol is naturally occurring compound which is derived from natural sources such as rice bran oil. Rice has been cultivated in one of the major food resources. The advancement in technology for refining the by-products of rice for example rice oil have been produced as edible vegetable oil and also the cosmetic ingredient. Rice is a very important resource for producing the oil and fats. Rice oil is loaded with verity of bioactive compounds such as tocotrienols, oryzanol, tocopherols, sterol etc. They all con tribute to make the rice bran oil with an excellent stability and functionality. The industrial scale manufacturing of gamma oryzanol is stablished by *Oryza* Oil & Fat Chemical compound. It is also registered as a medicine in South Korea and Japan.

Keywords: Gamma oryzanol; Rice bran; Tocopherols

Co-occurrence of Arbuscular Mycorrhizal Association and Dark Septate Endophytes in Roots of Invasive Plant *Senna tora*

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Abstract

Plant roots generally deals with a lot of micro-organisms, most importantly with Arbuscular Mycorrhizal Fungi (AMF) and dark septate endophytes (DSE), which shows a great significance in plants but their symbiotic-associations in invasive plants is poorly studied in comparison with other plants. This study was performed on root and soil samples, collected from Kota Forest area of Bilaspur Forest Division, Chhattisgarh. The collected samples were processed accordingly. The assessment of roots were done manually and the most popular method of cleaning and staining was adopted. Soil samples were processed for mycorrhizal spore isolation which were isolated by wet sieving and decanting method. Both roots and spores were then observed under microscope. This study mainly describes the presence of both associations in roots of *Senna tora* plant. A total of 90% roots were colonized by AMF whereas 80-85% root samples were colonized by both AMF as well as DSE and very few samples (~4-5%) were not colonized by any of them and there were about 8-9% samples were without DSE. Soil samples were rich in mycorrhizal spores and showed the higher rate of mycorrhizal association in alien host plant. Co-occurrence of AMF and DSE can be clearly seen in plant roots and most of the roots were colonized by both of them. AMF component such as vesicles, spores, extra and intra radical hyphae and dark pigmented structures of DSE were clearly observed.

Keywords: Arbuscular mycorrhizal fungi; Co-occurrence; Dark septate endophytes; Spores

A Review on Responses to Salinity Stress in Plants

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Abstract

Salinity stress is an abiotic stress caused by higher concentration of salt in the soil. More than 20% land of the world used for crop production is badly affected by salinity. High salinity adversely affects the growth and development of plants by inducing osmotic stress and ion toxicity leading to deficiency of essential nutrients. Salinity stress also results in the oxidative stress due to production of reactive oxygen species. However, the plants respond by developing several morphological, biochemical and physiological changes as adaptive mechanism to deal with such stress. This ability to adapt as well as extent of tolerance to saline conditions varies from plant to plant. The adaptive mechanisms include changes in the root and leaf anatomy, decreased stomatal conductance, osmotic regulation by release of osmoprotectants like sugar, proline, glycine betain etc. Moreover, there is reduction in the chlorophyll and carotenoid concentration and overall photosynthetic process whereas increase in antioxidative mechanism of plant including Superoxide dismutase, Glutathione peroxidase, Glutathione reductase etc.

The present review gives comprehensive information regarding the various responses by the plants at the morphological, biochemical and physiological level to cope up the salinity stress conditions.

Keywords: Abiotic stress; Salinity; Antioxidants; Osmotic stress; Biochemical; Osmoprotectants

Assessment of Pb Concentration in *In Vitro* Grown *Pithecellobium dulce* (Roxb.) Benth. Seedling

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Abstract

Globally, heavy metal (HM) toxicity is one of the major environmental concerns. Lead (Pb) is hazardous HM released invarious industrial effluent. It is highly persistent and has very less solubility in soils. Pb bioaccumulated in plants and vegetables when present in high concentration in soils, subsequently enters the human body through the food chain system. To remediate toxic HM from the soil, dendroremediation is a promising tool. *Pithecellobium dulce* (Roxb.) Benth. is a fast-growing, leguminous tree species belonging to the Fabaceae family, is commonly found in central India. The objective of this investigation is to evaluate the Pb extraction and bioaccumulation potentials of this candidate tree by *in vitro* study. Samples of root, stem, and leaf from the *P. dulce* seedling were collected in triplets, and acid digestion protocol was standardized. By using Flame Atomic Absorption Spectrophotometer, Pb concentration was determined in plant tissues. *In* vitro investigation revealed that *P. dulce* bioaccumulate the higher concentration of Pb in their tissue. Pb accumulation was also very high in the roots followed by stem and leaf tissues of the *P. dulce* seedling. Hence, *P. dulce* may prove as a possible candidate for the remediation of Pb contamination.

Keywords: Acid digestion; Dendroremediation; Heavy metals; Manila tamarind

Radiation Sensitivity of *Albizia saman* to Gamma Irradiation

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Abstract

Gamma rays belonging to ionizing radiation are the most energetic form of electromagnetic radiations. Gamma irradiation induces various physiological and biochemical alterations in plants. The present study was conducted to find out the impact of gamma irradiation on *Albizia saman*. One of the important nitrogen fixing tree *Albizia saman* has long been a source of timber and livestock feed. The air dried seeds of *Albizia saman* were exposed to different doses of gamma radiation ranging from 0 to 60kR using ^{60}Co source. The sensitivity and potential of *Albizia saman* under influence of different gamma irradiation doses were observed and recorded. The effect of gamma radiations on the germination and growth behaviors were compared with the control plants. Exposure to low dose(s) of radiation caused stimulatory effect on seed germination and early seedling growth of *Albizia saman*. Higher doses proved inhibitory for all parameters; the decline observed was positively correlated with increase in intensity of gamma radiation. Result obtained in present research showed that low doses of gamma irradiation could be useful in enhancing germination and growth of economically important tree *Albizia saman*.

Keywords: Gamma irradiation; Germination Ionizing radiation; Nitrogen fixing tree

Induced Mutagenesis in Haploids for Improvement of Qualitative and Quantitative Traits in *Guizotia abyssinica* L.f. Cass.

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Abstract

India is one of the prominent oil seed producing country in the world, which shares around 21% of the area and 15% of the production. Though, India has made a significant contribution to the total oilseed production. The country is not able to pace up with the skyrocketing demand for the oilseed brought about by the booming population growth. The country is still importing around half of its domestic consumption requirements of edible oils from various global exporters. Niger (*Guizotia abyssinica* L.f. Cass.) is a minor oil seed crop in India that contributes about 3% to Indian oilseed production. It is a highly cross-pollinated crop and is self-incompatible. Genetic variability is beneficial in crop improvement, producing new varieties with inducing mutagenesis. Thus, mutation breeding is the option to produce variability required for selection and any improvement program. Physical and chemical mutagens are used to create mutations. In the present study seeds of niger cultivar (JNS-9, JNS-28, and JNS-30) and anther derived callus (JNS-9 and JNS-28) were exposed to different doses of gamma rays ranging from 250, 500 and 20, 40 Gy respectively. 100 seed weight will be recorded in the M_1 generation due to differs in the percentage of seed germination, survival rate, plant height, number of leaves, leaf length, leaf width, number of primary branches, capitulum size, number of ray florets, number of capitula/plants, number of seeds/capitulum, seed yielding. Haploid mutation fixes the trait in one generation itself, giving an advantage over conventional mutation, which requires several generation fixes traits. Double haploid mutants generated will be screened based on their qualitative and quantitative traits and selection based on best performing in yield and yield related traits.

Keywords: Agronomical trait; Anther; Gamma ray; M_1generation; Mutagen

Plant Products as Antimicrobial Agents

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Abstract

In recent years, the utilisation of the hunt for medicinal compounds produced from plants has increased. Ethnopharmacologists, botanists, microbiologists, and natural-products chemists are scouring nature for phytochemicals and "leads" that could be used to treat a variety of infectious disorders. Since the beginning of time, the traditional medical system has relied on plant products to prevent or treat infectious diseases. The rising prevalence of drug-resistant pathogens has drawn the attention of the pharmaceutical and scientific communities to research into the antimicrobial activity of plant-derived phytoconstituents, a previously untapped source of antimicrobial chemotypes used in traditional medicine in various countries. Secondary metabolites present in plants include terpenoids, alkaloids, flavonoids, and tannins, which have been proven to have antibacterial characteristics. Some of these chemicals are present in healthy plants in biologically active levels, making them constitutive. Others, such as cyanogenic glycosides and glucosinolates, start out as inactive precursors that become active in the presence of tissue injury or pathogen attack. The current study focuses on plant products as a source of antimicrobial compounds that are active against bacteria and fungi.

Keywords: Antimicrobial compounds; Ethnopharmacology; Pharmaceutical

Efficient Production of Doubled Haploid Plants Through Colchicine Treatment in Niger (*Guizotia abyssinica.* L.f. Cass)

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Abstract

Oilseed crops are the second most important determinant of agricultural economy, next only to cereals within the segment of field crops. Despite being the world's fourth greatest producer of oilseed crops, India is now one of the world's largest importers of vegetable oils. The demand-supply gap in the edible oils has necessitated huge imports accounting for approximately 60%of the country's requirement. In an attempt to fill this gap, the present study was conducted on Niger crop. Although *Guizotia abyssinica* (L.f.) Cass is a minor oilseed crop, it is important as it contains 32 to 40 percent quality oil and 18 to 24 percent protein in the seed. In India, this crop is mainly grown by tribals on marginal, unproductive, waste lands without any production management under rain fed conditions. As the crop is grown largely by tribal farmers, so far it has remained neglected. Therefore, unlocking its genetic potential would help to breed highly productive cultivars. Double haploidy is an amazing evolutionary event that can be used in plant breeding to improve plant material. However large number of haploid plants remains a limiting factor in this technique. Therefore, the aim of this study is to improve the haploid production by in-vitro colchicine treatment. Niger haploid callus generated by anther culture was treated with four different concentrations of colchicine (0.025, 0.05, 0.1, 0.2) and, were applied to anther cultured callus of Niger in four different durations of exposure, (6, 16, 24, and 48 h). Colchicine helps to induce chromosome doubling thereby increasing the expression of characters leading to increased productivity. The generated plants after treatment will be analysed for its morphological and cytological variations as compared to control.

Keywords: Anther culture; Double haploidy; Colchicine; *Guizotia abyssinica*; oilseed

Development and Assessment of a Modified Ammonium nitrate Deficient MS Medium for Propagating Commercially Important Plants

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Abstract

Ammonium nitrate (AN) is the main source of nitrogen in Murashige and Skoog (MS) medium. AN is categorised as an explosive and is banned in several nations, together with India. As a result, an effort was undertaken to develop an alternate medium utilising ammonium hydroxide and nitric acid instead of AN in the basal MS, which is the most successful medium for in vitro culture of numerous plant species. Further, employing ATR-FTIR spectroscopy, characterisation of the neutralisation reaction product AN was carried out. In comparison to the basal MS medium, *in vitro* cultures of *Musa acuminata* cv. 'Grand Naine' on alternate MS medium produced a high mean shoot number with significantly higher shoot proliferation. A production cycle of *M. acuminata* was developed using alternative MS media, with seven consecutive subcultures followed by rooting and acclimatisation. Besides, various species were tested to determine the broad cross-species utility of alternate MS medium for shoot proliferation. These species' in vitro shoot multiplication rates on alternate MS medium were statistically no different from those on MS medium. The findings suggest that AN can be replaced in the preparation of an MS-based medium by the addition of ammonia solution (ammonium hydroxide) along with nitric acid. As this medium is potentially comparable to the tissue culture medium MS in proliferation of *in vitro* shoots as well as rooting, the alternate MS may further prove to be cost-effective for approaches towards the propagation of plant species commercially.

Keywords: Ammonium nitrate; Alternate MS medium; FTIR spectroscopy; Micropropagation; *Musa acuminata*

Toxic impacts of 2,4-Dinitrotoluene on *Vigna radiata* L. Seeds

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Abstract

The persistent nature of xenobiotic compounds such as explosives, pyrotechnic compositions, propellants, *etc*., in the environment has become an international issue. Exposure to such contaminants imposes deleterious amendments on the environment and ecosystems. Earlier studies demonstrated that nitroaromatics pose inhibitory effects on growth and development of plants. Thus, present study was designed to investigate the physiological, biochemical and molecular impacts of 2,4-dinitrotoluene (DNT) on *Vigna radiata.* Different concentrations (0.05 to 0.3%, w/v) of DNT were used to observe their deleterious effects in growth parameters (germination, biomass, viability and electrolyte leakage) of *Vigna radiata*. These growth parameters were found to be sensitive towards DNT and severe impacts were observed with increase in concentrations of DNT. Various biochemical (reactive oxygen species; ROS, malondialdehyde; MDA) and molecular analyses were conducted for depth understanding of toxic impacts of DNT. Analysis of ROS and MDA levels exhibited enormous increase in their level with increase in concentrations of DNT. Moreover, plant system has a variety of enzymatic antioxidants to deal with ROS and ROS induced deleterious reactions. In the present study, level of enzymatic antioxidants (superoxide dismutase, catalase and ascorbate peroxidase) was recorded spectrophotometrically and gene expression through RT-PCR. Results of enzymatic activities and gene expression support each other and exhibited that the exposure of DNT significantly influences the level of antioxidants. In conclusion, exposure of DNT imparts phytotoxic impacts on *Vigna radiata*, which can be observed by assessing physiological, biochemical and molecular parameters, and level of damage was significantly correlated with concentration of DNT.

Keywords: Antioxidants; Dinitrotoluene; Phytotoxicity; Reactive oxygen species; RT PCR

Colchicine Induce Polyploidy for Improving the Yield and Related Traits in *Guizotia abyssinica* (L.f) Cass

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Abstract

India is the world's fourth largest producer of oilseeds, accounting for an estimated 20% of total land and 10% of total production. Oilseeds, on the other hand, have a low growth rate of area and production compared to cereals like rice and wheat, with broad yield variability across the country. There are several minor oilseed crops that have the same features as the big crops as an alternative to the large crops. Niger (*Guizotia abyssinica* L.f.) Cass although considered as a minor oilseed crop. It is commonly cultivated in the two primary producing countries, India and Ethiopia. Because it is an excellent source of protein (20-30%) and fatty acids, Niger seed oil plays a significant role in human diets (oleic and linoleic acid). There has been very little effort put into improving this crop. The goal of this work is to induce polyploidy in Niger to boost crop productivity and yield-related parameters. For polyploid induction, in-vitro and ex-vitro colchicine therapy was used. Four different concentration of colchicine (0.025%, 0.05% 0.1% and 0.2% w/v) were applied to the seeds of Niger at four different duration (6, 16, 24 and 48 h). Seeds were used as explants and culture in full strength MS medium supplemented with different concentration of colchicine *in-vitro*. Same experiment was repeated under *ex-vitro* conditions to see the effect of treatments in two different conditions. Initial study indicates that the treated plants as shown higher germination percentage, plant height, and leaves size, as compared to the untreated control. Looking to the results, it can be anticipated that the treated plants are in higher ploidy states as compare to control, which can be confirmed by different cytological examination like analyzing stomata size, number of chloroplast per guard cell, cell size and nucleus size. Further authentication will be done using chromosome karyotyping and flow cytometric analysis. Increasing the ploidy levels of a crop may yield better productivity, which is necessary for mitigating the vegetable oil requirement in India.

Keywords: Colchicine; *Ex-vitro*; Flow cytometry; *Guizotia abyssinica; In-vitro*

Cosmoceutical Properties of Polar and Non-Polar Extract Selected Exotic Fruit Peels

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Abstract

To detect the cosmeceutical properties of polar and non-polar extract of selected exotic fruit peels. Skin is the outer most layer of the body that interacts with the environment. The environment is surrounded by enormous variety of microorganisms. Skin has its own microbial flora. The microorganism plays two edged roles. Fruit peels naturally have certain components that inhibit the metabolism of gut and intestinal pathogens. Microbes in the skin cause mild to drastic effects. Oily skins are more prone to be attacked by these organisms. In the view of resolving these, we proposed an idea of involving fruit peels in cosmetology. The skin swab from 5 different sources are obtained and cultured for 24 hours. Varieties of colonies are grown and 9 idiosyncratic colonies are isolated and stocked in slants. Aqueous and ethanolic extract of shade dried exotic fruit peels such as Rambutan, Mangosteen, Dragon fruit, Chickoo, Passion fruit and wood apple are prepared aseptically. The cetrimide activity of the fruit peel extracts are carried out by well bore method with different concentration of extract against selected 9 isolates. The 24 hours incubated plates shows both resistance and sensitive results. The results are being monitored accordingly. The aqueous extract of these fruit peels show no inhibition activity against the isolates. The ethanolic extract of Rambutan and Mangosteen fruit peels show inhibition against majority isolates. The research is in the future perspection of analysing phytochemical properties of these fruit peels and identification of bacterial morphology of isolates.

Micropropagation and DNA Fingerprinting of Elite Bamboo Variety *Bambusa tulda*

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Abstract

Bamboo is the backbone of rural economy and known as green gold. It belongs to the Poaceae family. Among different variety of bamboo, *B. tulda* have many economical uses. For the propagation of *B. tulda* a protocol has been developed using tissue culture technique under *in vitro* conditions. For the micro-propagation, nodal explants were used. In the laboratory various surface sterilization treatments was applied, among 5 treatments (T1-T5) T4 treatment has given highest (90%) survived with no contamination in culture media. Shoot initiation was achieved on Murashige and Skoog (MS) medium supplemented with 3 mg BAP/l (I4 treatment). Growth hormones cytokines shows good shoot multiplication in liquid medium with BAP (2 mg/l) and the best root induction was found on 3mg NAA/1. Complete plantlets were hardened on sand:soil:coco peat (1:2:2) with 85% success rate.

Genetic fidelity was checked using DAMD and ISSR markers. Banding profile of the micro-propagated plants found to be same as mother plant, indicating all plantlet are true to type. For the DNA fingerprinting a total of 5 DAMD and 1 ISSR primer were used. Amplified products are in ranges of 100 to 1517 bp. For developing DNA fingerprints total 132 bands were scored. Out of the total, 126 bands showed polymorphic (95.45%) and 6 bands showed monomorphic (4.54%). Out of 6 primers, 2 primers (DAMD 33-6-2 and DAMD 14C-2) produce highly reproducible bands. Dendrogram were constructed using the unweighted pair group method with arithmetic average (UPGMA) algorithms in the NTSYS analysis software. Under DNA fingerprinting studies dendrogram was constructed based on scored data from DAMD and ISSR markers, *B. tulda* and *B. balcooa* species were found to be more genetically similar as compared to *D. strictus*.

Micropropagation and DNA Fingerprinting of Elite Bamboo Var. *Bambusa nutans*

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Abstract

Bamboo belongs to the Poaceae family and it is fast growing plant. It is also known as green gold having many economical uses such as timber, house construction, scaffolding, paper mats and as agriculture tools etc. Conventional method for large scale propagation is not suitable because long flowering cycle and cuttings are infectious. *In-vitro* propagation or micro-propagation is a non-conventional method for large scale propagation and disease free plant development. In the laboratory various surface sterilization treatments was applied on the nodal segment explant, S6 (cotton swab 70% ethanol + Tween20 (10 minutes) + Bavistin (30 minutes) + $HgCl_2$ (5minutes) + PPM in culture media) has found to be the best sterilization treatment (88%) response. Shoot initiation was achieved on Murashige and Skoog (MS) medium supplemented with 2 mg BAP/l (I3 treatment) with PPM. For the shoot multiplication two cytokinin's MS liquid medium with BAP (2.5mg/l) and Kinetin (1mg/l) shows good response with 6.4 shoot/explant (M15) which needed to improve for better outcome. Root induction on MS solid agar medium showed better (50%) performance when supplemented with 3mg NAA/1 (R3). Complete plantlets were hardened on sand: soil: coco peat (1:2:2) with 80% success rate. Genetic fidelity was checked using DAMD and ISSR markers. For the DNA fingerprinting a total of 5 DAMD and 1 ISSR primer were used. Amplified products are in range of 100 to 1517 bp. For developing DNA fingerprints total 174 bands (TNSB) were scored. Out of the total, 150 bands showed polymorphic (86.20%) and 24 bands showed monomorphic (13.79%). Under DNA fingerprinting studies dendrogram was constructed based on scored data from DAMD and ISSR markers, *B. nutans* and *B. balcooa* species were found to be more genetically similar as compared to *D. strictus*.

Keywords: Bamboo; DNA fingerprinting

Haploid Production for Improving Yield Traits in Niger (*Guizotia abssinica* L.F. Cass)

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Abstract

Niger (*Guizotia abyssinica* (L.F.) Cass) is an essential minor oilseed crop that is grown in hilly areas of India. The out-crossing and self-incompatibility of niger pose significant challenges for inbred line development and making breeding efforts difficult. The application of anther culture for haploid production in niger improvement is to become using for new variety develop for short span time. Double haploids enable to increase the selection efficiency of desirable traits in recurrent selection scheme or used in producing synthetic cultivars. Identification of the best responsive microspore stage for anther culture and standardization of media for callus induction are prerequisite to regenerate plants using anther culture technique that supports the breeding program. Anthers of three Niger varieties JNS 28, JNS 9 and IGPN 8004 were cultured into MS media. MS media were supplemented different concentration of hormone with different treatments. The investigation was conducted to identification the suitable microspore stage for anther culture, standardize of media for callus induction and standardize of media for haploid plant regeneration.

Based on this study, it was concluded that 12 days old buds contains uninucleate stage microspores found to be the best suitable stage for anther culture in niger. The average callus induction percentage was found to be highest in MS+ 2,4-D (2mg/l) +KN (0.3mg/l) in JNS 28 (100%), JNS 9 (100%) and IGPN 8004 (90%). Among 26 different treatments used, for plant regeneration and shooting MS+ 0.5 mg/l BAP + 0.5 mg/l KN was found in to be the best in JNS 28 with 75% response. Among the different treatment tested for rooting, the highest rooting percent and maximum number of roots per shoots were obtained in media containing MS with 3 mg/l NAA.

Complete haploid plants were generated using the above protocol. Haploidy and diploidy analysis using karyotype and flow cytometry will be confirm the ploidy status of generated plants.

Curcuma longa - A Wonderful Antimicrobial Medicinal Plant

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Abstract

Turmeric (*Curcuma longa*), is widely used spice all over the world, shows to exhibit many health benefits. *Curcuma longa*, also called ‘yellow root' and derived from 'kourkoum', which means Indian saffron. It has pale yellow flower and doesn't bear fruit, cultivated in India, Indonesia and tropical regions. It has long been utilised in Indian systems of medicine, either alone or in conjunction with other herbs, to treat a variety of diseases. In modern era shows that an active component of turmeric, curcumin, may be used medically to treat variety of dermatologic disease and used as anti-microbial agent. *Curcuma longa* contains a spectrum of diverse phytochemicals enabling it to have a broad range of biological implications. In nonclinical studies, it has shown anti-microbial, anti-inflammatory, anti-tumor, anti-stress, neuroprotective, cardioprotective, and anti-diabetic properties. In-vitro degradation products of curcumin, dihydroferulic acid and ferulic acid also observed in-vivo in rats and may have biological effects. Additionally, It can also lower reactive oxygen species, alter mitochondrial activity, regulate apoptosis, and improve endothelial function. curcumin is highly pleiotropic molecule that influence multiple signaling pathway.

Formulation and Characterization of Nanosuspension-Based Aloe Vera Gel of Mafenide Acetate with Improved Wound Healing Activity

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Abstract

The present study focuses on the development and characterization of nanosuspension of a poorly soluble drug, Mafenide Acetate (MA) incorporated in Aloe vera gel (AV-gel) for improving its therapeutic efficacy. Mafenide acetate has suitable antibacterial activity against Gram-positive bacteria. This drug has a high permeability through the skin which causes not only low concentration in the target place but also systemic toxicity. The aim of this study was to develop a targeted drug delivery for the effective wound healing. Formulation by controlled nanoprecipitation method, followed by magnetic stirring nanosuspension was produced. The required quantity of the drug was completely dissolved in 30% ammonia (typically 0.25% (MA) dissolved in 30% ammonia). The nanosuspension of mafenide acetate drug solution into an aqueous surfactant/stabilizer solution in a beaker placed on a magnetic stirrer with speed at 1000 rpm. The formulated nanosuspension was characterized for particle size, surface morphology, polydispersity index, XRD studies. Evaluation of in vitro drug release exhibited an important enhancement in the release rate of the drug from developed nano gel interpretation (78.16 ± 3.341%) in comparison to marketed formulation (45.81 ± 1.352%) after 48 h. The current investigation indicates the formulation of MA-loaded nanosuspension-based AV- gel reduces the side effect of mafenide acetate, controlling the release of mafenide acetate and reducing the dose frequency of mafenide acetate, and targeting the cells. Nanosuspension reversed the wound healing retardation effect of MA in the animal model, trail for faster burn wound healing.

Keywords: Antibacterial; Drug; Nanosuspension; Therapeutic; Toxicity

Free Radical Scavenging Anti-Inflammatory and Anti-Bacterial Potential of *Boswellia seratta*: A Novel Therapeutic Agent

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Abstract:

The present study has been undertaken to estimate the free radical scavenging and anti-inflammatory effectiveness of *Boswellia serrata* extract by three different *in vitro* methods. The free radical scavenging assays of *Boswellia serrata* standardized extract was performed by using BHA as standard. The hydroxyl radical scavenging activity was performed by using Ascorbic acid as standard and the Nitric oxide scavenging activity was performed by using BHA as standard. The anti–inflammatory activity was evaluated by hyaluronidase enzyme inhibition assay. The percentage Free radical scavenging activity of the test sample was estimated at different concentrations (10µg, 50µg and 100µg). The results revealed that the extract showed dose dependent inhibition i.e. 75.90% at 100µl concentration. The hydroxyl radical scavenging activity was also evaluated at three different concentrations (10µl, 50µl and 100µl) and the results obtained in same pattern as free radical scavenging activity i.e. in dose dependent manner. The maximum (89%) of inhibition was obtained at 100µl concentration where as standard drug Ascorbic acid showed (94.84%). For nitric oxide scavenging activity the sample at concentrations (10µg, 50µg and 100µg) was used and the maximum % of scavenging was obtained at 100µl concentration (87.64%) where as standard drug BHA showed (89.73%). The results of hyaluronidase enzyme inhibition assay indicate that the test compound exhibit 84.84 % inhibition at 100µl concentration. The *Boswellia serrata* extract exhibit noble free radical scavenging and hyaluronidase inhibition activity in a dose dependent manner.

Key words: Anti-inflammatory; Enzyme inhibition; Free radical scavenging, Hyaluronidase inhibition, *In-vitro*

QSAR: Amazing Tool for Discovery of New Antifungal Agents

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Abstract

Life-threatening infections caused by pathogenic fungi are becoming increasingly common, especially in individuals with suppressed immune systems such as cancer chemotherapy or AIDS patients. However, there are only a limited number of antifungal drugs available for such infections, which leads to a strong need to develop new classes of compounds having antifungal activity. Although, there are newer, less toxic antifungal agents available for clinical use but their clinical efficacy is not active against various fungal infections. So there is a constant need for the discovery of novel and safer anti-fungal drugs.

QSAR is the one of technique which is helpful to optimize the lead molecule and identifying drug targets via Bioinformatics tools. They can be used to analyze the target structure for the possible binding site, generate candidate molecules, and check for their drug likeness. In this work, we try to update the theoretical aspects pertaining to the antifungal drug discovery i.e. proposed novel mechanisms, new drug targets and pathways by mentioning some new antifungal compounds.

Keywords: Life-threatening; Pathogenic; Chemotherapy

Determination of Novel Drug Targets in Major *Candida* Species by SPA Approach

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Abstract

Due to ongoing multiple drug resistance, current antifungal treatment is ineffective. Novel drug targets that can replace generic ones are desperately needed. The qualitative identification of potential therapeutic targets was done using a subtractive proteomics technique. The full proteome of *C. albicans*, *C. glabrata* and *C. tropicalis* was downloaded from NCBI and shortlisted using subtractive proteome analysis (SPA) to identify new targets. Only a few proteins were found to be non-homologous to humans, while others were shown to be crucial metabolic proteins. Using a subtractive proteome analysis technique, new protein targets in three species were successfully identified and shortlisted. Results report the comparative promising pharmacological targets of three major species which were involved in a virulence pathway among the 64 proteins studied. Because cytoplasmic proteins are regarded good druggable targets, all proteins were identified as cytoplasmic proteins and might be cured as promising antifungal drug targets with putative druggable abilities. The novel drug targets that we are reporting in this study will help to broaden and contribute towards promising antifungal therapy and drug discovery against *C. albicans*, *C. glabrata* and *C. tropicalis* infections.

Keywords: Antifungal; *C. albicans*; *C. glabrata*; *C. tropicalis*; SPA

Neoteric Evolution in Biological Applications of Benzothiazolyl Derivatives A Short Review

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Abstract

Due to significant biological and pharmacological properties, heterocyclic compounds analogues and derivatives have attracted a lot of attention in recent years. A heterocyclic compound or ring structure is a cyclic compound that has atoms of minimum two different elements as members of its ring. Heterocycles play an vital role in biochemical processes because the core groups of the most typical nucleic acids, majority of drugs, essential constituents of the living cells, most biomass and many synthetic and natural dyes are based on heterocycles. For the development of novel drugs, the benzothiazole moiety has unique and multifunctional properties. Benzothiazole derivatives are found in medicinal and bioorganic chemistry with applications in drug discovery and development for treatment of autoimmune and inflammatory diseases in the prevention epilepsy, solid organ transplant rejection, antitumor, antiviral, anticonsulvant, neuroprotective and immunosuppressive properties. Many Benzothiazoles are known as industrial chemicals, drugs and dyes. In present short review we tried to summarize the research work reported in the recent scientific literature on different biological activities of benzothiazole and its derivatives.

Keywords: Antitumor; Antiviral; Benzothiazole; Heterocyclic

Formulation and Characterization of Nanosuspension-Based Aloe Vera Gel of Mafenide Acetate with Improved Wound Healing Activity

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Abstract

The present study focuses on the development and characterization of nanosuspension of a poorly soluble drug, Mafenide Acetate (MA) incorporated in Aloe vera gel (AV-gel) for improving its therapeutic efficacy. Mafenide acetate has suitable antibacterial activity against Gram-positive bacteria. This drug has a high permeability through the skin which causes not only low concentration in the target place but also systemic toxicity. The aim of this study was to develop a targeted drug delivery for the effective wound healing. Formulation by controlled nanoprecipitation method, followed by magnetic stirring nanosuspension was produced. The required quantity of the drug was completely dissolved in 30% ammonia (typically 0.25% (MA) dissolved in 30% ammonia). The nanosuspension of mafenide acetate drug solution into an aqueous surfactant/stabilizer solution in a beaker placed on a magnetic stirrer with speed at 1000 rpm. The formulated nanosuspension was characterized for particle size, surface morphology, polydispersity index, XRD studies. Evaluation of in vitro drug release exhibited an important enhancement in the release rate of the drug from developed nano gel interpretation (78.16 ± 3.341%) in comparison to marketed formulation (45.81 ± 1.352%) after 48 h. The current investigation indicates the formulation of MA-loaded nanosuspension-based AV- gel reduces the side effect of mafenide acetate, controlling the release of mafenide acetate and reducing the dose frequency of mafenide acetate, and targeting the cells. Nanosuspension reversed the wound healing retardation effect of MA in the animal model, trail for faster burn wound healing.

Keywords: Antibacterial; Drug; Nanosuspension; Therapeutic; Toxicity

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Anubhuti Jha[a]*, Awanish Kumar[b]

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Abstract

Due to ongoing multiple drug resistance, current antifungal treatment is ineffective. Novel drug targets that can replace generic ones are desperately needed. The qualitative identification of potential therapeutic targets was done using a subtractive proteomics technique. The full proteome of *C. albicans*, *C. glabrata* and *C. tropicalis* was downloaded from NCBI and shortlisted using subtractive proteome analysis (SPA) to identify new targets. Only a few proteins were found to be non-homologous to humans, while others were shown to be crucial metabolic proteins. Using a subtractive proteome analysis technique, new protein targets in three species were successfully identified and shortlisted. Results report the comparative promising pharmacological targets of three major species which were involved in a virulence pathway among the 64 proteins studied. Because cytoplasmic proteins are regarded good druggable targets, all proteins were identified as cytoplasmic proteins and might be cured as promising antifungal drug targets with putative druggable abilities. The novel drug targets that we are reporting in this study will help to broaden and contribute towards promising antifungal therapy and drug discovery against *C. albicans*, *C. glabrata* and *C. tropicalis* infections.

Keywords: Antifungal; *C. albicans*; *C. glabrata*; *C. tropicalis*; SPA

Oral Microbiome - Implications in Oral Health and Disease

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Abstract

The microbes in and on our bodies form a functional organ that is fundamental to our health and physiology. The oral cavity is a complex environment that encompasses multiple distinct microbial habitats. These microbial residents found in human oral cavity are referred as oral microbiome. Oral microbiome is finely tuned by nature to protect us from disease. The relationship between microbiome and host is dynamic and influenced by many aspects of modern lifestyle, such as diet, tobacco consumption and stress. Alteration in oral microbiome leads to variety of oral and systemic diseases. The recent advances in technology have started to unravel the complexities of the oral microbiome and gained new insights about the concept of a balanced oral microbiome and its importance in oral and systemic health. In the future, oral microbiota will contribute to the development of more effective therapeutic and diagnostic techniques. This paper highlights role of oral microbiome in health and disease.

Keywords: Oral Health; Oral microbiome

Cosmeceutical Properties of Polar and Non-Polar Extract Selected Exotic Fruit Peels

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Abstract

To detect the cosmeceutical properties of polar and non-polar extract of selected exotic fruit peels. Skin is the outer most layer of the body that interacts with the environment. The environment is surrounded by enormous variety of microorganisms. Skin has its own microbial flora. The microorganism plays two edged roles. Fruit peels naturally have certain components that inhibit the metabolism of gut and intestinal pathogens. Microbes in the skin cause mild to drastic effects. Oily skins are more prone to be attacked by these organisms. In the view of resolving these, we proposed an idea of involving fruit peels in cosmetology. The skin swab from 5 different sources are obtained and cultured for 24 hours. Varieties of colonies are grown and 9 idiosyncratic colonies are isolated and stocked in slants. Aqueous and ethanolic extract of shade dried exotic fruit peels such as Rambutan, Mangosteen, Dragon fruit, Chickoo, Passion fruit and wood apple are prepared aseptically. The cetrimide activity of the fruit peel extracts are carried out by well bore method with different concentration of extract against selected 9 isolates. The 24 hours incubated plates shows both resistance and sensitive results. The results are being monitored accordingly. The aqueous extract of these fruit peels show no inhibition activity against the isolates. The ethanolic extract of Rambutan and Mangosteen fruit peels show inhibition against majority isolates. The research is in the future perception of analysing phytochemical properties of these fruit peels and identification of bacterial morphology of isolates.

Keywords: Microorganisms; Cetrimide activity, Cosmeceutical, Exotic

Formulation and Evaluation of Polymer based Nanoparticles for Anti-oxidant and Anti-diabetic Potential

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Abstract

In this research, we have developed nanoparticle drug delivery system for the delivery of bioactive compounds such as Curcumin and Piperine. Various parameters such as FTIR spectral analysis was done to determine the drug polymer interaction. Scanning Electron Microscopic studies were done to determine the surface topography of the nanoparticles. DSC studies of the different formulations were carried out and results indicated there is no drug polymer interaction. XRD study of the final formulation showed that there was no interaction between the drug and polymer exist. The total antioxidant activity was performed by using Butylated hydroxyanisole (BHA) as reference standard. The *In vitro* cytotoxicity potential of nanoparticle formulations were evaluated by agar diffusion method using bacteria *E. coli AB 1157*. Dimethylsulfoxide (DMSO) was used as solvent. In cytotoxicity study, none of the formulations exhibited any zone of inhibition. *In vivo* studies such as evaluation of toxicity of the developed nanoparticles were conducted on albino rats as per Organization of Economic Cooperation and Development (OECD-407) guideline. It was observed that, group treated with nanoparticles containing Curcumin and Piperine do not exhibit any toxicity in animal models. Results of therapeutic effectiveness of prepared formulations in STZ induced diabetes model showed antidiabetic potential when compared to other groups of animals.

Keywords: Nanoparticles; Toxicity; Curcumin; Piperine; Therapeutic potential

Development and Study of Neem Oil Based Microemulsion of Fluconazole

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Abstract

Fluconazole is a hydrophilic bis-triazole has been extensively used as a first line agent to treat various fungal infections such as mucosal leishmaniasis, oropharyngeal candidiasis, visceral leishmaniasis and dermatomycosis. Microemulsions are single optically isotropic and thermodynamically stable liquid solution. Microemulsions can be used to drugs delivery to the patients via several routes, but the topical application of microemulsion has increasing interest. The aim of this work was to formulate and evaluate neem oil based microemulsion for topical drug delivery. The microemulsion containing Fluconazole was developed by phase titration method. The pseudoternary diagrams were plotted to obtain the area of microemulsion region. The effect of Smix (surfactant: cosurfactant) on the microemulsion region was determined and optimum systems were developed. Six formulations were prepared for microemulsion formulation with fixed amount of oil, water and mixture of surfactant and cosurfactant at two different ratios 1:1 and 2:1. The prepared microemulsion was evaluated for particle size, zeta potential, conductivity, pH, viscosity drug release, skin irritation, skin permeability, antifungal activity and stability. The viscosity was found to be in the range of 150 to 800 cps. The pH was determined by the digital pH meter and the pH was found in the range of 4.31 to 6.12. The conductivity of microemulsion was from 0.012 – 0.024 (µs/cm). The maximum drug release was found to be 58.78 % in F4 (2:1). The maximum percentage of microemulsion permeability was found to be 82.45±2.57% with no skin irritation. The antifungal activity of microemulsion was found to be more as compared to standard fluconazole gel. Overall the formulation shows good stability and no significant changes were observed.

Keywords: Antifungal; Co-Surfactant; Fluconazole; Microemulsion; Surfactant

Zolgensma: Gene Therapy for Spinal Muscular Atrophy

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Abstract

Onasemnogene abeparvovec, sold under the brand name Zolgensma, is a gene therapy medication used to treat spinal muscular atrophy. Its type of drug called virus vector –based gene therapy .It was developed by the U.S. Biotechnology startup AveXis, which was acquired by Novartis in 2018 approved in May 2019 in the U.S.FDA. It is a recombinant AAV-9 based gene therapy. It works by using the AAV-9 vector to help carry the SMN-1 gene into the body to replace the function of the non working SMN-1 gene to the motor neuron cells. It is approved to treat spinal muscular atrophy in children less than 2 years old which works by supplying a healthy copy of the faulty gene. The zolgensma drug will be available in single use vials. Elevated aminotransferases & vomiting are the normal side effects. Liver problems, respiratory infection, allergic reaction to be avoided.

Keywords: Onasemnogene abeparvovac; AAV-9; SMN-1; SMA

A Review on Comparative Study of Various Sophisticated Instruments Used in Drug Discovery and Development

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Abstract:

Pharmaceutical instruments cover a wide range of items, supplies, and machinery. In every single step of the manufacturing process, each form of instrumentation plays a significant role. Pharmaceutical instrumentation requires the highest level of precision, reliability, and efficiency. The pharmaceutical development has brought about a revolution in human health. The pharmaceuticals can fulfill their intended purpose only if they are free of impurities and are administered in an appropriate amount. Different chemical and instrumental methods were developed at regular intervals to make drugs serve their purpose which are involved in estimating drugs. An important role for this analytical instrumentation is played by and methods. This review emphasizes the role of the analytical instrumentation and the analytical methods in evaluating the drug quality.

Keywords: Ultraviolet-visible Spectroscopy; Mass Spectroscopy; NMR Analysis; FTIR-spectroscopy

An Review on Biological Evaluation of 1,3,4-thiadiazolidine

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Abstract

A series of 1,3,4-thiadiazolidine were designed and synthesized their assayed antibacterial activities were evaluated by agar-cup diffusion method. The results of biological test showed compound (5a-f) have favorable antimicrobial activity with MICs of 24.0, 23.5, 27.0, 26.0, and 28.0 ug/ml against *E. coli, S. aureus, P. vulgaris, B. subtilis* & shigella respectively. Included both gram positive as well as gram negative strains.compound (5a)and (5d) are highly active against *S. aureus* (5b) is having high activity against *S. flexneri*. Most of them are inactive against *B. subtilis*.

Keywords: 1,3,4-thiadiazolidines; Biological evaluation; Structure activity relationship

Herb Drug Pharmacokinetic Interaction of Methotrexate and Turmacin in *Albino Rats*

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Abstract

Cancer is the dreadful disease affecting most of the people worldwide. The use of chemotherapeutic drugs for cancer treatment caused various side effects and for avoids these patients tends to administer the use of complementary medicines. A survey concludes that patients depend on the use of herbal medicines to get rid of damaging side effects of these agents or to get faster relief. The patients using these herbal medicines and are unaware of the interaction of these herbal medicines with the concomitant use of chemotherapeutic drugs. Our aim is to study the interaction of one such drug methotrexate with herbal medicine turmacin (a novel turmerosaccharide solvent free phytoconstituent) from *Curcuma longa*. This *in vivo* pharmacokinetic herb drug interaction study was conducted in *Albino rats.* Rats were divided into four groups, one group was given MTX alone (100mg/kg, intravenous), while the other three groups were given different dose of turmacin (600 mg/kg/day, 1200 mg/kg/day, 2400 mg/kg/day) consecutively for 7 days along with drug MTX. Group of animals with drug (MTX) and after co-administration of turmacin were examined by taking their blood samples and performing high performance liquid chromatography, to record the levels of drug in their plasma. The results showed that levels of MTX showed slight variation in their kinetic profile and mean residence time with high doses of turmacin (1200 mg/kg/day and 2400 mg/kg/day). No significant changes were observed with low dose of turmacin (600 mg/kg/day). This study confirmed that at low dose turmacin is safe but high doses of turmacin should not be used for safety concern in patients.

Keywords: Alternative medicines; Drug interaction; Cancer; Methotrexate; Turmacin

Synthesis, Characterization and Biological Evaluation of Triazole Derivatives of Propyl Gallate

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Abstract

Heterocycles with a symmetrical triazole are an interesting class of molecules with a wide range of biological actions, including anti-inflammatory, anti-cancer, anti-tubercular, antiviral, and antibacterial characteristics. In this investigation, propyl gallate and hydrazine hydrate were used as starting materials to synthesis molecules. Following the scheme, five distinct compounds with various aromatic substituents were created. For structural confirmation, the synthesized compounds were submitted to physical characterization and spectral investigation. After that, the compounds were tested for antibacterial and antifungal activities. Bacillus subtilis, Staphylococcus aureus, Escherichia coli, and Klebsiella pneumoniae were all shown to have modest activity against all of the tested bacterial strains in the bacterial screening. The chemicals that remained were found to be less active. When comparing the minimum inhibitory concentration values of the compounds against bacteria stains, substance S3, S4 has a faster commencement of action against all bacteria strains than the standard.

Keywords: Antibacterial activity; Antifungal activity; Triazole; Propyl gallate

Atenolol Microemulsion: Parenteral (I.V.) Drug Delivery System

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Abstract

Atenolol is a cardio selective beta-blocker, called such because it selectively binds to the β1-adrenergic receptor as an antagonist up to a reported 26-fold more than β2- receptors. Selective activity at the β1 receptor produces cardioselectivity due to the higher population of this receptor in cardiac tissue. Microemulsion is a transparent or nearly transparent, quasi-homogeneous, thermodynamically stable mixture of two immiscible liquid stabilized by surfactant and co-surfactant. As pharmaceuticals drug delivery systems, microemulsion have unique properties, including clarity, high stability and ease of preparation. Due to their physicochemical properties, microemulsion often advantages over traditional topical and transdermal drug delivery systems. Moreover, microemulsion dispersion are promising candidates as means for controlled drug delivery, and as drug carriers for oral, topical, and parenteral administration. Microemulsion can be used for the delivery of hydrophilic drugs as it enhances the membrane permeability, hence suitable for drugs belonging to BCS class III. Parenteral administration (especially intravenous route) of drugs with limited solubility is a major problem in industry because of the extremely low amount of drug actually delivered to a targeted site. Both O/W and W/O microemulsion are used for parenteral delivery and can be used for the parenteral delivery because the toxicity of the surfactant and parenteral use. A drug's permeability across biological membranes is a key factor that influences the absorption and distribution. Drugs may cross cell membranes by passive diffusion, active transport, and pinocytosis etc. Parenteral administration is preferred at times over other drug-administrations routes, such as in emergency situations of cardiac arrest and anaphylactic shock. This type of administration route exhibits several advantages, such as first-pass metabolism avoidance, better bioavailability, and reliable dosage. Compared with oral administration, parenteral administration has control over the dose and rate, thus generating more predictable pharmaco-dynamic and pharmacokinetic profiles.

Keywords: Atenolol; Microemulsion; Parenteral administration; Intravenous route

Costunolide: A Potential Therapeutic Agent

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Abstract

Costunolide is a sesquiterpene lactone specifically a colourless crystalline compound, first isolated from genus *Costus*. It is a one of the biologically active compounds commonly found in the plants of Costaceae family. Sesquiterpene lactones are large class of secondary metabolites universally found in large group of plants. Costunolide come under germacrenolides. Medicinal value of any plant is basically due to presence of different phytoconstituents such as terpenes, phenols, flavonoids, saponins, steroids, glycosides etc.*Costus speciosus* is well known for its medicinal values as it has diverse therapeutic potentialsuch as, antidiabetic, anticancer activity, antimicrobial activity, neuroprotective effects, antifibrotic effects etc. Costunolide also showed stable interaction with some cell cycle regulators and enzymes confirming its potential anticancer activity. Molecular docking studies will be further helpful to explore the use of costunolide compound in drug discovery.

Keywords: Anticancer; Medicinal; Metabolites; Neuroprotective; Sesquiterpene

Evaluation of Antinociceptive Effect of *Helicteres isora* Extract Loaded-Phospholipid Complex Against Pain and Inflammation

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Abstract

The present study investigates the effect of a phytoactive extract based formulation on muscular and nervine disorders. In the present research an attempt has been made to evaluate the activity profile of *Helicteres isora* (*H. isora*) plant for the treatment of muscular and nervine disorders which includes muscular inflammation and nerve pain. In this study the herbal extract loaded phytosomes were prepared and their characteristic evaluations like particle size, zeta potential, drug entrapment and % percentage yield were identified. Later on antinociceptive effect of *H. isora* extract loaded-phospholipid complex (HEPC) against Capsaicin-, Glutamate-, Phorbol 12-Myristate 13-Acetate- (PMA-), and Bradykinin-Induced Nociception was evaluated. Our study clearly indicated that the extract is effective in suppressing all pain induced biomarkers to a greater extent as compared to standard.

Keywords: Antinociceptive; Bradykinin; Muscular; Nervine; Zeta potential

Formulation Optimization of Silver Nanoparticles using Experimental Designing

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Abstract

Silver nanoparticles (AgNPs) have been known for their unique features such as shape, size, electrical and antimicrobial properties. For the synthesis of AgNPs, a range of preparation approaches have been documented, including gamma irradiation, laser ablation, electron irradiation, photochemical processes, chemical reduction, and biological synthetic, microwave processing methods. Chemical reduction method is one of the simples, fastest method of synthesis of yield silver nanoparticles. The impacts of three variables, including reaction time, temperature and string speed were studied simultaneously. The three components were optimised using Box-Behnken design (BBD). It is further characterized by UV- spectrophotometer, scanning electron microscopy and anti-oxidant property. AgNPs shows sharp peak between 350nm to 450 nm having particle size below 100 nm, with an average Zeta potential lie between 30 to -35 nm. It also shows the potent 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging potential and hydrogen peroxidise reduction. These simultaneous antioxidant activities of the AgNPs showed its potential for application to reduce oxidative stress.

Depression : Allopathic Medicine for Depression

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Abstract

Depression is a common mental disorder. Depression is a leading cause of disability worldwide and is a major contributor to the overall global burden of disease. More women are affected by depression than men. Depression can lead to suicide. Depression is a common illness worldwide, with an estimated 3.8% of the population affected, including 5.0% among adults and 5.7% among adults older than 60 years (1). Approximately 280 million people in the world have depression. WHO's Mental Health Action Plan 2013-2030 highlights the steps required to provide appropriate interventions for people with mental disorders including depression. Depression is one of the priority conditions covered by WHO's Mental Health Gap Action Programme (mhGAP). Antidepressants are useful in the management of depressive disorders, anxiety disorders, sexual dysfunction, and personality disorders. The Antidepressent medicine in allopathic better results show and less time consuming. Different classes of antidepressants are in practice depending on the type and requirement of depression. Through this poster, you will learn about the pathophysiology, mechanism of action, as well as new advancement in the treatment of depression.

Keywords: Depression; Antidepressants drugs

Review on Green Synthesis of Silver Nanoparticle by *Catharanthus roseus* (L.) G. Don and Their Photocatalytic and Antimicrobial Activity

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Abstract

The nanoparticle is small size particle that size range between 1 to 100 nanometers and this particle is based on the advanced technology called nanotechnology. This technology is used for so many benefits of human life. In so many fields like waste management, diseases treatment, water purification system, transparent sunscreen, pharmaceutical companies this technology is used. In this study, *Catharanthus roseus* (L.) G. Don plant extract was used to prepare silver nanoparticles as a green technique. Because silver nanoparticle is less toxic, it is used. *Catharanthus roseus* of the Apocynaceae family is the most beneficial, remedial, restorative plant. Various diseases can be cured by the use of different parts of this plant (like cancer, relieving muscle pain diabetes, leukemia, menstrual regulators, and hypertension). The characters of green synthesized silver nanoparticles were introduced by using multiple techniques like scanning electron microscopy (SEM) to access morphological properties, X-ray diffraction (XRD) to investigate crystal plane of nanoparticles, Fourier transmission infrared spectroscopy (FTIR) to identify a functional group of the surface, and UV-visible spectroscopy for particle range. Antibacterial activity and photocatalytic activity showed by green synthesized silver nanoparticles. It will help to control water pollution and make a better environment for living organisms to grow and survive.

Keywords: Antimicrobial activity; *Catharanthus roseus*; Green synthesis; Photocatalytic activity; Silver nanoparticles

Recent Development in the Treatment of Zika Virus Disease

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Abstract

Zika Virus Disease (ZVD) is a mosquito-borne, viral disease caused by Zika virus (ZIKV). Mild fever, rash (usually maculopapular), headaches, arthralgia, myalgia, asthenia, and non-purulent conjunctivitis are all symptoms that appear two to seven days after being bitten by an infected mosquito. The long-term consequences of ZIKV infection are still unknown. There are currently no treatment or vaccination options available to protect people who have been infected with ZIKV. Ivermectin (IVM) was discovered to be an effective agent for preventing ZIKV transmission. These diseases were caused by ZIKV strains. We look at various vector-centric techniques for controlling the current outbreak, as well as the prospects for vaccines and treatments development.

Keywords: Asthenia; Arthralgia; Headaches; Non-purulent conjunctivitis; Rash; Zika Virus

Investigation on the Antimicrobial Activity of the Sea Urchin *Stomopneustes Variolaris* (Lamarck, 1816) Collected From Vizhinjam, South West Coast of Kerala

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Abstract

Sea urchins are sea creatures that live in the ocean all over the world. They are the members of a large group of marine invertebrate in the phylum Echinoderma, Subphylum Echinozoa and Class Echinoidea. Some species of sea urchin are rich in biochemical contents and served as a source of food. Some of the sea urchin produces secondary metabolites and they may be pharmacologically active on humans and are used as medicine aim of the present study is to evaluate the antimicrobial activity of methanolic and acetonic extract from *S. variolaris* collected from vizhinjam, south west coast of Kerala. Methanolic and acetonic extract of sea urchin were extracted using a water bath at 70°C. The extracts were tested using the disc diffusion method against 4 pathogenic bacteria named as *Salmonella typhimurium, Vibrio cholerea, Klebsiella pneumonia, Escherrichia coli* and against 4 pathogenic fungi named *Penicillium crysogenium, Aspergillus niger, Aspergillus flavus, Candida albicans*. The highest antibacterial activity was observed in the methanolic extract were *V. cholerea* (11.33 mm) showed the highest activity and the least was shown by *S. Typhimurium* (8.33 mm). The highest antifungal activity of the methanolic extract was shown by *C. Albicans* (3.18 mm) and the least by *P. crysogenium* (2.32 mm). The methanolic extract showed the good antimicrobial activity against the selected pathogens compared to acetonic extract. Qualitative analysis of carbohydrate, protein, fats, alkaloids, diterpenes, saponins, cardial glycosides, phenol, flavanoids, steriods were examined. The present findings on the sea urchin demonstrate that this species may form the basis for the source of active manner of antimicrobial potential in future.

Keywords: Antimicrobial; Invertebrates; Vizhinjam; Kerala

Bioassisted Synthesis of Silver Doped Zinc-oxide Nanoparticles and Evaluation of their Anti-cancerous activity

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Abstract

Biocompatibility and stability of Silver Doped Zinc-oxide Nanoparticles synthesized using plants is an interesting research area of study in nanotechnology, due to its wide applications in biomedical, industrial, cell imaging, and biosensor fields. The present study reports the novel green synthesis of stable Silver Doped Zinc-oxide Nanoparticles using various concentrations of zinc nitrate (0.01M, 0.05M, 0.1M) and *Albizia lebbeck* stem bark extracts as an efficient chelating agent. Antimicrobial, antioxidant, cytotoxic, and antiproliferative activities of the synthesized NPs on human breast cancer cell lines were evaluated using different assays.

Keywords: *Albizia lebbeck*; Biocompatibility; Silver Doped Zinc-oxide Nanoparticles

Analysis of the Impact of Cone Flower Extracts in Respiratory Infection Treatment

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Abstract

Pneumonia is a potentially fatal disease of the lungs. When individuals get Pneumonia, the air sacs in their lungs become inflamed. The inflammation is caused by fluid or pus filling in the sacs and may result in death. It is particularly dangerous for newborns, children, and aged (above 65). The disease can cause coughs with pus, fevers, difficulty breathing, or chills. Vaccines help in preventing certain types of pneumonia and are treated with antibiotics. These patients must be admitted for proper medical attention, or rather depending on their health conditions, restoration may take several weeks or months. When symptoms appear, home remedies can aid in disease management while somehow increasing their level of comfort at home. The perennial CFs (Cone flowers) are popular home medications for treatment of Pneumonia. These perennial flowers are hot and drought tolerant, simple to cultivate, and bloom throughout years. The primary goal of this research is to examine cone flower extracts in the treatment of respiratory function. This study also demonstrated the benefits and application of cone flower in the treatment of pneumonia.

Keywords: Cone flower; Flower extracts; Pneumonia; Medicinal use

Enhanced Chemical Substructure Representation with Deep Learning Framework for Drug-Drug Interaction Prediction

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Abstract

Unfavourable DDIs (drug-drug interactions) are becoming a major source of deaths where patient's safety is crucial to society. Identifying DDIs during medicinal designs have been studied but with limitations: (1) absence of specialised drug representations in prediction of DDIs; (2) predictions are not generalized but based on limited known data; (3) models use more parameters making interpretations difficult. This paper suggests ECARDLTs (Enhanced Chemical Substructure Representations with Deep Learning Techniques) which predict DDIs in drug's chemical structures. The suggested scheme aims to overcome limitations by employing (1) a SPMs (sequential pattern mining) based on DDIs for characterising drug's functional sub-structures; (2) auto-encoding of labelled/unlabelled chemical structures for improving predictive accuracy and generalizations; (3) using dictionaries that explain predictions with coefficients that measure input substructure relevance. The proposed ECARDLTs was tested on DDI datasets where it outperformed others in experimental results in terms of AUCs (Area Under Curves), accuracies, precisions, recalls, and f-measures.

Keywords: Area Under Curves; Drug-Drug Interactions; ECARDLTs; Patient safety

Novel Drug Ursolic Acid Used as Anti-carcinogenic and Chemo-protective Effect

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Abstract

Ursolic acid is a pentacyclic triterpenoid that occurs naturally in a variety of fruits and vegetables. Ursolic acid and its derivatives were shown to have anticancer, anti-inflammatory, and apoptosis-inducing properties in numerous human cancer cells, according to recent study. The bulk of cancer fatalities are caused by cancer metastasis, which has emerged as a serious public health hazard. Traditional chemotherapeutics were formerly efficient, but they now have minimal therapeutic efficacy and dangerous adverse effects. Recently, Various Ursolic acid nano-systems have developed as viable techniques for successful cancer therapy as a result of the advancement of nanotechnology. Ursolic acid suppresses cancer growth, metastasis, angiogenesis, and cell death by scavenging of free radicals and activating a variety of anti- and pro-apoptotic proteins. Ursolic acid has also been shown to scavenge free radicals .The goal of this work is to discuss recent research on ursolic acid's anticancer effect and emphasis on its mechanisms of action.

Keywords: Angiogenesis; Cancer Metastasis; Pentacyclic; Pro-Apoptotic Proteins, Triterpenoid

Formulation Optimization and Characterization of Transdermal Film of Curcumin by Response Surface Methodology

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Abstract

India is referred as goldmine of herbal drugs but still lack of optimization of herbal drugs, which has kept us on the back foot. The rationale of the study is to prepare optimized transdermal drug delivery system of curcumin to study the collective effect of independent variables which significantly influenced characteristics of the formulation. Twenty formulations containing varying concentrations of polymers and permeation enhancer were prepared using solvent casting technique. The study revealed that the effect of dibutyl phthalate (DBP) concentration was the highest on percentage elongation ($P < 0.0001$), while hydroxy propyl methyl cellulose (HPMC) concentration exhibited pronounced effect on drug release ($P < 0.0001$) through dialysis membrane. Linear model fitted the best for curcumin release and elongation for all formulations. According to Derringer's desirability prediction tool, the composition of optimized film was found to be 242.14% of HPMC, 109.59% of ethyl cellulose (EC), and 1.03% of DBP. Under these conditions, the optimized patch exhibited a predicted value of %elongation and in vitro drug release of 94.35% and 80.0306%, respectively, which was comparable to the actual values of percent elongation and in vitro drug release i.e., 95.02% and 81.03% respectively. FTIR and thermal studies were also performed which revealed no interaction or complexation between drug and excipients. The ex vivo study performed using rat skin showed that the cumulative drug release from the optimized patch showed flux of (30.68±18) mg/cm^2/h. It can be concluded that in future if proper optimization of herbal formulations is carried out, they can become the first choice for patients as compare to synthetic drugs.

Keywords: Derringer's desirability prediction; Drug delivery; Herbal drugs

Formulation and Evaluation of Novel Herbal Microparticles of *Terminalia chebula*

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Abstract

Gastroretentive programs, DDS in the floating abdomen offer many more benefits than the end-of-life system. There are a variety of controlled drug regimens that can overcome these problems and free the drug to maintain its plasma concentration for a long time. One such drug delivery system is a comprehensive drug delivery system. After its administration, the drug would remain in the stomach and release the drug in a controlled manner, which is why the drug could be administered continuously in its absorption-related areas of the gastrointestinal tract. Four formulations containing varying concentrations of polymers and permeation enhancer were prepared using solvent evaporation technique. The study revealed the percentage yield of all floating microsphere formulations was more than 88.68% suggesting the method used for encapsulation was effective. The percent yield significantly increased as the amount of polymer was increased in each formulation. The drug entrapment efficacy of different formulations was found to be in the range of 91.94 -67.11%, was good in all the cases. This suggested that optimized parameters were used in the method of preparation. The particle size increased significantly as the amount of polymer increased. Micromeritic properties of microparticles involving organoleptic bulk density, tapped density, angle of repose, Hausner's ratio, melting point range were carried out as per IP specification. From the SEM study, it was observed that microspheres were rough in surface. It was concluded that PVA, ethyl cellulose, eudragit S100 can be successfully used in the formulation of *Terminalia chebula* gastroretentive floating drug delivery system.

Keywords: Gastroretentive; Microparticles; *Terminalia chebula*

Development and Characterization of Nanostructured Lipid Carrier (NLC) for Topical Delivery of Celecoxib

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Abstract

Nanostructured lipid carriers (NLCs) have been used to improve the penetration of an active chemical through the skin after topical administration. The present study describes the development of a novel NLCs for celecoxib (CX) topical delivery. The NLCs system is composed of physiological, biocompatible, and biodegradable solid and liquid lipid components, as well as surfactants, and it has been approved by regulatory agencies for use in several drug delivery systems. Celecoxib is a non-steroidal anti-inflammatory drug (NSAID) used for the treatment of inflammation and allied conditions. It has been accepted for the treatment of different kinds of pain, rheumatoid arthritis, and osteoarthritis. NLCs have been intensively studied as novel drug delivery carriers for hydrophilic and hydrophobic drugs. NLCs introduce great entrapment efficiency in the case of drugs with poor aqueous solubility like celecoxib. Stearic acid was used as a solid lipid, oleic acid was used as a liquid lipid, and tween 80 was used as a surfactant to make CX-NLC. NLCs ensure close contact with stratum corneum due to their small particle size in the nanometer range (10-500nm). The NLCs were characterized for drug entrapment efficiency, particle size and its distribution, TEM (transmission electron microscopy), and drug release behavior. The NLCs displays a biphasic drug release pattern with burst release at the initial stage followed by sustained release. These studies indicate that the NLCs is acceptable carrier for celecoxib with improving drug loading capacity and sustained drug release properties. All these properties indicate that they may be a promising and effective nanocarrier for topical delivery of celecoxib.

Keywords: Celecoxib; Nanostructured lipid carrier; Nanocarrier; Transmission electron microscopy

Crizanlizumab, A Monoclonal Antibody - An Updated Review

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Abstract

Crizanlizumab is a monoclonal antibody. Novartis markets it under the brand names Adakveo and Ryverna, as well as the generic name crizanlizumab-tmca injectable. Crizanlizumab was approved by the US Food and Drug Administration based on data from a single clinical trial including 132 patients with sickle cell disease who had previously experienced a Vaso-occlusive crisis. Crizanlizumab binds to P- selection on endothelial blood platelets, blocking intraction of P- selection glycoprotein ligand-1 on endothelial cells, platelets, red blood cells, and leukocytes. Components of the blood are less likely to come together as a result of this interaction, generating a vaso-occlusive crisis in sickle cell disease patients. It is a drug that is used to lower the frequency of vaso occlusive crises in sickle cell anaemia patients aged 16 and up. Our efforts in this study have been focused on examining the mechanism-based potential of crizanlizumab, which will aid future research.

Keywords: Crizanlizumab; Glycoprotein; Monoclonal antibody; Sickle cell anaemia; Vaso-occlusive

Sesquiterpenoids: An Insight in Prevention and Treatment of Life Threatening Disorders

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Abstract

Terpenoids or isoprenoids were the prenyl lipids subclasses, representing the oldest group, widely spread in nature. They play an extensive role in plant growth and development, response to the environment and other physiological processes. They are known to possess anti-inflammatory, antibacterial, antiviral, anti-malarial, anti-tumor and anti-ageing properties. They also found applications in insect resistance, immune-regulation, auto-oxidation and neuroprotection, thus acting via variant mechanism of action. Recently, terpenoids were also evaluated as protease inhibitors and were found to be effective treating COVID-19. Keeping in view, this review aims to focus on sesquiterpenoids; describing numerous pharmacological activities, and their recent progress with their underlying mechanism as anticancer. This will help the researchers to enlighten the terpenoid molecules more and more with better potency and efficacy by doing some modifications in the parent nucleus and thus sheds more light on their potential in treating life threatening disorders. Current studies will help the researchers to increase the chances of gaining breakthrough insights in the field to be employed in therapeutic practice against these diseases.

Keywords: Antibacterial; Cancer; Inflammation; Pharmacological Potential; SAR; Terpenoids

CATH-BOT: First Step Towards An Independent Heart Catheterization Robot

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Abstract

Heart catheterization relies mostly on fluoroscopic imaging for guidance which exposes the staff and patient to harmful radiation. Human error is also an important factor of morbidity and mortality. The ultimate goal of CATH-BOT is a self- directed robot which is capable of performing remotely supervised cardiac catheterization without ionizing radiation.

CATH-BOT will create a patient specific 3-D anatomical model by obtaining all recent pre- procedural imaging within the hospital electronic record system (eg.MRI) and also uploaded images from outside sources. The 3-D anatomical model is co-registered with patient real time imaging prior to procedure. Catheter location and course are continuously tracked by an EMTS (electromagnetic tracking system) which is also co-registered. Thus CATH-BOT is aware of real- time catheter position in relation to patient anatomy without the need of fluoroscopy.

Catheter movement is accomplished using a robotically steerable catheter. CATH-BOT will have pre-programmed a catheter manipulation algorithm (CMAs) which is attained through integrating catheter position, desired location and real-time patient anatomical map. Safeguards include reduntant force sensors, mechanical restraints and predefined acceptable catheter zones. Future integration of computational creativity and deep learning via artificial neural network will raise the level of catheter manipulation to that of human operator, all without radiation.

The ultimate goal of CATH-BOT is procedural independence. The EMTS prototype performed well & next phase of development of steerable catheter and CMA database is on progress.

Keywords: Fluoroscopic imaging; CMA; EMTS

Computational Studies, Synthesis and Antihypertensive Evaluation of Novel 1,4-Dihydropyridine Derivatives

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Abstract

Hypertension is a universal public health hazard, a leading cause of mortality and ranked third as a cause for disability-adjusted life years. It affects approximately 26% of the population worldwide, nearly 45% of deaths by heart disease and 51% of deaths by stroke are due to hypertension; accounting for 9.4 million deaths worldwide every year. In India, its prevalence varies from 20-40% in urban to 12-17% in rural areas. It is estimated that the prevalence of hypertension might rise to 214 million by 2025. The 1,4-dihydropyridine (DHP) drugs are the most commonly used drugs in the treatment of hypertension. Molecular docking study of the novel 1,4-dihydropyridine derivative with a calcium channel protein (PDB ID- 3LV3). Selection of best binding affinity molecule, synthesis and characterization by IR, NMR, and Mass spectroscopy, and evaluation of the antihypertensive activity. The molecular docking studies of novel 1,4-dihydropyridine derivatives were done on Protein (PDB ID- 3LV3) using software AutoDock 4.2.6, DSV, and MOE. In this synthesis, the Hantzsch reaction was used for the synthesis of 1,4-dihydropyridine derivatives. IR, NMR, and Mass spectra were used for characterization and the antihypertensive activity was evaluated using the tail-cuff method. Based on the docking study, the best docking score derivatives of 1,4-dihydropyridives (DHP-A,DHP-B,DHP-C,DHP-D,DHP-E) were synthesized. Derivatives showed significant difference in lowering the blood pressure level compared to standard drugs nifedipine, clonidine. DHP-B compound showed to be equally effective as clonidine. The compound synthesized appeared and was consistent with their proposed structures based on the pharmacological evaluation.

Keywords: Antihypertensive activity; AutoDock; 1,4-dihydropyridine; Hantzsch reaction

Distinct Biochemical Properties of Selected Halophilic Proteins: A Comparative Study

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Abstract

Halophilic bacteria are found in a saline environment, where the mesophiles possess slow or retarded growth. Molecular mechanisms of study of osmotic adaptations revealed the adaptation strategies include hybrid strategy, chloride dependent growth, compatible solute synthesis and compatible solutes based protection to the proteins at stressed conditions. Three major metabolic pathways *viz* glycolysis, ED pathway and TCA cycle are involved in this compatible solute-dependent adaptation. Osmo-sensing and osmo-signaling involve membrane-bound sensory proteins known as the two-component system; the external stress of high salt concentration stimulates the down processses leads by the two-component system (EnvZ/OmpR). OmpF and OmpC are two porin proteins as well as membrane proteins regulated by the EnvZ/OmpR. The comparative analyses of amino acid compositions suggested changes in physicochemical and biochemical properties of halophilic proteins. *In silico* analyses of halophilic proteins and its non-halophilic counterparts have been done by analysing the changes in the percentage of presence of different amino acids residues in the selected proteins ExPASYProtParam online tool. We observe the increase in the acidic amino acids residue in the halophilic proteins compared to heir homologs in non halophiles. The changes in amino acid residues may lead to other biochemical and structural changes in the proteins necessary for adaptation and functional activities in the high salt environment.

Molecular Docking Study of Best Ranked Metastasis Driver Proteins of Breast Cancer (1fdv, 3hb5) with Anacardic Acid

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Abstract

Worldwide, breast cancer is the most common cancer in women. Along with lung cancer, breast cancer is the most commonly diagnosed cancer, with 2.09 million cases each in 2018. Breast cancer affects 1 in 7 (14%) of women worldwide. In this project, the best-ranked metastasis driver proteins of breast cancer (1FDV, 3HB5) were docked with plant-based anti-cancer drug molecules i.e., Anacardic acid, and analysis between the two results. The binding affinity of 1FDV and 3HB5 protein with an Anacardic acid drug molecule is -206.17 and -293.52 respectively, which means that 3HB5 protein has a better binding affinity to the cavity. Structure models clearly showed that the cavity decreases docking score due to steric repulsion of certain conformation of the ligand.

Keywords: Anacardic acid; Cancer; Ligand

2D-QSAR Study of Dicationic m-Terphenyl and 1,3- Dipyridyl benzene Derivatives as Potent Antitrypanosomal Agents

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Abstract

QSAR Study has been established on Dicationic m-Terphenyl and 1,3-Dipyridylbenzene analogues as antiprotozoal activity using linear and non-linear method. Satisfactory Statistical values of r= 0.9677, r^2= 0.936, r^2cv= 0.812, F= 62.744 and S= 0.3 have been obtained by MLR and a statistical significance =1.295 r^2cv=0.813 and fraction of variance explained= 0.929 have been obtained by PLS. The validation through external test set provided R^2 value of 0.710 (MLR) ,0.715 (PLS) and 0.776(FFNN) analyses. This indicates that both linear and non-linear methods gave comparable results and showed good correlation and predictive ability of the model. model suggest the importance of Inertia moment 3 length(sub.1),Dipole moment Xcomponent (sub.1), Rotable bonds (sub.3) and No.of Hydrgen bond donors (sub.1) descriptors in determining the HAT inhibitory activity.

Keywords: Antiprotozoal; Correlation; Dicationic m-Terphenyl; 1,3-Dipyridylbenzene; Statistical

In-silico ADME and Toxicological Analysis of Some Bioactive Compounds of Medicinal Plants

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Abstract

According to WHO, 80% of the population uses herbal medicine as alternative therapeutics. Still, there are indications of false drugs, unscientific use, and unfavourable drug reactions of herbal drugs. Thus, the clinical validation must be applied to verify the safety and efficacy of these herbal products. In drug discovery, studying the activity of the drug in the body to assess the safety and toxicity is of prime importance. Nowadays, we have witnessed the paradigm shift in clinical studies since the advent of computational biology in drug designing pharmacokinetics study. The *in-silico* ADME and Toxicology are critical steps to assure drug viability and efficacy. The objective of the present study is to analyze some bioactive compounds of medicinal plants of Chhattisgarh for their druggability.

Keywords: ADME; Druggability; *In-silico*; Pharmacokinetics; Toxicology

Improved Dark Fermentative Hydrogen Production Using Different Organic Residues Applying Augmentation Strategies: A Way to Convert Bio Waste to Bioenergy

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Abstract

The present day energy crisis can be tackled by using biofuels. Hydrogen produced by biological routes can be considered as carbon neutral and clean fuel. Among the biofuels, bio hydrogen production can be considered as a promising approach as it requires minimal energy input as compared to conventional methods of hydrogen production. In Dark fermentative hydrogen production wide variety of low cost feedstock can be used as substrate thus providing an added advantage of waste management. Thus dark fermentative hydrogen production possesses tremendous potential in energy sector. In the present work potentiality of bio-augmented system developed by using facultative anaerobic bacteria with obligate anaerobe for improved hydrogen production was studied. Application of two different group of anaerobic bacteria offered a elaborate enzyme system for hydrogen production. The co-culture strategy comprising of *Klebsellia pneumoniae* and *Clostridium acetobutylicum* improvement in hydrogen yield was attained by 37% and 18% respectively as compared to individual organism. Moreover, the COD removal efficiency was also higher in case of co-culture. Maximum H_2 yield by this augmented system using cane molasses, starchy wastewater and distillery effluent were 9.47, 8.72 and 7.78 mole H_2 Kg^{-1} $COD_{reduced}$ respectively. So, bio-augmented system could be helpful in realizing the goal of "waste to energy" concept.

Keywords: Bioaugmentation; Co-culture; CSTR; [FeFe]-hydrogenase; FHL complex

α-Amylase Production and Parameter Optimization from Deoiled Rice Bran using *Staphylococcus aureus*

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Abstract

Amylolytic enzymes hold great economic importance in modern-day biotechnology comprising approximately ~25-30% of the whole enzyme market. α-Amylase (endo-1,4-α-D-glucan glucanohydrolase, E.C.3.2.1.1) belongs to the Glycoside Hydrolase family 13 (GH13) that offers several applications in starch-based industries. It randomly hydrolyzes the α-(1,4) glycosidic linkages of starch to generate short-chain α-anomeric products like glucose, maltose, maltotriose and limit dextrin. The current study investigates the potential of agro-waste residue (deoiled rice bran) for α-amylase production using *Staphylococcus aureus* MTCC 3160. Furthermore, the favourable operational parameters including exogenous nutrient supplementation (carbon and nitrogen sources) for maximum enzyme production was determined. The maximum α-amylase production (161.45± 2.60 U/mL) was obtained from 15 g of the substrate at pH 10, 32°C after 48 hours of incubation. Among the various nutrient supplement analyzed, maximum production was achieved in production medium supplemented with 2% (w/v) maltose (431.89±19.31 U/mL), 0.2% (w/v) ammonium nitrate (148.71±2.15 U/mL) and 0.5% (w/v) yeast extract (309.18±11.80 U/mL). The main motive of the study is to assess the potential of the agricultural by-products generated in massive quantities per year. The study highly encourages the utilization of a low-cost substrate for manufacturing enzymes like α-amylase that will aid in resolving the issue arising due to the mismanagement of solid waste.

Keywords: Agro-waste**;** α-Amylase; Deoiled rice bran; Glycoside Hydrolase; Parameter optimization

Utilizing Rice-Milled By-Products for Cost-Effective α-Amylase Production

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Abstract

Bacterial enzymes are the most vital bio-product which possess several applications in present-day. α-Amylase (endo-1,4-α-D-glucan glucanohydrolase, E.C.3.2.1.1) is one such extracellular enzyme that own applications in starch, detergents, textile, food processing and pharmaceuticals industries. It is an endoenzyme that catalyzes the breakdown of the internal α-D-(1,4) glycosidic linkages of starch and other related polysaccharides to generate diverse products in α-configuration comprising glucose units. In recent years, the research and development regarding starch hydrolyzing enzymes have speeded up globally. The biomass generated from the agricultural sector represents a sustainable feedstock for bio-refineries. The plentifully available agricultural residues provide a cost-effective and sustainable substrate for large-scale bio-product formation that will aid in the solid waste disposal problem. The current study deals with α-amylase production and biochemical characterization from rice-milled by-products viz. rice bran (RB) and deoiled rice bran (DORB) using *Bacillus tequilensis* TB5 via one-factor-at-a-time approach. A combination of pH 10, at 37°C and exogenous supplementation of 2% (w/v) soluble starch after 48 hours of incubation was best suited for maximum α-amylase production from RB (181.67±0.66 UmL^{-1}). Contrastingly, the supplementation of 2% (w/v) maltose, pH 8 at 37°C for 96 hours favoured higher α-amylase production in DORB (285.36±3.45 UmL^{-1}). The variation in the biochemical parameters of α-amylase produced from both RB and DORB is due to the differences in their chemical composition and texture. The study highly promotes the utilization of agricultural by-products released at the time of harvest and during milling, for manufacturing various bio-products like an enzyme. Moreover, the study provides a basis for utilizing such sustainable substrates that should be analyzed further for their techno-economic feasibility at an industrial scale.

Keywords: Agro-waste; α-Amylase; Glycoside Hydrolase; Rice bran; Deoiled bran; Solid Waste Management

Optimization of Culture Conditions for CMCase Production by *Aspergillus quadrilineatus* NFCCI-4157 using Submerged Fermentation

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Abstract

Cellulases are key enzymes involved in catalysing hydrolysis of cellulose molecule into fermentable sugars and are third largest class of biocatalyst known for their industrial and biotechnological applications. These enzymes are further divided into three classes' viz., endoglucanase, exoglucanases and β-glucosidases which are known for working in concerted manner. Carboxy methyl cellulases (CMCases) also known as endoglucanses are responsible for degradation of amorphous cellulose and have immense applications in textile industries. The present investigation aimed for improved CMCase production by soil fungi obtained from textile waste dumping site of Raipur city. The isolate was characterized based on morphotaxonomy and ITS gene sequence analysis and was identified as *Aspergillus quadrilineatus* (RSCF6) NFCCI-4157. The isolate was deposited to National fungal culture collection India and the sequence was submitted to NCBI Gene bank database (accession number MN871860). The fermentation parameters optimized for hyper production of CMCase were observed at incubation time of 7 days at a temperature of 28^{o}C, the optimal pH of the medium was found to be 5.50 with six discs of fungal mycelium (10 mm diameter) as optimal inoculum size, and agitation speed of 150 rpm, peptone (0.3%) as optimal nitrogen source with 1.5% carboxy methyl cellulose as a substrate, 2% sigma cell 20 (avicel) as supplementary carbon source and manganese chloride (0.04%) was found to be best additive for increased production of CMCase. This study enhanced CMCase production by 2.32 fold when compared with control.

Keywords: *Aspergillus quadrilineatus*; CMCase; Endoglucanase; Soil Fungi; Submerged Fermentation; Textile

Microbial Analysis of Soil from Municipal Solid Waste for Waste Degradation

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Abstract

The word "waste'' refers to useless, unwanted or discarded materials which are no longer considered of sufficient value and are thrown away by the processor. Wastes includes solids, liquid and gases. Every day a huge quantity of waste generate in all the developed and developing countries. Most of the waste is subjected to dumping in a specified disposal yard. The greatest challenge to the environmentalists is the ecofriendly management of this waste and application of micro- organisms. So, the purpose of this study was to investigate microbial strain from waste dump site of Latur, Maharashtra, India. Also find out effective micro-organisms which take part in waste degradation and its optimum cultural condition, morphological and Biochemical characterization, antagonisticity, metal tolerance, antibiotic susceptibility and Production of extracellular enzyme of isolated organisms were documented.

Keywords: Extracellular enzyme; Metal tolerances; Municipal Solid Waste; Organisms

Effective Utilization of Domestic Waste as Substrate for Spawning of *Pleurotus* Sp.

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Abstract

Effective utilization of domestic wastes is one of the main concerns in the waste management process. One of the best ways of utilization of the wastes is to use them as the substrates for the cultivation of edible mushrooms. The study aims at the usage of domestic wastes like dried banana leaves, fruit peels, vegetable wastes, newspaper wastes etc for the spawn production. *Pleurotus* is the mushroom of choice, is been cultivated commercially for the past 50 years. In general *Pleurotus* Sp is rich in different types of bioactive substances like phenolics, flavonoids, proteins, fibre and vitamins. Among the edible Mushrooms *Pleurotus* Sp have a high commercial value. The current study aims at the screening and effective utilization of the domestic wastes as the substrate for the spawning of *Pleurotus* Sp. Five species of *Pleurotus viz., Pleurotus pulmonarius, Pleurotus djmaor, Pleurotus citrinopileatus, Pleurotus eryngi and Pleurotus florida* were selected for the study. Spawn production was carried out in the used saline bottles and polyethylene bags. Spawn running was carried out with all the necessary conditions in the customized spawn running room. Spawning was done at a rate of 1% for all the chosen substrate. Biological efficiency of the substrates, the conversion percentage of the dry substrate weight to the spawn weight was calculated. The highest spawn production was reported in the onion peel for all the five chosen species followed on by the vegetable wastes, dried fruit peels and sugarcane baggasse. The maximum spawn production was in onion peel for *Pleurotus pulmonarius* and *Pleurotus citrinopileatus*. The results of the above study have given a scope for the further effective utilization of the domestic wastes for spawn running and cultivation of the edible mushrooms.

Keywords: Mushroom; *Pleurotus citrinopileatus*; *Pleurotus pulmonarius*; Spawn

Waste to Wealth through Mushroom Farming: A Source of Food, Nutrition, Health and Income Security

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Abstract

Mushrooms are unique groups of fungi characterized by wonder, rise up from lignocellulosic wastes, become so bountiful, nourishing and are environmentally friendly. It provides vegetable of high quality, and enrich the diet with high quality proteins, minerals and vitamins which can be of direct benefit to the human health and fitness particularly sufferings during coronavirus pandemic. Mushrooms can serve as food, tonic, and medicine. They biosynthesise their own food from agricultural crop residues like paddy straw, wheat straw, soybean straw, straws of chickpea lathyrus, maize, sorghum, sugarcane etc. which are produced abundantly in Chhattisgarh state and are least utilised and causing environmental pollution. As per one of the estimate about 85 lakh tons of paddy straw is produced every year in Chhattisgarh state which can be suitably used for cultivation of oyster, paddy straw, milky and button mushrooms. In AICRP (Mushroom) at IGKV, Raipur, we tried varieties of agro wastes *viz.*, paddy straw, wheat straw, mixed paddy +wheat straw, cereal wastes which are easily available and obtained very good yield (55-120% BE) of oyster mushroom. Paddy straw is widely used for cultivation of paddy straw mushroom in several districts of Chhattisgarh like Korba, Mahasamund, Raigarh, Janjgir Chapa and it has been proved to be an important income generating activities by the women of Self Help Groups and young entrepreneurs in Chhattisgarh. Paddy straw with chicken manures is now commonly used for compost making in order to grow button mushroom in Chhattisgarh in a commercial scale and the production is about 5000 tons per annum. Mushrooms can serve as agents for promoting equitable economic growth in society and we can pilot a non-green revolution in less developed countries, and in the world at large.

Keywords: Mushroom; Pandemic; Medicine; Economic

Microbial Xylanases and their Applications in Pulp and Paper Industry

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Abstract

Xylanases are hydrolytic enzymes responsible for breakdown of β-1,4-glycoside linkage.,of the polysaccharide xylan present in plant cell wall. It is the most important renewable polysaccharide after cellulose. There are four different forms of xylans viz., arabinoxylans, glucuronoxylans, glucurono arabinoxylans and galactoglucurono arabinoxylans. The side chains of each xylan are responsible for the solubility, bodily shape and the reactivity of the xylan molecule with other components of hemicelluloses, thereby influencing the mode and quantity of cleavage of the xylan. Xylanases produced by microorganisms including actinomycetes, yeasts, fungi, marine algae and protozoans. Commercial application for xylanase includes chlorine free bleaching of wooden pulp prior to the papermaking method. Other than this, xylanase may be used for the production of biofuel from unusable plant fabric. Xylanase also play a vital role in the bioconversion of agro industrial waste to biomass that is utilized in animal feed. They are involved in enhancing the dietary quality of animal feeds. Regardless of the thorough understanding of the microbial xylanolytic machine, studies are still required to understand the mechanisms of xylan degradation by means of microbial xylanases and in their promising uses within the biological bleaching. Cellulase-free xylanase is crucial for bio-bleaching of pulp against the usage of poisonous chlorine compounds causing environmental and health threats .On this evaluate, we focused on the studies of structural composition of xylan in vegetation, the supply of xylanases, the mode of action and production of xylanases, factor affecting xylanase production and their capablility in business utility with emphasis on biobleaching.

Keyword: Actinomycetes; Biobleaching; Fungi; Pulp and Paper industry; Xylanases

Need and Challenges in utilisation of Fish Waste for Chhattisgarh's Aquaculture Industry

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Abstract

Aquaculture industry is growing with expeditious speed in recent years in Chhattisgarh and now it contributes to a large percentage of the state economy. This sector not only contributes to nutritional sufficiency but also provide employment and livelihood to million of people. In Chhattisgarh state fish production is abundantly increasing at present, giving rise to equal amount of fish waste production. The impact of waste produced from aquaculture is giving the threatening impact to the environment causing health issues to all the organisms. On an average 15 to 20% of protein is found in fish flesh. One of the major waste products of fish is Ammonia, formed from the metabolism of protein.

This study focuses on the fish waste management with various type of methods utilized in this process in order to minimize improper waste disposal in the environment. Various methods are used for fish waste treatment like hydrolysis, bio-remediation, anaerobic treatment, screening and various multifunctional methods. It is necessitated to study the need and challenges involved in fish waste treatment by segregating the fish waste into the liquid fish waste and solid fish waste and providing separate treatment using chemicals and indoor composting method. Underutilization or non-use of these wastes will not only increase disposal cost, but also loss of quality manure and revenue. Depending on the results obtained from the various studies it was found that liquid waste can be disposed of in water bodies and solid waste can be used as fertilizers in agriculture. Furthermore, the insights provided on the utilization of aqua-waste in state are encouraging in respect of increasing aquaculture productivity, economic value and environment sustainability.

Keywords: Aquaculture; Waste management; Fish; Waste treatment; Sustainability

Assessment of Fluoride Toxicity Sinking and Plant Growth Promoting Properties of *Pseudomonas aeruginosa*

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Abstract

For the last few years, fluoride (F) pollution in various natural ecosystems such as ground water, soil, etc., has become a matter of concern in Chhattisgarh as well as several other states of the India, and also elsewhere due to the excessive use of fertilizers and several other anthropogenic activities, which requires a quick and proper attention. Microorganisms present in the contaminated soil and water samples are the indicator of the pollutants which can be used in their detoxification processes. Identification of F tolerant bacterial strain(s) among them might be a potential application in bioremediation. Occurrence of F resistance bacterial population can be due to secretion of high affinity anion binding compounds called ionophores which have the capability of concentrating F ion so that it becomes less available in the soil. This study envisages developing microbial inoculants approach for agriculture in F contaminated soils. *Pseudomonas aeruginosa* was isolated from F contaminated soils of Chhattisgarh, India. It was further screened for F tolerance and plant growth promoting properties. Biosorption of F by *Pseudomonas aeruginosa* was evidenced by colorimetric method and SEM-EDX study. Further, assessment of various plant growth promoting traits *viz.;* indole acetic acid and hydrogen cyanide production, siderophore production, and phosphate solubilization capacity revealed that *Pseudomonas aeruginosa* may serve as an efficient plant growth promoter. *In vitro* experiments under F stressed conditions were performed using rice (*Oryza sativa*) variety MTU1010 as a test crop. Fluoride toxicity reduced seed germination and growth of seedlings; however, inoculation of F tolerant bacterial strain not only alleviated the F toxicity but also enhanced plant growth parameters. Thus, the findings demonstrates the potentiality of *Pseudomonas aeruginosa* for bioremediation and could be serve as a suitable candidate for developing microbial formulations for enhancing growth of crop plants in F contaminated soil, at least.

Keywords: Bacteria; Bioremediation; Fluoride; Microorganisms

Efficacy of *Pseudomonas fluorescens* on Die Back Disease Causing Fungi of *Bauhinia purpurea* L.

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Abstract

Pseudomonas fluorescens is a proven potential biocontrol agent widely used against variety of fungi. In present study a leguminous tree species *Bauhinia purpurea* L. with die back symptom categorized by progressive decease of twigs, shoots and branches that initiate from the tips, was identified in our Thiagarajar College campus in Madurai, Tamil Nadu. The plant leaves were surface sterilized and inoculated on Potato Dextrose Agar medium for 48 hours. The mycelium was stained with lactophenol cotton blue and observed under microscope. Based on the morphology it was identified the die back disease associated with many fungi predominantly as *Peranospora* spp., *Curvularia* spp. and *Fusarium* spp. To control these fungal growths and stop the plant from dying, *Pseudomonas fluorescens* pure broth culture applied to the plant rhizosphere and foliar spray was done for four times with consistent four days interval. After 15 days, the infected plants started reviving from the infections. New leaves and branches were started emerging from the bark region indicates the plant healthy rejuvenation. The biocontrol efficacy of *Pseudomonas fluorescens* was confirmed through *in vitro* inhibition on the pure cultures of *Peranospora* spp., *Curvularia* spp. and *Fusarium* spp. Hence *Pseudomonas fluorescens* can be used as effective biocontol agents against these fungi separately and even if they are in consortium.

Keywords: Biocontrol; *Curvularia* spp.; Die back disease; *Fusarium* spp.; *Peranospora* spp

Recent Techniques for *M. tuberculosis* Detection

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Abstract

Mycobacterium tuberculosis (MTB) is causative agent for tuberculosis (TB) disease which is a life-threatening, transmitted by aerosols, released through coughing of an infected person to a healthy one. An early detection of TB reduces the interval between infection and the beginning of treatment. The conventional diagnostics technique of TB relies on detection of the MTB bacterium in culture and microscopic examination, which have limitation by low detection rate and longer time. Although techniques, nucleic acid amplification tests such as PCR, RT- PCR assay, line probe assays (LPA), isothermal nucleic acid amplification have been able to provide rapid and sensitive diagnosis. However, these are more expensive and require trained manpower. Therefore it's an urgent need to develop rapid, sensitive, specific, reliable, stable, and cost effective diagnostic test for early detection of TB before reaching to the chronic conditions.

In past few decades, biosensors have attracted great attention due to their fast response, simple utility, accessibility, and real-time detection. Biosensors are increasingly being considered as pioneering tool for point-of-care diagnostics in communities with a high burden of TB.

Among biosensors, the electrochemical biosensors have the advantages of low-cost operation, fast processing, simultaneous multi-analyte analyzing, operating with turbid samples, comparable sensitivity and easy to miniaturization. The bio recognition element in electrochemical biosensors is usually based on antibodies (immunosensors), DNA (genosensors), and aptamers (aptasensors).

Keywords: Diagnostics; Electrochemical biosensor; Point-of-care; Tuberculosis

Mycoremediation: A New Trend to Mitigate Arsenic

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Abstract

Arsenic is among the most abundant heavy metals on earth's crust. It is present naturally in all environmental matrices in very little concentration. This metalloid has been employed in the production of many useful items like veterinary medicines, agricultural products and some compounds of arsenic have been used for the treatment of myelomas also. It is toxic for human health to drink water having arsenic concentration above 10µg/L, as per WHO recommendation. Arsenic builds up oxidative stress leading to the death of plants. It induces morphological and physiological conditions involving, necrosis of leaf margins and tips, leaf wilting, root cell plasmolysis, diminished germination, reduction in the number of leaves and leaf area, discoloration and denodulation, suppression of starch hydrolyzing enzymes, reduced growth, distortion of chloroplasts membranes, repression in the photosynthetic activity, etc. in plants. Arsenic is connected with the induction of various difficulties in the human organ systems like nervous, cardiovascular, integumentary, immune, hepatic, respiratory, hematopoietic, endocrine, renal, development and reproductive system. It is also seen that arsenic is capable of causing epigenetic changes and genetic mutations in the human body. The various physical and physicochemical methods have been described for the removal or mitigation of arsenic from contaminated soil and water. It was declared that bacteria were also capable of mitigating arsenic. The mycoremediation technique using fungi is also reported to minimize the harmful effect of arsenic species by mitigating or transforming them into less harmful forms. The biological techniques like phytoremediation, bacterial remediation and mycoremediation have been known to mitigate arsenic in a sustainable and eco-friendly way.

Keywords: Arsenic; Fungi; Human health; Mitigation; Mycoremediation; Phytoremediation; Soil

Microbes - A Tool for Degradation of Plastics

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Abstract

Microbes are the friends and foe of human beings. As today with the increase in population, there is increase in demands of plastics. But to manage plastics after usage is a very difficult task to be ever achieved. Degradation of plastics is a serious issue which the biotic and abiotic ecosystems are facing with it. Many processes are there for the degradation of plastics but one of the most cheapest, non-hazardous, eco-friendly method is usage of microbes for the degradation of plastics, even though it is a slow process, this ability has been found in many bacteria, including invertebrate symbionts and microscopic fungi. Different types of thermoplastics have to be treated with different techniques employed for their degradation. According to the stages of degradation of plastics (biodeterioration, biofragmentation, bioassimilation, mineralization) different techniques are applied. Techniques used are SEM, AFM, Gel Permeation Chromatography, Mass spectrometry, gas chromatography, HPLC, FITR, NMR, thermogravimetric analysis, gravimetry. The recombinant hydrolases from thermophilic actinobacteria is responsible for degradation of PET, is the most effective plastic degradation process.

Keywords: Biodeterioration; Biofragmentation; Bioassimilation; Mineralization; Thermophilic

Microbial Consortium: An Alternative Strategy to Combat Xenobiotic Compounds

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Abstract

Recalcitrant xenobiotic compounds discharged from agricultural and manufacturing industries has crossed the endurance limit of nature. Despite of the Environment Protection Act, 1986, the disposal of xenobiotic compounds is a challenge that requires intervention of other methods besides the conventional physico-chemical treatment. Hence bioremediation is an innovative technology that has the potential to extenuate the effect of toxic contamination. Microorganisms are alternative solution to overcome this challenge. Microorganisms individually cannot degrade most hazardous compounds. Effective biodegradation results in a sequential degradation by a consortium of microorganisms in various habitats have been identified. These microorganisms are environmentally safe and promising valuable genetic material to solve imperil. Various genetic engineering approaches are used to develop new strain of microorganisms (GEM's) that have a broad spectrum of destructive metabolism for bioremediation. GEM's which use xenobiotics as source of carbon, nitrogen and /or energy can get their nutrients where they are located. Biodegradation be stimulated by supplementing nutrients, electron acceptors and substrates or by introducing microorganisms with desired catalytic capabilities. Bioremediation using GEM's can always be followed by autolysis to counter balance the risks to living beings and environment. Microorganisms are thus restoring the original natural surroundings and preventing further pollution.This presentation is a review of the various approaches to bioremediation using microorganisms as apromising and less expensive way of cleaning up contaminated sites. Genetically Engineered Microorganisms also overcomes the limits of using wild type microbes.

Phytochemical Screening and Photocatalytic Degradation of Crystal Violet using Biologically Synthesized Silver Nanoparticles from *Gymnema sylvestre*

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Abstract

Nanobiotechnology - nanoparticle synthesis, through green method or plant-mediated method. It has been shown great interest and achievement in the research field, due to its environmentally friendly and higher efficiency. In our study, we have done synthesis of nanoparticles from the leaf of plant *Gymnema sylvestre* extract, using silver nitrate as a precursor. The photochemical catalytic activity was performed by testing plant secondary metabolite. The results show positive for alkaloids, tannins, flavonoids, saponins, terpenoids, cardiac glycosides, and steroids. Characterization of silver nanoparticles was done by using UV-VIS spectroscopy at 420 nm (it gives a peek). Synthesized nanoparticles (silver nanoparticles) photocatalytic activity was estimated by degradation of crystal violet dye using UV-VIS spectroscopy. The dye was effectively degraded by green synthesized silver nanoparticles after; 48hrs (maximum) exposure as compared to 24hrs and initial exposures. The dye degradation capacity was increased by the higher concentration of silver nanoparticles. The results show that the dye degradation potential is directly influenced by the concentration of silver nanoparticles and time of exposure.

Keywords: Dye degradation; *Gymnema sylvestre*; Nanobiotechnology; Silver nanoparticles

Isolation, Screening and Identification of Efficient Bacterial and Mushroom Isolates from Selected Waste Water and Garbage Dumping Sites of Madurai, Tamil Nadu

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Abstract

The pollution of natural resources such as air, water and soil has become one of the most important ecological problems on the planet. Various strategies/methods are being utilized to deal with the increasing rate of these pollutions but among all those methods, It is a biotechnological approach of rehabilitating areas degraded by pollutants by the ability of biological organisms to degrade, transform, or detoxify organic compounds of polluted areas by converting undesirable and harmful substances into non-toxic compound. So it will be one of the suitable processes to clean the Madurai city's waste water and garbage dumping sites. As there are many evidences which shows that mushrooms can be employed in the bioremediation process the research is mainly focused on the implementation of mushrooms in the Bioremediation of those selected sites. And also, the bacterium which is widely used is also selected for the research.

Four waste water sites were selected in and around Madurai. As to identify the efficient one(s) samples taken from the sites will be inoculated and morphologically different one(s) will be isolated once after the pure culture is obtained. After the isolation process those isolated bacteria(s) and mushroom(s) will be screened to the waste water. After screening it will be compared with the initially determined physico-chemical characteristics and then the efficient one(s) will be taken to the field trials for site treatment. As of now, 8 different idiosyncratic colonies of bacteria were isolated from the selected site-1, 6 different colony forming bacteria, from site-2 and from site-3 respectively. The research in future perception will be isolation of mushroom and then laboratory trail followed by field trail of those isolated bacteria and mushroom to analyze their efficiency in the Bioremediation process.

Keywords: Bacteria; Bioremediation; Pollution; Waste water

Biosorption by Different Species of Algae: A Review

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Abstract

Biosorption, or the passive removal of toxic heavy metals such as Cd^{2+}, Cu^{2+}, Zn^{2+}, Pb^{2+}, Cr^{3+}, and Hg^{2+} by affordable biomaterials, necessitates a substrate with high metal absorption and selectivity, as well as appropriate mechanical qualities for applied remediation scenarios. Many low-cost sorbents have been studied in recent years, but marine algal biomass have proven to be the most effective and promising substrates. Algal biomass can be regenerated and reused rather easily. And among algal biomass brown algae turns out to show better performance of biosorption of heavy metals. Most importantly, algal biomass has a metal removal capacity that is comparable to or better than that of other traditional adsorbents. This improved performance among biomaterials can be attributed to their core biochemical makeup. The importance of heavy metal removal from waste streams is discussed in this review, which includes a brief overview of algae's potential as a biosorbent and biosorption technology, as well as the undelaying characteristics of biosorption and operating conditions such as pH, dose required, initial concentration, temperature, and treatment performance.

Keywords: Biosorption; Biosorbent; Heavy metals; Marine algae

Nanogel a Boon for Wastewater Treatment Contaminated with Heavy Metals

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Abstract:

Recent studies has keen interest in industrial wastewater treatment methods where elimination of heavy metals is a priority as a result of growing concerns over its harmful effects on human health and environment and over shortages of clean water. The heavy metals (like Cr^{6+}, Cu^{2+}, Pb^{2+}, Cd^{2+}, etc) are most dangerous types of contaminants found in industrial waste water due to their high toxicity at a very low concentration, non-biodegradable. There are various conventional treatment methods many of which have certain disadvantages: incomplete metal removal, generation of toxic sludge or high energy requirements. but out of those Adsorption and Bioremediation plays a major role due to its characteristics, Adsorption is considered as one of the most effective method: economically favourable and easy to separate. Researchers instead of using commercial materials they used natural; agricultural waste products which are inexpensive materials and started working on advanced nano-engineered technologies; a combination of basics of chemical engineering, surface chemistry and nanotechnology which opens up particularly attracting scopes towards the treatment. Now a days, naturally occurring biopolymers have attracted the attention as potential adsorbents, among these nanogels are in the spotlight of the research owing to their different advantages such as large surface area, stimuli responsiveness, high loading, tunability of size, stability, *in situ* gelling mechanisms, extra shelf lifetime and easy to recover and reuse. This review comprises of adverse effects of heavy metals, conventional methods for treatment of wastewater, methods of synthesis of nanogels by various natural sources along with all the recent research works done on nanogels in the treatment of heavy metals from polluted wastewater that have so far been undertaken, thereby providing researchers with a deep insight bridging the gap between the past, present and future of nanosorbents or a nanogel.

Keywords: Adsorption; Bioremediation; Heavy metals; Nanogel; Wastewater

Biofilms in Bio-remediation

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Abstract

Toxic pollutants and contamination increase continuously in the environment raising an alarming situation with a significant threat to living organisms. It is extremely crucial to devise a strategy to protect the environment and the lives of those who live in it. Current techniques and methods, such as physical and chemical, have drawbacks, including cleaning efficacy, cost, and after effects. Biological processes, on the other hand, are cost-effective and eliminate the aforementioned disadvantages. Biofilm communities have the potential to be used in bioremediation. These biofilms have several applications such as bioproduction of valuable chemicals, and wastewater management, bioremediation, despite the fact that they are known to cause problems in several areas of human health and industry. Interestingly, these biofilms can be utilized for bioremediation because they absorb, immobilize, and degrade a wide range of contaminants. As a result, biofilm formed by numerous microorganisms will most likely provide a suitable microenvironment for effective bio-treatment activities.

Keywords: Contamination; Bioremediation; Biofilms; Immobilize

A Short Review on Heavy Metal Tolerance of Endophytic Fungi

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Abstract

Endophytic fungi (EF) reside inside (living) tissues of plants without causing any symptom or disease, they are non-pathogenic. EF have a rich source of secondary metabolites which may enhance growth, nutrient uptake, bio-mass aggregation and ability to tolerate abiotic stress in plants, there by establishing its role in agriculture, pharmaceutical and medical industries. EF enhances plant growth either directly by accumulating resources such as nitrogen, iron, potassium etc. from environment and indirectly by promoting synthesis of plant hormones like auxin, gibberellin etc. EF possess the ability to decrease the risk associated with metal, metalloid contamination in soil by decreasing the bio-availability of chemicals or by chemical modification. Diverse species of endophytic fungi isolated from hyperaccumulator plants can be identified for heavy metal (HM) tolerance property. In metal polluted plants endophytic fungi colonization are found in abundance and the heterogeneity of these EF are characterized by colonization extent (CE) and isolation extent (IE) and the relative frequency (RF) of isolation identifies the dominant genera among the isolates. Culturable endophytes are isolated and characterized to their respective taxa based on morphological and spore characteristics while genus is identified by internal transcribed spacer (ITS) region and a reference database. Metal tolerance results are expressed in terms of tolerance index (TI). Differential sensitivity to particular ion among different isolates and particular isolate sensitivity to different ions can be found out and intentional association of stress adapted fungal isolates in host plant of HM contaminated soil could produce bioactive metabolites that promote growth, provide protection against pathogens, control phytotoxicity and play major role in phytoremediation.

Keywords: Biomass; Biosorption; Endophytic; Hyperaccumulator; Phytoremediation

Mycoremediation of Textile Dyes - A Review

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Abstract

Textiles are one of the most polluting sectors due to the untreated wastewater discharge, which contains high quantities of metal-based dyes, phenol, aromatic amines, and other contaminants. The presence of dyes and foaming chemicals in textile waste water reduces biological activity due to decreased light penetration and poses threat to both aquatic and terrestrial life. The dye's complex structure makes them resistant to ozone, light and biological degradation in the environment. Wastewater treatment technologies are divided into three categories: physical, chemical and biological. The high cost, low efficiency, limited adaptability, interference by other wastewater constituents and waste management are some of the primary issues with physico-chemical approaches.

Various naturally occurring microorganisms, such as bacteria, fungi, and their enzyme can be used to bioremediate dyes. Fungi are the most ideal microorganism for environmental clean-up because they have a high cell to surface ratio and so have more contact with the environment. Moreover, due to secretion of extra-cellular enzymes fungi thrive and tolerate high concentrations of toxicants too. As a result, fungi in a non-sterile open environment have a high potential for mycoremediation. As a result, fungi in a non-sterile open environment have a high potential for mycoremediation. Many studies have focused on mycoremediation, which has the potential to be an appealing decentralised system. However, turning these findings into practical applications has been difficult. This review focuses on the mechanism or pathways of dye transformation as well as process optimization so as to design an operational strategy for mycoremediation.

Keywords: Dyes; Environment; Mycoremediation; Fungi; Textile effluent

Microbial Surfactants a Potential Tool for Bioremediation

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Abstract

Environmental pollution caused due to hydrocarbon contamination, heavy metal waste and industrial waste is a serious issue of concern now a days. These pollutants are persistent to the environment and cause a serious threat to the aquatic environment including living forms. Remediation of polluted sites becomes essential as it exerts an additional pressure on the biodiversity which leads to crop loss. Use of biosurfactant to treat such sites becomes a cost effective and eco-friendly strategy. In present investigation, soil samples contaminated with hydrocarbon / petroleum products were collected and continuous subculturing followed by enrichment was done with mineral salt medium containing 2% oil as sole source of carbon with agitation at 200rpm at 37^0C for 7days. A well isolated colonies with distinct morphology were selected and screening was done for biosurfactant production using haemolysis assay, drop collapse test, oil spreading assay and surface tension measurement. Total 30 isolates were selected out of them 10 isolates showed a potential to produce biosurfactant. Biochemical and phylogenetic analysis showed that the microorganisms belong to the genera *Pseudomonas*, *Bacillus*, *Achromobacter* and *Ochromobacter*. Most of the isolates were Gram negative, aerobic, motile and non-spore forming. Highest surface tension reduction upto 27.85mN/m with 30% emulsification activity was recorded by isolate BS8 when engine oil was used as substrate, while the optimum condition for highest activity was recorded at pH 7 with 1% salt concentration at 37℃ temperature. The isolate was further tested for biosurfactant activity using different oil as substrate. Result of the study showed that the isolate can be useful for the bioremediation of polluted sites along with ability to produce some extracellular enzymes which also increase the importance of isolate in further investigation.

Keywords: Bioremediation; Biosurafactant production; Phylogenetic analysis; Surface tension

Cadmium Bioremediation Potential of Some Indigenous Bacteria Isolated from Sediments of Different Industrial Zones of West Bengal

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Abstract

The most common heavy metals are arsenic, cadmium, copper, nickel found mainly in industrial waste around the whole world has a negative effect on human life, animal life and environmental life. Heavy metals are used in leather processing, mining, pesticide industry, production of nickel-cadmium battery, computer monitor and several other applications. Among the known metal pollutant cadmium occupies a position among the top ten metal pollutants and is characterized by high solubility and toxicity. Cadmium is not degradable, so cadmium is removed from contaminated site by using cadmium resistant bacteria as a bioremediation agent which reduce the cost and increase the efficiency. The purpose of the present study was to isolate and identify the cadmium-resistant bacteria from industrially polluted sediments of West Bengal for removal of cadmium. The aim of present study is to isolate, identify and characterize cadmium resistant bacteria from waste sediment of different industrial zones of West Bengal. Samples of sediments were used to measure the different physicochemical character using standard methods and total amount of cadmium by Atomic Absorption Spectroscopy (AAS) and after heavy metal profiling it is observed that the sample of KOKL contain high level of cadmium which is most toxic in sample relation. Among Cd-resistant bacteria, 64% gram negative rod which is further characterized biochemically. MIC and cadmium absorption pattern of selected isolates were also determined to identify the maximum cadmium biosorption potential. Among the isolate SfEn14 could absorb maximum cadmium (52.94 µg/mg of dry cell mass) with in short time (6 hours). The strain SfEn14 was identified as *Achromobacter* sp. SHB204 gi [697268012] on the basis of morphological, biochemical and phylogenetic characteristics.

Keywords: Bioremediation; Environmental pollution; Heavy metal; Industrial waste

Entrepreneurship Intellectual Property and Innovation Ecosystem

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Abstract

This review aims to establish the relationship between entrepreneurship, intellectual property (IP) and innovation ecosystems at a global level. Entrepreneurship is the ability and readiness to develop, organize and run a business enterprise along with any of its uncertainties in order to make profile Intellectual property (IP) refers to creations of the mint, such as inventions; literary and artistic work; designs; symbols, names and image used in commerce. An innovation ecosystem refers to a loosely interconnected network of companies and other entities that co-evolve capabilities around a shared set of technologies, knowledge or skills, and work cooperatively and competitively to develop new products and services. Now a days the ecosystem is play important role of the entrepreneurship and intellectual property to give technology based fundamental tools of companies. Intellectual Property (IP) systems can be critical in helping new ventures transform their innovation potential and creativity into market value and competitiveness. Intellectual Property rights (IPR) allow innovative entrepreneurs to protect their inventions. Entrepreneurship create organizational that offer employment to millions of people and create goods & services.

Keywords: Entrepreneurship; Innovation Ecosystem; Intellectual Property

Study of Cage Culture Technique of Sarodha Dam

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Abstract

Cage culture has become most popular practice among all over India. During present course of investigation cage culture technique in Sarodha dam area was selected to check average yield of fishes from each cage. It was noticed that the catchment area of Sarodha dam is about one hundred ninety five square kilometer and have hundred cages. The average fish yield from per cage is about four thousand seven hundred kilogram. From one cage at a time, in one batch thirty three thousand rupees earned. So huge water area can be utilized for cage culture and it can help in mass production of fishes and also help in enhancing entrepreneurship among rural youth.

Keywords: Cage culture; Catchment area; Entrepreneurship**;** Mass production of fishes; Sarodha Dam

Effects of Advances in Biological Sciences on Entrepreneurship

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Abstract

The past decade has adept a notable increase in the number of papers on the biology of entrepreneurship. It exemplifies the advancement of science along two dimensions. First is the drive to look for smaller units of survey to identify the core mechanisms of action. Second is the antagonistic drive to look for larger units of survey to identify general principles. These concurrent processes move our understanding of social and natural phenomena closer to a consolidated theory. In this article, we reflect on how the biology of why, how, what, when, and where of entrepreneurship constitutes a natural advancement from the institutional, organizational, and psychological descriptions. It is called biological perspective in entrepreneurship. The biotechnological whirl has been characterized by the expeditious pace of discovery in the biological sciences, and a colossal impact on entrepreneurship opportunities. Studies scrutinize the genetically ability of entrepreneurship indicate that explanations for why people engage in entrepreneurship that ignore genes are incomplete. However, in spite of assurance that were firmly avouched with prior power calculations, attempts to identify specific genetic variants underlying the heritable variation in entrepreneurship have until now been unsuccessful.

Keywords: Biological Sciences; Biotechnology; Entrepreneurship

Intellectual Property Rights - Its Implications and Importance

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Abstract

Intellectual property rights (IPR) are defined as ideas, which is given by an individual over the creation of own mind. IPR issued certain rights to the creators or inventors of that property for commercial benefits from their creative efforts or reputation. Several types of intellectual property rights such as patent, trademark, copyright etc. firstly the patent is an important recognition for an invention, which fulfill the criteria of global novelty, industrial application and non-obviousness. It is prerequisite for better rendering, identification, , commercialization, planning and thereby protection of invention. Each industry have to evolve their own IPR policies, strategies, management style and so on depending on the area of specialty. Pharmaceutical industry recently has evolving IPR strategy requiring a much better approach and focus in coming era. In present era, patent understanding is very important for research and development.

Keywords: Drug; license; Intellectual property; Patent; Pharmaceutical

Microemulsions as Excellent Candidates for Ocular Drug Delivery System

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Abstract

Ocular drug delivery has remained as one of the most challenging task for pharmaceutical scientists. The unique structure of the eye restricts the entry of drug molecules at the required site of action. Targeted drug delivery has generated a great deal of interest in the field because of its potential to overcome many barriers associated with current therapy many newer carriers are evolving with the advent of technology and the demand of targeted delivery like microemulsions. Microemulsions are an attractive technology platform for the pharmaceutical formulator as they are thermodynamically stable, possess excellent solubilization properties, and their formulation is a relatively straightforward process. They can be used to optimize drug targeting without a concomitant increase in systemic absorption. The role of microemulsion in providing novel solutions to overcome the problems of poor aqueous solubility of highly lipophilic drug compounds and provide high, more consistent and reproducible bioavailability. Current momentum in the invention of new drug delivery systems hold a promise towards much improved therapies for the treatment of vision threatening disorders. Previous research works showed higher percentage of surfactant used for the formation of microemulsions, irrespective of different routes of administration, but there is a lack of toxicological evaluation of the prepared microemulsions, which can be a broad research area in future.

Keywords: ocular drug delivery, microemulsion, thermodynamically stable, toxicological evaluations

Various Antibiofilm Agents against *Candida albicans* Biofilm

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Abstract

Biofilm-forming microorganisms are known for their invasiveness and multidrug resistance as well as their propensity to cause serious and difficult-to-treat infections. *Candida* species exist as commensal organisms in both humans and the environment. *Candida ablicans* proliferate rapidly in individuals suffering from diseases or have a weakened immunity. The occurrence of *Candida* yeast colonization on implanted medical equipment are consistently reported. The capacity of *C. albicans* to build biofilm is linked to the majority of infections like different forms of candidiasis including vulvovaginal, oropharyngeal and oesophageal. When compared to planktonic cells, biofilm exhibited lower susceptibility to antifungal and greater survivability under adverse environmental conditions. *C. albicans* produces highly organised biofilms made of different types of cells including round, budding yeast-forms cells (oval, pseudohyphal, elongated, cylindrical, hyphal) that are embedded in an extracellular matrix due to which they are prevented from any external stimuli like defences from host immune system and antifungal drugs. *C. albicans* biofilm requires innovative antibiofilm agents to combat common antifungal drugs like azole, echinocandins and amphotericin B. Antibiofilm agents might be natural, synthetic or semi-synthetic. The antibiofilm agents inhibit the biofilm growth possibly through the inhibition of the genes like ERG1, ERG11, lanosterol 14 that are responsible for ergosterol biosynthesis. Moreover, some antibiofilm agents downregulates the expression of β-1, 3-glucan synthase or promotes the formation of transmembrane pore for cell membrane lysis which ultimately kills the fungus. The efficacy of the antibiofilm agents is decreasing with each passing day due to the development of different ways of drug resistance in *C. albicans*. This demands the development of novel and efficient therapeutics to eradicate *C. albicans*. The purpose of the presented review is to highlight the major classes of antibiofilm agents and their effectiveness in eradicating the biofilms that will probably open new horizons towards the development of novel therapeutics against *C. albicans*.

Keywords: Antibiofilm; Antifungal resistance; Biofilm; Candidiasis; Multidrug resistant

Design Optimization of Nanoparticle through Simplex Lattice Mixture Design: Application to a BCS Class IV Biological Molecule

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Abstract

The goal of this research was to use design of experiment to develop Paclitaxel nanoparticles using combination of Eudragit RSPO/RLPO and PLGA for treatment of breast cancer. Using JMP® software, a three-factor, simplex lattice mixture design was created to determine the optimum proportions of different polymers required to provide a formulation with the hemolysis less than 5 percent, particle size less than 250 nm, drug release more than 70 percent. With all three polymers, the design was statistically significant. All formulation components had a significant impact on particle size, hemolysis and drug release, as described by ANOVA. Individually, all of the polymers had a considerable impact on particle size, as did their two-factor interactions, ERSPO*PLGA and ERLPO*PLGA. The inclusion of ERSPO and ERLPO in the formulation as well as their cross term had a substantial impact on hemolysis. The lowest interaction coefficient in release studies showed that combining ERLPO and PLGA had a detrimental influence on drug release. Nanoparticles were successfully prepared using design of experiment. The particle size was reduced with ERLPO and hemocompatibility was improved by adding PLGA. In conclusion, combining two polymers produced better results than using the individual polymers.

Keywords: ERLPO; ERLPO; Nanoparticle; PLGA; Polymer

Magnetic Resonance Tractography

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Abstract

The development of diffusion-based tractography has afforded a valuable tool for many neurosurgeons. The technique is grounded in the observation that the connections between neurons are organized into larger fiber tracts, much in the same way that the individual lanes of the highway combine to form major arteries of transportation. The images provided by tractography are extraordinary, both in anatomic beauty and functional accuracy. Anatomically, the major tracts visualized by diffusion tensor imaging tractography largely corresponded quite nicely to those unveiled during anatomic dissection of cadaveric specimens The major difference between the two approaches is that the tractography images are generated in a completely noninvasive manner. Functionally, intraoperative electric stimulation of the tractography-defined tracts consistently solicited the expected physiologic response. For instance, the pyramidal tract connects the motor cortex to the lower motor neurons. Intraoperative stimulation of regions of the cerebrum shown by diffusion tensor imaging tractography to be the pyramidal tract consistently resulted in motor stimulation. This review will provide a physiologic context for the importance of fiber tracts as they pertain to neurosurgery, as well as a discussion of the clinical applications of magnetic resonance (MR) tractograph.

Keywords: Diffusion MRI; 3D Modeling; Neuroscience; Tractography

Emerging Techniques for *Salmonella typhi* Detection

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Abstract

Salmonella food allergies have long been part of the world. The desire to see the disease before it kills is much needed. Here we present comparative studies between standard diagnostics and nano biosensor-based techniques for *Salmonella typhi* detection. Common diagnostic methods are based on culture, time-consuming, labour-intensive, and inadequate local testing. To date, there are a variety of *Salmonella* detection methods available as immunological-based trials; molecular-based testing; methods based on mass spectrometry; methods based on spectroscopy and electrochemical biosensors. These mechanisms can target and differentiate *Salmonella* up to its serotype level. Apart from these methods of detecting electrochemical biosensors may be a good tool for the detection of Salmonella as they can detect the presence of Salmonella or its cellular components in a matter of minutes. Electrochemical biosensors are often used to detect biomarker cells associated with the disease. The electrochemical biosensor has become a staple in the discovery of *Salmonella* mainly due to its excellent sensitivity, speed, cost efficiency, and versatility. Implementation of specialized bioreceptors, such as aptamers, antibodies, ssDNA, and the use of nanomaterials are factors that contribute to these excellent features. The use of nanomaterials has given biosensors greater sensitivity and faster response.

Keywords: *Salmonella typhi* detection, Nanomaterials, Biomarkers, Nanobiosensors

Recent Advancements in the Field of Nanotechnology

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Abstract

Nanotechnology, also shortened to nanotech, is the use of matter on an atomic, molecular, and supramolecular scale for Biological Sciences. Nanotechnology may be able to create many new materials and devices with a vast range of applications, such as in nanomedicine, nanoelectronics, biomaterials energy production, and consumer products. Nano pharmaceuticals can be used to detect diseases at much earlier stages. Today the products made using nanomaterials having general as well as special applications like treating cancer, phosgene detection, Nanotech contact lenses and virtual reality, Nano detectors for heart attacks, Dragonfly-Inspired Black Silicon Fights off Bacteria, Revolutionizing Eye Surgery, Silver Germ-Killers, Nanotech-Enabled Breathalyzer for Diabetics, etc. Various risks involved in using nanotechnology are also taken into consideration because it is believed that the most disruptive future changes may occur as a result of molecular manufacturing, an advanced form of nanotechnology.

Keywords: Biomaterials energy production; Cancer; Nanoelectronics; Silver Germ-Killers

Waveatom, Curvelet and Wavelet Based Noise Reduction in Medical Images

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Abstract

Image enhancement is a technique used in the area of multimedia, medical imaging and other numerous applications. As the quality of image is very much dependent on light, weather or equipment that we used to capture the picture. We propose to employ wavelet transform, curvelet transform and wave atom for denoising of medical images having gaussian noise. The main purpose of image enhancement in medical imaging is to provide better results. To solve the problem of reinstating an image from noisy image we have done some comparative analysis. Experimental results show the denoising method by wavelet transform is less effective than the other methods because both curvelets and wave atoms have very high degree of directional specificity. We have used some registered sets of Medical Images like MRI, Ultrasound and quality parameters like MSE, PSNR to know the quality of images.

Keywords: Curvelet; Denoising; MSE; Noise; PSNR; Transform; Wavelets; Wave atoms

Identification of Diagnostic and Prognostic Biomarkers in the Colorectal Cancer Patients of Central India: An Approach towards Precision Medicine

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Abstract

Being the third most frequent form of malignancy worldwide, the colorectal cancer (CRC) has been reported to claim 0.94 million human lives in 2020. At the same time about 1.93 million new cases were reported. This increase in the incidence is projected to reach 3.2 million by 2040. As the CRC is also a lifestyle related diseases, the westernization has led to a frightening increase in the incidence rate in developing countries. Also, due to the underdeveloped healthcare infrastructures, the population residing in the developing countries is more susceptible to deaths. This human burden is further increased due to the lack of precision medicine, as there are genes and their polymorphisms that may render a person unresponsive towards certain drug or may increase the toxicity of the drug. The aim of our study is to find out the novel and/or putative gene panels which have the potential to serve as the biomarkers in the population of Chhattisgarh and Madhya Pradesh and the drugs for which biomarkers are being targeted include Oxaliplatin, Doxorubicine, Capecitabine, and combination drugs CAPOX, and FOLFOX. The gene panels selected for the initial screening have been reported from different studies worldwide but remain unreported in our population. The meta-analysis has been done to confirm the association with drug before selecting the gene.

Keywords: Biomarker; Colorectal cancer; Drugs; Meta-analysis

Synthesis and Characterization of Zirconium Coated Low Cost Disc Membrane For Blood Purification Applications

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Abstract

Nowadays, membrane technology plays an important role in medical applications, particularly in a wide range of life-saving treatment procedures such as drug administration, tissue regeneration, artificial organs, diagnostic devices, medical devices, bioseparations, and many others. In general, membrane applications in biomedical field employed a wide range of natural and synthetic materials. Ceramic membranes are increasingly being used in biotechnological and biomedical applications at present days. In this study, disc shaped composite membrane was fabricated by coating a thin film of zirconia on the disc shape ceramic support by spray pyrolysis method. The physico-chemical properties such as morphology, average pore size, porosity, water permeability, pH, and chlorine stability were analysed. The prepared membrane was found to be pH and chlorine resistant. After a thorough surface morphological investigation, the manufactured membrane was determined to be defect and pinhole free. The biocompatibility characterization of membrane was also performed, and it was discovered that created membrane has better biocompatibility property, indicating that membrane can be used in blood purification. These studies confirmed the disc shape composite membrane's potential utility for hemofiltration applications.

Keywords: Medical; Ceramic; Composite

Capmatinib: A Novel Mesenchymal-Epithelial Transition Tyrosine Kinase Inhibitor: An Overview

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Abstract

Tabrecta contains the active ingredient Capmatinib an antineoplastic agent (a mesenchymal-epithelial transition (MET) tyrosine kinase inhibitor) is a medication for the treatment of adults with metastatic non-small cell lung cancer (NSCLC) whose tumors have a mutation that leads to the exon 14 skipping of the *MET* gene, which codes for the membrane receptor HGFR. Tabrecta is the first FDA-approved therapy to treat NSCLC with specific mutation in the United States in May 2020, along with the Foundation One CDx assay as a companion diagnostic for capmatinib. The substance inhibits c-MET a tyrosine kinase that plays a role in embryonic development, organogenesis and wound healing, but also in the development of cancer. Tabrecta is available and recommended in the form of tablet dosage form, the recommended dose of Tabrecta is 400 mg orally twice daily with or without food. Interstitial lung disease (a group of lung conditions that causes scarring of lung tissues), pneumonitis (inflammation of the lung tissue), hepatotoxicity (damage to liver cells), photosensitivity, and embryo-fetal toxicity are the side effects caused by capmatinib. In this review we have highlighted the Pharmacological action of capmatinib at molecular level.

Keywords: Tabrecta, capmatinib, tyrosine kinase, *MET* gene, Interstitial lung disease

Micro/Nano Technology System of Drug Design and Development for Biomedical Application

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Abstract

A universal goal of micro/nano technological development is the embellishment of human life.The last decade has seen increasing use of micro and nanotechnology for biological and biomedical applications. This can be attributed to several reasons, a tremendous advancement research and development of micro and nano technological tools and devices, progress in cell and molecular biology and biomedical sciences also made, huge push towards multidisciplinary research that involves close collaboration among researchers from several disciplines including medicine,biology,physics,chemistry,and engineering.The nano-sized cellular components self-assemble into cell systems of incredible complexity,characterized by multiple layers of increasingly more sophisticated functionality. Micro/neno drug designing include nano particles for bio-imaging and bio-sensing, optical and biophotonic techniques for probing diseases at the nano scale, micro and nano-fabricated tools for eluci-dating molecular mechanisms of mechano transduction in cell and molecular biology and cell separation microde-vices and techniques for isolating and enriching targeted cells for disease detection and diagnosis,additionally a wide range of advanced techniques used to fabricate and study artificial systems with dimensions ranging from several micrometers to a few nano meters.The ultimate goal of developing technologies, such as micro/nano electronics,micro-machine,or biotechnology devices,is to reinforce human lives,and also provide transducers with dimensions comparable to that of cells or bio-molecules.One of the hotly pursued nanotechnology research is in the fabrication and use of nano particles.Nano particles, having sizes less than 100 nm,are at the same scale as proteins and bio-molecules.

Keywords: Micro/nano technological, Biomedical sciences, Bio-sensing, Biophotonic

Genetic Polymorphism of Chemokine Receptors among Patients of Sickle Cell Anemia

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Abstract

Sickle Cell Anemia is a worldwide monogenetic inherited disorder which leads to diverse complications in the patients. A variety of chemokines and its receptor are involved in these, some of which facilitate the binding of HIV virus. The aim of this investigation is to find out the chemokine receptor polymorphisms among sickled patients. A Total 725 samples were screened for Sickle Cell Anemia, of which total 7.86 % population was reported Sickle positive out of which 6.75 % as HbAS and 1.10 % as HbSS. All positive blood samples were subjected to genomic DNA extraction and PCR amplifications were performed for the genetic assessment of selected genes of chemokine receptors and PCR-RFLP method was processed for genotyping. A total of 60 samples were subjected to restriction digestion, of which all 60 (100%) participants recruited were homozygous wild-type (1194 bp and 806 bp) for CCR5-m303 allele and no individuals found with heterozygous and homozygous mutant allele. For the CCR5-Δ32, total 58 (96.66%) individuals were found with heterozygous (332 bp and 403 bp) and only 2 (3.33%) individuals found with homozygous wild type allele (332 bp) but no individual was found to carry the CCR5-Δ32 mutation. Total 13 (21.66%) individuals were found with homozygous wild-type (380 bp), 11 (18.33%) individuals of heterozygous (380, 215 and 165 bp) and 36 (60%) individuals found with homozygous mutants (215 and 165 bp) for CCR2-64I allele. For SDF1, we scored 18 (30%) individuals as wild type (202 and 100 bp), 32 (53.33%) individuals as heterozygote (302, 202, and 100 bp) and 10 (16.66%) individuals as mutant homozygote (302 bp, no restriction site). More screening of population is being examined to detect polymorphism of chemokine receptors among sickled population in society.

Keywords: Chemokine; Genotype; PCR-RFLP; Polymorphism; Sickle Cell Anemia

Formulation, Characterization and Evaluation of Micellar Loaded Complex of *Cuminum cyminum* to Treat COVID 19 (Respiratory Infection)

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Abstract

Coronaviruses are a family of viruses that causes illness like common cold, fever, Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), Cancer and Asthma. RTI (Respiratory Tract Infection) is a viral infection that spreads from person to person, especially among children and the elderly. The treatments are available but have so many limitations. Cuminaldehyde (*Cuminum cyminum* L.), a phyto-constituent antibacterial medication, was chosen to treat RTI, however it has low bioavailability, poor water solubility, and is quickly removed from the body. To address these difficulties, a micellar loaded complex method based on new drug delivery (nanoparticles) was used. The micellar (CM) was made by mixing cuminaldehyde and soya lecithin with an anti-solvent precipitation approach, and the micellar loaded complex (CMLC) was made by loading micellar (CM) in aqueous chitosan solution. DSC and FTIR physical compatibility investigations confirmed the presence of CMLC in soya lecithin and chitosan. With a mean particle size of 279.100.02 nm, 296.240.10 nm, and a zeta potential of -8.18 mV, -8.77 mV, respectively, the optimised CMLC and CM had irregular particle shape and crystalline structures. The % entrapment efficiency and % drug loading of CMLC (72.13±0.26 %, 06.46±0.01 %) and CM (89.09±0.20%, 08.05±0.19 %) was found efficiently. The *in vitro* release rate of CM (88.09±0.41 %) was slower than CMLC (89.02±0.06 %) in pH 7.4 phosphate buffer up to 24 h by diffusion process (Korsmeyer Peppas model). Furthermore, when compared to CM, CMLC has demonstrated potent in vitro antioxidant activity, susceptible antibacterial activity, and significant anti-inflammatory activity against stress, microbial infection (*S. aureus* and *E. coli*), and inflammation, all of which have been linked to respiratory infections. CLMC has demonstrated increased bioavailability and efficient hematological parameters value on rabbit blood against the incubation of bacterial organism. CLMC may have the ability to effectively cure COVID 19's causative disease, RTI.

Keywords: Cuminaldehyde Micellar; COVID 19; Respiratory tract infection

New Phase and Hope in Curing the Emperor of All Maladies

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Abstract

Advancement in cancer medication and therapies has always targeted on curing cancer permanently. With the remarkable advancement for past several decades, a number of small molecule anti-cancer drugs that targets particular type of cancer are approved. The main difference between a targeted and an untargeted drug is unconventional chemotherapeutics i.e. untargeted ones specifically inhibit cell proliferation and may cause other disadvantages like toxicity and side effects, whereas, novel ones i.e. targeted ones inhibits proliferation while also interacting with the protein of interest that cancer cells rely on. To degrade a broader range of proteins, one of the techniques developed is Proteolysis Targeting Chimerics (PROTAC). PROTAC are small bifunctional molecules, capable of degrading or removing unwanted proteins, a process similar to pharmacological protein inhibition. PROTAC hostages the intracellular inherent ubiquitin proteasome system in cells to degrade different target proteins. The components included in PROTAC mechanism are made up of ligands of targeted proteins, E3 ligase which leads to formation of covalent bond with residue that is formed after catalysis, leading to proteolysis. PROTACs targeting almost 50 proteins are under clinical trials.

Keywords: Anticancer drugs; Cancer; PROTAC

Determination of Genotype of Deficiency of Uridine Monophosphate Syndrome (DUMPS) Genetic Disorder in Sahiwal and Holstein Friesian Crossbred Animals in the Chhattisgarh State

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Abstract

Several genetic disorders have been identified on autosomal chromosomes in exotic and Holstein Friesian (HF) crossbred cattle and Deficiency of Uridine Monophosphate syndrome (DUMPS) is one of them. In DUMPS suffering animals, the UMP synthase enzyme is disrupted which is having a key role in the pyrimidine nucleotide synthesis. So caution is required for testing and reducing the risk of spreading of DUMPS in the herd. In view of the above facts, the current study was executed to develop the facility for testing the DUMPS defect in HF cross bred and Sahiwal cattle at College of Veterinary Science and A.H., DSVCKV, Anjora, Durg (C.G.).To accomplish this, DNA was isolated from 40 blood samples of each breed and Polymerase Chain Reaction (PCR) and allele specific PCR-RFLP (Restricted fragment length polymorphism) techniques were standardized and applied to detect mutation in specific DNA target sequence of UMPS gene. The quality and quantity of the isolated DNA was evaluated by 0.7% agarose gel electrophoresis and Nano drop respectively. A part of UMPS gene containing mutation site was amplified and a specific band, 108 bp in length, was visualized under Gel Doc system. PCR product was purified and sent for sequencing for further confirmation of the gene specific product. PCR product was further subjected for RFLP by *AvaI* restriction endonuclease enzyme digestion for 3 hours at 37˚C. The digested samples were run in 2.5 % Agarose gel and three bands (19, 36, 53bp) were obtained in all 80 animals (frequency is 1.0) depicting all animals to be normal. None of the Sahiwal/HF animals were found to be carriers or affected of DUMPS (frequency is 0.0). Test developed in the present study will be helpful in diagnosis and eradication of the DUMPS genetic disorder in Chhattisgarh state for animal improvement programmes and in building animal husbandry, an economy sector.

Keywords: Crossbred; DUMPS; Endonuclease; Electrophoresis; Genetic

Recent Advances in Nanoparticle-Mediated Drug Delivery

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Abstract

The engrossment towards controlled drug delivery seeks the development of suitable drug carriers that can transmit a sufficient dose of drug to diseased lesions. Various nanostructures including liposomes, polymers, dendrimers, and magnetic nanoparticles have been tested as carriers in drug delivery. Nanoparticles make it possible to achieve improved delivery of drugs which are poorly soluble in water by delivering drug of small particle size allowing faster dissolution in blood stream leading to targeted drug delivery in a cell- or tissue-specific manner. This article provides an overview of the recent developments in the preparation and use of nanoparticles in drug delivery.

Keywords: Nanoparticles, Drug delivery system, Targeting, Liposomes, Dendrimers

Microemulsion Based Drug Delivery Systems for Transnasal Delivery of Carbamazepine

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Abstract

Carbamazepine, sold under the trade name Tegretol among others, is an anticonvulsant medication used primarily in the treatment of epilepsy and neuropathic pain. Novel microemulsion containing carbamazepine can be a boon for the treatment of epilepsy. There are several advantages of microemulsion like one phase system, thermodynamically stable, better long time storage & easy to prepare and handle .The limitation for intranasal drug delivery is the fact that most drug diffuse poorly and slowly through the nasal mucosa and thus the desired levels of the therapeutic agent cannot be achieved. Also, the nasal cavity accommodate limited volume will drain out into the pharynx and be swallowed. Carbamazepine solution, suggests carbamazepine transnasal delivery systems are an excellent alternative medication for epilepsy treatment.

Keywords: Carbamazepine; Epilepsy; Microemulsion; Therapeutic; Transnasal

Polyethylene Glycol Mediated Synthesis of Gold Nanoparticles and Evaluation of its Anti-cancer activity after Bioconjugation with Anti-cancer Drug

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Abstract

Globally cancer is one amongst the leading causes of deaths and millions of new cases are recorded every year. Drugs, currently administered in cancer treatment have adverse life-threatening side effects thus; an alternative approach is much needed. Nanobiotechnology has shown great potential in fabrication and development of highly precise drug delivery systems. For instance, Gold Nanoparticles (GNPs) having high surface-to-volume ratio, exemplary biocompatibility and low toxicity makes them excellent choice for drug bioconjugation. Synthesis of gold nanoparticle is done by reducing the gold salt (Auric Chloride) and coating the surface of nanoparticles with polyethylene glycol (PEG) and characterisation is performed by UV-Vis spectroscopy.Coating with polyethylene glycol is normally done to enhance the delivery efficiency of nanoparticle for targeting various tissues and cells. Further, a more efficient anti-cancer nano drug can be designed by bioconjugating GNPs with chelating agents such as EDTA (Ethylenediaminetetraacetic acid) to a commercially available drug such as Methotrexate. Further, cytotoxicity analysis should be carried out on cancer as well as normal cell lines under optimal conditions to determine the drug penetrance.

Keywords: Anti-cancer drug; Bioconjugation; Cytotoxicity analysis; Gold nanoparticles

Recent Advancements in the Treatment and Management of Hepatocellular Carcinoma

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Abstract

Hepatocellular carcinoma (HCC) is a deadliest kind of liver cancer. Patients with chronic liver disease are more likely to develop this tumour. HCC is the world's sixth most common cancer with 782,000 new cases identified in 2012. In 2012, 746,000 people died from liver cancer. HCC is the third most lethal cancer in the world. Other biomarkers, in addition to AFP, have been identified as a result of extensive research on HCC serological diagnosis: Lens culinaris Agglutinin-reactive AFP (AFP-L3), Des carboxyprothrombin (DCP), tyrosine kinase with Ig and Epidermal growth factor (EGF) homology domains 2 (TIE2) expressing monocytes (TEMs), Glypican-3 (GPC3), Golgi protein 73 (GP73) and Interleukin-6 (IL-6). In the treatment of HCC, drug-eluting beads combined with Yttrium-90 radioembolization may be successful. The only systemic treatment for HCC that has been approved is sorafenib.

Keywords: Descarboxyprothrombin; Hepatocellular carcinoma; Lens culinaris agglutinin-reactive; Sorafenib; Tyrosine kinase

Amlodipine Used in the Treatment of Antihypertensive Drug

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Abstract

Amlodipine (AD) is a calcium channel blockers. It is used in the treatment of hypertension and angina. Treatment of cardiovascular diseases as it has shown to possess antioxidant activity. AD is a photosensitive drug and requires protection from light. The calcium channel blockers are suitable for a wide range of hypertensive patients including the elderly, black, and those with concomitant disease that preclude the use of other antihypertensives. The calcium channel blockers have improved vascular selectively and longer durations of action. They bind to Target receptors in a slow and sustained pattern producing a smooth onset of action with a 24 hour control of blood pressure. Once daily dosing of these longer acting calcium channel blockers improves patient compliance and is associated with minimum encounter of side effects.

Application of Carbon-based Nanoparticles in Cancer Diagnosis

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Abstract

According to the World Health Organization, Cancer is the second leading cause of death globally, with an estimated 10 million deaths recorded as of 2020. Among many, the early detection is most important factor for efficient cancer treatment. Conventional imaging techniques present in the market are intrusive, non-specific, and frequently cause toxicity to normal cells at vicinity. Nanobiotechnology, on the other hand, is remarkable field that can be used for diagnosis as well as to treat cancer in a variety of ways. Detection procedures using nanotechnology have remarkable advantages over conventional therapies including greater reliability, sensitivity and specificity. Recently, Carbon-based nanomaterials have been exploited for their various diagnostic and therapeutic potential. Carbon Quantum Dots (CQD), Graphene Quantum Dots (GQD), Nanodiamond, Carbon Nanotubes (CNT) are commonly used nanoparticles (NPs) and their properties such as high contrast bioimaging, fluorescence, biocompatibility and low toxicity make them excellent molecular diagnostic tools. CQDs are semiconductor nanocrystals that produce fluorescence when exposed to light and have unique optical properties such as high brightness, capacity to generate fluorescence at various wavelengths and photo-bleaching resistance. QD-based nanotechnology is a promising platform for detecting various tumours due to its chemical and optical advantages.

In medical imaging, CNTs are commonly used as contrast agents. They have several advantages over other nano-sized detection agents, including a large surface area and ability to incorporate in the diagnostic moieties on the surface or within the inner cavity. Additionally, its photosensitivity property can also be used in diagnostic purposes.Early cancer detection using nanostructures is expected to become a promising technique in the coming years.

Keywords: Carbon-based nanoparticles; Carbon nanotubes; Carbon quantum dots

Establishment of PCR Based Method for Molecular Screening of Canine Parvovirus-2 (CPV-2) in Clinical Samples for Subsequent Molecular Prevalence Study in Chhattisgarh

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Abstract

Present study was carried out to record the molecular prevalence of Canine Parvovirus (CPV) infection in dogs for subsequent study of predominant antigenic CPV types currently circulating in Chhattisgarh. The prevalence study of CPV infection was conducted in Durg, Rajnandgaon, Raipur and Balod districts of Chhattisgarh state for a period of 8 months from January 2021 to August 2021. A total of 100 fecal samples were collected from dogs aged 1 months to 1 year having symptoms suggestive of CPV infection i.e. diarrhea with/without blood and vomition. Molecular screening of CPV was done by four different PCR reactions PCR-O, PCR-C, PCR-I and PCR-N using two different set of primers. Vanguard vaccine and vaccine spiked fecal samples were used as positive control to optimize the different PCRs. To validate PCR results, total 5 PCR products (4 PCR-C products and one PCR-N product) from 4 different CPV positive field samples were subjected to sequencing.73.12% samples by PCR-I, 19.74% samples by PCR-O, 100% samples by PCR-N, 58% samples by PCR-C tested positive for CPV2. Nested PCR displayed highest sensitivity followed by Inner PCR, Combination PCR and Outer PCR in decreasing order for diagnosis of CPV2 in the clinical cases. Out of 100 fecal samples, 99 fecal samples were found to be positive for CPV indicating overall prevalence of 99% by producing an amplicon of 569bp/630bp and/or 159bp in different PCR based method under study. In Durg (71), Raipur (20) and Balod districts (1), all samples were found positive for CPV except in Rajnandgaon district, where 8 out of 9 samples (88.89%) were detected positive for CPV. Nucleotide sequencing of all the isolates revealed 569bp sequence from PCR-C and 118bp from PCR-N. Nucleotide sequence analysis revealed that out of four isolates sequenced in present study, two isolates belonged to CPV new 2b variant and other isolates belonged to CPV 2c variant.

Keywords: Amplicon; Canine Parvovirus; Molecular screening; Nested PCR

Molecular Mechanism and Nanotechnology-Based Diagnostic and Therapeutic Approaches for the Management of Colorectal Cancer with Special Importance to its Clinical Trials

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Abstract

Colorectal cancer (CRC) develops in the rectum or colon. According to the report, World Health Organization (WHO) statistics reveal that 1.93 million new instances of colon cancer were diagnosed in 2020, and 0.94 million people died as a result. CRC-related causes worldwide account for 10% of global cancer incidence (a total of 19.29 million new cases) and 9.4% of cancer deaths (a total of 9.96 million deaths). In terms of cancer-related mortality, it is the third most common cause for both men and women. It has been reported that polyps (clumps of cells) play a significant role in the progression of CRC, which may start benign but then become aberrant due to uncontrolled growth and eventually spread to form a solid tumor. Metastasis is the main cause of mortality for cancer patients with chromosomal instability (CIN), microsatellite instability (MSI), and chromosomal mismatch repair (CIMP), three of the major processes implicated in colorectal cancer that are specific to each host. To reduce the death toll from colorectal cancer, new screening procedures that are more precise and accurate are needed. Cytotoxic drugs have side effects and drug resistance that limit their use. Using nanocarrier technology to deliver medication to cancer patients is one of the most promising cancer treatment methods. Targeted nanoparticles may be used to deliver cytotoxic drugs by exploiting differences in cancer cell surface chemicals. The molecular mechanism of colorectal cancer is discussed in this article, which also gives background information on nanotechnology-based diagnostics and treatment options, it also addressing about completed and ongoing clinical trials for the management of colorectal cancer.

Keywords: Colorectal cancer; Molecular mechanism; Mortality; Nanotechnology

Recent Advancement in Cancer Therapy: Role of Topoisomerase Inhibitors

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Abstract

Topoisomerases have been proven to be effective cancer chemotherapeutic targets. Anticancer drugs that target Topoisomerase I and II have been tested in the clinic and shown to be extremely successful, but with considerable adverse effects. In anticancer treatment, human DNA topoisomerase II is a key target. Even though medications that target topoisomerase II have had therapeutic success, the emergence of resistant cancer cells can restrict their clinical usefulness. Combination therapy and multitarget medications have been recommended in numerous studies to optimize the therapeutic potential of anticancer drugs when the use of multitarget pharmaceuticals is favourable from a pharmacokinetic standpoint. TOP1 (nuclear DNA topoisomerase I) is a human enzyme that is necessary for life. The alkaloid camptothecin, which is used to make the powerful anticancer drugs irinotecan and topotecan, has just one identified target. Because camptothecins attach to the TOP1-DNA complex, the TOP1-DNA complex is at the interface. Several camptothecin and non-camptothecin compounds are being researched to improve anti-tumour effectiveness while reducing adverse effects. The mechanisms and molecular drivers of tumour response to TOP1 inhibitors are discussed, and logical TOP1 blocker combinations based on current knowledge of the repair and checkpoint pathways involved with TOP1-mediated DNA damage are examined. We examine the scientific rationale for targeting topoisomerase II, as well as several other significant targets in cancer therapy, as well as the current state of the field and future possibilities.

Keywords: Cancer therapy; Camptothecins; Combination therapy; TOP1-DNA; Topoisomerases

Novel Herbal Drug Delivery System for Inflammatory Bowel Disease

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Abstract

Inflammatory bowel Disease (IBD) is a collection of signs and symptoms that include stomach pain, changes in bowel movement patterns, diarrhoea, constipation, or both. IBS is caused by colon inflammation, such as Ulcerative Colitis and Crohn's disease. Inflammatory bowel Disease (IBD) is a group of symptoms that include stomach discomfort, irregular bowel movements, diarrhoea, constipation, or both. With the help of novel herbal drug delivery system, we are able to deliver the active constituent at the site of action in the form of microparticles (ranging up to 150-250µm) providing sustained delivery action in colonic region encouraging anti-inflammatory activity. IBD and associated disorders such as anxiety, major depression, and chronic tiredness affect over 40% of the world's population. Colon inflammation, such as ulcerative colitis and Crohn's disease, causes IBD.

Intranasal Drug Delivery System for Brain Targeting

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Abstract

Brain is well protected from outside influences by the blood brain barrier (BBB). This barrier consists primarily of endothelial cells forming the wall of brain micro vessels. These cells are close contact with astrocytes and pericyte connected over a vessel's membrane. Furthermore, endothelial cell specifically regulates the transport of substances into the brain and these specific transport mechanisms are responsible for the inability of the certain drug to cross the barriers. In addition to that, it enhances the systemic concentration of the drug by avoiding first-pass elimination. Unlike most conventional liquid formulation for nasal delivery, bio adhesive nasal formulations have high viscosity, which prolongs the drug contact time and release the drug in controlled manner, which result in improved local and systemic bioavailability, reduced dose requirement and improved patient safety and acceptability. Interestingly, nasal formulations could be very useful for efficient delivery of drug in the treatment of any CNS disorder. The promising strategy to improve nasal drug bioavailability is to enhance the drug absorption rate via permeation enhancer or by prolonging the drug contact time at the nasal absorption.

Keywords: Drug delivery; Endothelial cell; Formulations; Intranasal

Fabrication and Evaluation of Novel Microbeads Loaded Gel for Mouth Ulcer

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Abstract

The present study deals with the preparation of "Fabrication and evaluation of novel microbeads loaded gel for mouth ulcer" using ascorbic acid as a drug and menthol as a cooling agent. This product imparts therapeutic effect at affected parts of oral cavity for treatment of mouth ulcer. Mucoadhesive gel has been prepared by using different polymer like carbopol 940 and propylene glycol as a gelling agent. In this preparation we used glycerol as a solvent. Ascorbic acid used as an antioxidant and helps fighting bacterial infection and maintains blood pressure. It could treat mouth ulcer effectively with improved patient compliance and reduced side effect and toxic effect. The present work focuses on the mucoadhesive drug delivery systems that are based on bioadhesion of mucus layer covered biological surfaces. Mucoadhesive drug delivery systems have many advantages over others that make it novel drug delivery system designed for systemic administration of various drugs. Major advantage of mucoadhesive drug delivery system is that it extends the dwelling time at the site of application. High blood delivery and permeability of the buccal mucosa, the buccal cavity is the paramount alternative for both local and systemic delivery of the many drugs. In summary, mucoadhesive drug delivery system is novel drug delivery system by means of its diverse advantages and prospective formulation for various chronic diseases.

Keywords: Bioadhesion; Drug delivery; Microbeads; Mucoadhesion

Treatment and Advancements of Uterine Fibroids

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Abstract

Uterine fibroids (leiomyomas) are made of muscle cells and other grow tissues grow in and around of the wall of the uterus. Uterine fibroids benign tumours in women reproduction age worldwide. Many are discovered incidentally on clinically examination. Approximately 30% of women with uterine fibroids will present with severe symptoms, which can include abdominal uterine bleeding, anaemia, pelvic pain and constipation. Symptom of fibroids also includes recurrent miscarriage and infertility, depending on their size and location, particularly for intramural and sub mucous myelomas distorting the cavity of uterine. Current option for symptomatic fibroid treatment includes expectant medical and surgical management radiology procedures. Ultrasound can be done, when a patient is symptomatic of uterine fibroids. Fibroids are generally classified by their location; intramural fibroids, subserosal fibroids, submucosal fibroids. The cause of uterine fibroids is unknown, But research and clinical experience proposes that genetics, hormonal imbalance, other growth factor and extracellular matrix accumulation could be the contributing factors. Generally, uterine fibroids are not risky, but can lead to several complications such as uneasiness, anaemia and fatigue due to heavy bleeding. Our aim is to highlight the new treatments and advancements in treating uterine fibroids. Later we have also highlighted the future advancements and innovations that are used in developed countries for same.

Keywords: Anaemia; Disease symptoms; Red blood cells; Uterine fibroids

Structure-Based Virtual Screening and Molecular Docking of Embelin for the Identification of Potential Inhibitor Against Breast Cancer

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Abstract

Breast cancer is prominent reason for cancer-related demises in women. Breast tumours are caused by overexpression of genes that promote cell growth in breast cells. The development of effective inhibitors is a sound chemopreventive strategy. Approximately 75% breast cancers are hormone receptor positive and 20-30% is HER2 positive. In normal mammary gland development estrogen receptors responds to estrogen and helps in cellular growth and development. HER2 receptor helps in breast cell growth, division and repair mechanism. ERα and HER2 receptors play a vital role in development of breast cancer by overexpressing and stimulating cell survival and growth pathways. The current in silico study offers a pharmacoinformatic method for identifying activity of embelin against estrogen receptor ERα and human epidermal growth factor receptor HER2. Phytochemicals are constantly being researched for use in modern medicines. Embelin is a key phytochemical of *Embelia ribes* plant. Embelin possesses potential anti-inflammatory, antioxidant, cytotoxic, anti-cancer, anti-bacterial, anti-fungal and wound healing activity. An in silico study was carried out to assess embelin's anti-cancer activity against breast cancer. Molecular docking study has revealed favourable ligand interactions of embelin with ERα and HER2. In comparison to standard drug, binding energy of embelin was -7 kcal/mol and -7.2 kcal/mol for ERα and HER2 respectively. Though it can target both the receptors, ERα can be more prominent target as compared with HER2 as strong interactions could be seen with ERα rather than HER2. This study hypothesizes that embelin can be developed as selective estrogen receptor modulators SERM, which can block binding of estrogen to estrogen receptor and downmodulate the expression of genes.

Keywords: Embelin; ERα; HER2; Molecular docking; SERM

Effects of Dietary Supplementation of Herbson Duodenum of Broiler Birds

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Abstract

The manufacturing of poultry breeding and enhancement feed efficiency have quickened the use of feed additives in the broiler diet. The feed is a major input for the broiler rearing and contributes about 70–80% of production cost, hence plays a vital role in the broiler's economy. This experiment was conducted to assess the effect of feed supplemented with Amla (*Emblica officinalis*) fruit Powder, Ashwagandha (*Withania somnifera*) root powder, Tulsi (*Ocimum sanctum*) leaf extract and Kalimusli (*Curculigo orchioides*) root powder on the performance of broilers. A total of 78 healthy broiler birds of Ross AP strain irrespective of their sex were devided into Six birds were sacrificed at day one. Remaining seventy-two birds were divided into four groups (eighteen birds in each groups) control (Group I), Standard group (Group II), Kalimusli Supplemented group (Group III) and Polyherbal supplemented group (Group IV). Six birds from each group were sacrificed at 14, 28 and 42 days of age to record the gross morphology and morphometrical parameters. The treatments were: a control group (Group I) received no supplement, Standard group (Group II) supplementation in Basal feed with 0.25% enramycin antibiotic, 2% Kalimusli supplementation in Basal feed with kalimusli Supplemented group (Group III) and 2% Polyherbal (0.5% Tulsi, 0.5%Amla, 0.5% Ahswagandha, 0.5% Kalimusli) supplementation in Basal feed with Polyherbal supplemented group (Group IV powder). Herbal supplementation has significant effect on weight, length and width of ileum at all ages. The weight, length and width of duodenum was maximum in group III and minimum in group I in adult broiler birds. Histologically, the structure of the duodenum had four layers tunica mucosa, tunica submucosa, tunica muscularis and tunica serosa. Herbal supplementation has significant effect on total wall thickness of duodenum. In group III, total wall thickness was maximum in all age groups. However, in group IV, the total wall thickness was more and significant at 14 and 28 days of age. At 42 days of age, the total wall thickness was more in group II in comparison to group IV but nonsignificant. The villi were tongue (fig 16) and foliate shaped (fig 15). Height of villi increased with advancement of age. It is concluded that dietary supplements with Kalimusli herb enhanced the performance and health status of broiler chickens.

Keywords: Broiler birds; Herbs; Gross and histological parameters

Effects of Dietary Supplementation of Herbs on Ileum of Broiler Birds

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Abstract

Different herbs and spices have been used as feed additives for various purposes in poultry production. This experiment was conducted to assess the effect of feed supplemented with Amla (*Emblica officinalis*) fruit Powder, Ashwagandha (*Withania somnifera*) root powder, Tulsi (*Ocimum sanctum*) leaf extract and Kalimusli (*Curculigo orchioides*) root powderon the performance of broilers. A total of 78 healthy broiler birds of Ross AP strain irrespective of their sex were taken for experiment. Six birds were sacrificed at day one. Remaining seventy-two birds were divided into four groups (eighteen birds in each groups) control (Group I), Standard group (Group II), Kalimusli Supplemented group (Group III) and Polyherbal supplemented group (Group IV). Six birds from each group were sacrificed at 14, 28 and 42 days of age to record the gross morphometrical and histological parameters. The treatments were: a control group (Group I) received basal diet, Standard group (Group II), basal feed supplemented with 0.25% enramycin antibiotic,Kalimusli supplemented group (Group III) supplemented with 2%Kalimusli in basal feed and 2% Polyherbal (0.5% Tulsi, 0.5%Amla, 0.5% Ahswagandha, 0.5% Kalimusli) supplementation in Basal feed (Polyherbal supplemented group -Group IV). Herbal supplementation has significant effect on weight, length and width of ileum at all ages. The weight, length and width of ileum were maximum in group III followed by group II, group IV and group I at forty days broiler birds. Similarly, effect of herbal supplementation was significant on the microscopic structure of ileum like thickness of mucosa, height of villi and total wall thickness diameter of gland. It was concluded that dietary supplements with Kalimusli herb enhanced the performance and health status of broiler chickens.

Keywords: Broiler birds; Herbs; Gross morphology; Histology

Various Methods for Biofilm Visualization

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Abstract

Biofilms can be found in a variety of natural contexts, including water bodies, soil, and healthcare settings. It is an important strategy used by microorganisms to cope with the harsh environment in which they live. Biofilms develops a barrier of microorganisms by entrapping and shielding them from the harshness of the natural physical environment. Because of this barrier, the bacteria are resistant to almost all of the existing antibiotics. As biofilms can be infectious and harmful to a healthy host, detecting them early is critical for diagnosis. Various research groups are developing and using newer approaches to better understand the depth of biofilm growth dynamics, as well as their structural components and structure. These techniques are beneficial to researchers interested in the development of biofilms that cause infection in humans and other warm-blooded hosts.

Keywords: Biofilm; Biofilm visualization; Drug resistance; Infections; Microorganisms

Solubility Enhancement of Hesperidin by Using Different Method

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Abstract

The main objective of the present investigation to develop and evaluate solid dispersions of BCS Class IV drug hesperidin employing natural polymers, compatible with conventional manufacturing method to enhance solubility of poorly soluble drugs. Hesperidin is a flavanone glycoside having various pharmacological activities including anti-oxidant, anti-inflammatory, antiallergic, obesity and cardiovascular disease. Its use as a drug in pharmaceutical industries is limited due to its poor aqueous solubility. In this study, hesperidin solid dispersions were prepared using *Ocimum* mucilage and mannitol by melt extrusion method. Solid dispersions and pure hesperidin in the form of powder were characterized in comparison with pure drug and corresponding physical mixtures in the same ratios by Fourier transform infrared spectroscopy and in-vitro drug release. Solid dispersion (F4) prepared with *Ocimum* mucilage and mannitol (60:40) ratios were showed highest solubility in water. Hence the solid dispersion (F4) was selected for characterization. In vitro drug release profiles demonstrate that formulation F4 has a greater dissolving rate (99.54%) than the other formulations. It is concluded that, increasing concentration of carrier showed increases the drug dissolution rate. This study has shown that the solid dispersion of hesperidin using natural carrier can be promising formulation for solubility and dissolution enhancement and the natural polymers used have shown promising results in the modification of drug release from the formulations.

Keywords: Hesperidin; *Ocimum* mucilage; Mannitol; Solid dispersions

Formulation and Evaluation of Nanoparticles of *Terminalia chebula*

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Abstract

A bacterial infection is a proliferation of a harmful strain of bacteria on or inside the body. To treat this type of bacterial infections plants like *Allium sativum, Zingiber officinalis, Caryophyllus aromaticus, Cymbopogon citratus* and *Terminalia chebula* extracts are used against Gram-positive and Gram-negative bacterial strains isolated from human infections. An ethanolic extract of *Terminalia chebula* fruit was studied for its antibacterial activity against *Staphylococcus* and *Streptococcus* or other organisms. The antimicrobial susceptibility was screened using the disc diffusion method and the minimum inhibitory concentration (MIC) was determined using the broth microdilution method. Phenolic compounds of *Terminalia chebula* are not chemically stable and have low skin permeation Hence, these limitations are overcome by developing nanoparticles because of the ease of encapsulation of various bioactive compounds in these vesicles, an increase in physicochemical stability, the reduction in side effects and skin irritation and the enhancement of transdermal absorption and the accumulation of the loaded substances at the site of administration.

Novel Herbal Drug Delivery System of *Terminalia chebula*

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Abstract

Bacterial infection is as the rapid production of detrimental strains of bacteria on or into our body. To cure these kinds of infections various plants like *Terminalia chebula, Allium sativum, Zingiber officinalis, Caryophyllus aromaticus* and *Cymbopogon citratus* extracts are used against several Gram-positive and Gram-negative strains of bacteria which are secluded from human infections. Ethanolic extracts of *Terminalia chebula* was reported to possess antibacterial activity against these *Staphylococcus* and *Streptococcus* strains of bacteria and many other organisms. The antibacterial vulnerability was screened by using disc diffusion method and minimum inhibitory concentration (MIC) was evaluated by using broth microdilution method. The phenolic compounds of *Terminalia chebula* are not chemical stable and have larger molecular size owing to lower skin permeation. Hence, these problems are conquered by developing novel drug delivery system, because encapsulation of these bioactive compound's results in reduction in side effects, skin irritation and increase in stability studies and absorption values and accumulation of loaded substances at the administration site.

Treatise on Autism Spectrum Disorder

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Abstract

Autism is a neurological & amp; developmental malady that lasts a lifetime. The hallmarks of the impairment, such as limited or non-existent speech development, avoidance of social contact or awareness, and behavioural routines, are not experienced in the same way by everyone with autism. PDD NOS (Pervasive Developmental Disorder Not Otherwise Specified), Autistic Disorder, Pervasive Developmental Disorder, Childhood Disintegrative Disorder (CDD), Rett syndrome are all terms used to describe autism spectrum disorder. Disability begins in children from the age of three and may lasts for a lifetime. Autism is a spectrum disorder having many symptoms like eye contact anxiety, social difficulty, aggression, noise sensitivity, abnormal/flat speech, Abnormal posture, poor sensitivity, depression etc which may improve with time. The main cause of ASD is yet unknown but some suspected factors like having an autistic relative in the close family, Genetic diseases such as fragile X syndrome and others, as well as specific genetic mutations, Being the child of older parents, Birth weight that is too low, Vulnerability to heavy metals and contaminants in the environment, metabolic discrepancies, A history of viral infections in the mother, Valproic acid or thalidomide (Thalomid) exposure during pregnancy may cause the disorder. There are various methods for diagnosis of ASD by examines the suspect, genetic testing etc. As a treatment of ASD, behaviour therapy is considered as first line treatment with pharmacological therapy would be the best to improve the condition. Autism Awareness Day is observed every year on April 2nd. On April 2, the entire planet will become blue in honour of World Autism Awareness Day. Light it Up Blue campaign, which aims to increase understanding and appreciation of individuals with autism.

Keywords: Autism; Childhood Disintegrative Disorder (CDD); Pervasive Developmental Disorder; Thalomid

Recent Advancement in the Field of Biosimilars

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Abstract

In this work, an overview of latest trends, new ideologies, advancements and some major guidelines in the area of biosimilars is discussed. Some biologic products have been created and developed over a few decades. The expiry of the patents of the original product of the company lead to the production of biosimilars. Biosimilars generally have a shorter timeline for approval (approximately 8 to 9 years) as compared to the original innovated biological product (around 11 to 13 years). The major difference between these two is that, biosimilars need a bigger and larger analytical foundation to create and modify the product to work like the original one whereas the established product doesn't require such things in a broader way.

In the present scenario, there is an increase in the demand of biological products and it is still increasing day by day. So, the production, manufacturing and development of biosimilars boosted by the manufacturers with the existing technologies. Here, biosimilars came into action and grabbed attention because they have almost null investment in phase 1 and 2 of clinical trials and they are available at a cheaper price so they have a less market risk. In simpler terms we can say that the biosimilars are the 'generic' version of the established reference biological drugs and products. The main goal of this article is to provide a deeper knowledge of biosimilars and its related information in a simpler, easy and understandable way and all the information used to create this article have been taken from the established articles from different pharmaceutical journals that are well known.

Keywords: Biosimilars; Future prospects of biosimilars

CRISPR Cas9 Gene Editing Molecular Tool and its Applications in Varied Fields

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Abstract

CRISPR gene editing (clustered regurlarly interspaced short palindromic repeats) is a technique relating to genetic engineering that uses a synthetic guide RNA (g-RNA) to recognize CRISPR sequences in genome of varied organism by complimentary base pair mechanism and delivers a cas9 nuclease which cleaves at presize site. This CRISPR cas9 is a naturally occuring nuclease found in bacteria such as *Streptococcus pyogenes*, that act as a defence system against invading viruses. In 2012, Jennefir doudna and Emmanuelle charpentier made this breakthrough invention. After than in 2017, EPO announced claims to use this tool and by 2018 applied it in GM food. On Feb 2020, a US trial showed safe gene editing in 3 cancer patients. On Oct 2020 it's discoverers were awarded Nobel Prize in chemistry for their outstanding invention. By then, research on CRISPR cas9 has taken a run. Its application can be found in areas compiling research, in disease models, biomedicine, in infectious disease treatment, cancer treatment and research, knockdown therapies, prime editing etc. This review article deals with such aspects, applications and recent advances related to technology dealing with CRISPR cas9 gene editing.

Keywords: Cas9; CRISPR; Gene Editing; g-RNA; Genetic Engineering

Ethno Medicine Practices in Gond Tribe
(Special References to Mahasamund District, Chhattisgarh)

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Abstract

Medical anthropology is the sub-discipline of Anthropology which studies human health problems and healing systems in their broad social and cultural contexts. In some case ethno medicine practice of tribal groups are very useful but in modern medical culture is not believing in ethno medicine that's why we are losing many important herbals and related treatment. Present research paper is trying to preserve some ethno medicine practices and herbals through documentations. This research work conduct in Kalidarha village, Mahasamund district of Chhattisgarh state. Present research paper is based on triangulation method as combination of quantitative and qualitative method. The lessons of native idea and practises in relation to health and sickness in many cultures are crucial to comprehending human behaviour. Health educators often fail to understand the cultural meanings which people associate with health behavior. Attempts must be made to understand why people behave the way they do. Main objective of present study are, To Study the Ethno medicine in the Gond Tribe. To examine the medical practices and healing rituals existing in the Gond tribe and evaluating the traditional medical system there, To evaluate the changes occurring in the traditional medical system as a result of the influence of modern medicine and, To examine the impact of both the traditional medicine and modern medicine on the people. The traditional healing practices are mostly done by few practitioners of the village, who have specialized knowledge in ethno medicines. In spite of the increasing influence of modern medical system, the use of traditional practice is still continuing for some diseases like Impotency, cough, cold, fever, mental disorders, Magic/ Sorceries, T.B., Diarrhea etc. The local medicinal plants help in providing medicines to the poor people. Some people who have no medical access and poor economic conditions, directly or indirectly depend on the traditional methods of curing different diseases. For example, the ethno medicines of bones, i.e. for fractures, are still considered as one of the best medicines. Instead of replacing the bones through modern techniques, the medicinal plants allow joining of fractured bones in

natural way. Similar was found in case of Jaundice, paralysis, diabetes. The practice of rituals and festivals also depend on sacred plants to appease the deities. Such an old age practices have led to the preservation of the natural resources to a greater extent in the past. As mentioned earlier, it was found that maximum numbers of the population were proceeding towards modern medical system. It is a sign of awareness among the people towards modern medication and development of health facilities but a decline of the valuable traditional knowledge.

Keywords: Ethnomedicine; Gond Tribe; Herbal Medicines; Local healers

An Efficient Machine Learning Approach for Labelling of Side Effects Occuring on Anti Inflammatory Drugs using Linear Variant based Support Vector Machine

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Abstract

NSAIDs (Non-steroidal Anti-Inflammatory Medicines) are consistently used by the elderly, though it increases multiple risks in them. Studies have pointed out that continuous usage of NSAIDs can lead to chronic diseases such as peptic ulcers, renal failures or myocardial infarctions. Cyclooxygenase and Lipoxygenase are critical in medications, but cause side effects due to their inflammatory properties. The main goal of this research work is to use MLTs (Machine Learning Techniques) like LVSVMs (Linear Variant based Support Vector Machines) for predicting side effects that occur while consuming the anti-inflammatory drugs. A real time analysis was carried out on datasets, gathered from social media websites and using MATLAB. The study found that the proposed method ensures increased accuracy of predictions when compared with other MLTs.

Keywords: Anti-inflammatory drugs; Chronic disease; Machine Learning Techniques; Side effects; Social media websites

Impact of Online Purchasing upon Traditional Retail Business on Cell Phone in Raipur City of Chhattisgarh

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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 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. Our 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. Our 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.

Keywords: Traditional retail market; Online market; Domestic territory; Market forces; Consumers' attitude

Recent Developments of Fungal Cellulase Production and its Application

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Abstract

Cellulase is a complex enzyme system that contains endo-1,4-β-D- glucanase, exo-1,4-β-D-glucanase and β-D-glucosidase. This complex enzyme has been found to be produced by several microorganisms such as bacteria and fungi. These cellulolytic enzymes play a central role in the cellulosic hydrolysis, which is requisite for the development of successful lignocellulosic biorefinery. Cellulases are produced by some members of fungi viz. *Aspergillus* sp., *Trichoderma* sp., *Sclerotium* sp., and *Trichoderma longibrachiatum* are one of the major species utilized in industries. The cellulolytic potential of fungi has been more when compared with bacterial due to its mycelial structure leading to higher capability of penetration in the substrate and enzyme synthesis. The production of this consortium of enzymes is currently achieved via submerged fermentation as well as solid-state fermentation using bioreactors. The vivid application of cellulase enzyme has made it occupy almost 15% of the global industrial share after amylase and protease in the market. The major consumers of cellulases are pulp and paper industry, textile industry, bio-refinery, wine and brewery industry, food industry, pharmaceutical industries and waste management etc. The development of new methods such as mixed culture and genetic engineering by manipulating the gene for hyper cellulase production as well as its optimization including measures for cost reduction are under progress. The current review incorporates general aspects of cellulolytic enzymes with special emphasis to fungi including its applications in various industries as well as its production which would result in higher efficiency of biomass hydrolysis, hence becoming more economically feasible.

Keywords: Cellulases; Fungi; Endoglucanase; Exoglucanase; β-glycosidase; Pulp and paper; Textile; Waste management; Biofuels

Enhancement of Bioavailability of Lipidic Drug Paclitaxel using Factorial Design Approach

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Abstract

The poor aqueous solubility and low bioavailability of antineoplastic drugs restrict delivery through the oral route. A self-micro emulsifying drug delivery system (SMEDDS) is an imperative tool in addressing low solubility and bioavailability issues of a lipophilic drug. Paclitaxel (PTX) is an antineoplastic drug especially used for the treatment of ovarian and breast cancers with very low aqueous solubility (0.3µg/ml). This study aims to formulate SMEDDS incorporating Paclitaxel to enhance its aqueous solubility. Isopropyl myristate (Oil), Tween 80 (surfactant), and Transcutol (co-surfactant) were used to formulate SMEDDS. 3^2 factorial design analysis helps in studying the effect of an independent factor on a dependent factor on statistical principles. Independent factors, concentrations of oil and mixture of surfactant and co-surfactant (S_{mix}), and two dependent factors, emulsification time and in vitro drug release were chosen. All the nine formulated B1-B9 were subjected to various physicochemical tests. The globule size was found to be 136.38 – 223.14 nm, zeta potential ranges between -31.54 to -7.58, drug content ranges between 65.34 – 83.56%. Statistical analysis shows that an increasing amount of surfactant decreases emulsification time. This may also decrease the average droplet size of resultant SMEDDS. With an increase in the concentration of tween 80, PTX release also increased. Rapid and more extent of PTX released from formulated SMEDDS indicates that the aqueous solubility of PTX has increased. B9 formulation releases 99.46% PTX at end of 60 minutes whereas 35.23% of pure PTX powder was solubilized in dissolution medium. In vitro drug release study reveals that the prepared SMEDDS have acceptable properties of immediate-release dosage forms.

Keywords: Antineoplastic drug; Bioavailability; Lipidic Drug; Paclitaxel

Microbial Inoculants for Sustainable Management of Plant Diseases

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Abstract

The behaviour of microbial inoculants in ecosystem always have uniqueness, while the practical use of natural or genetically modified microorganisms has been developed. Many researchers reported that relevance of synthetic microbial consortium can promote the resident microbial communities. These are the effect of microbial interaction with the inhabitant microbial communities, or circumlocutory effects arbitrated by improved growth and increased stamina against pathogen. The use of inoculants to suppress diseases in a wide range of agricultural crops and nursery is gaining momentum. In future, agrochemicals will replaced by microbial inoculants. But we want to search valuable strains by optimization of single or consortium of the microbial strain that have multiple traits, which have different modes of action like PGP and disease suppression.

Keywords: ACC deaminase; Biocontrol; Immunity; Disease management; Plant microbiome; Plant-microbe interaction; Synthetic community

Anti-Biofilm Activity of Microbes: A Review

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Abstract

Biofilm is a microbial community of bacteria that adhere to a surface and are encased in a self produced extracellular polymeric substance. The formation of these static communities and their natural resistance to antimicrobials are the main reason for many persistent and chronic infections of bacteria. According to reports 80% of human bacterial infections are biofilm-associated, mostly infections are frequently being caused by *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa.* The Chemical therapy of these infections is unsatisfactory for various reasons including toxicity, ineffectiveness and drug resistance. Therefore, to address this situation new alternatives have been proposed. Drugs which are derived from natural sources are major interest, and thus the study is focused on various microbial compounds for their anti-biofilm activities. In recent year microbes have been exploited for the search of new compound that can lead to further pharmaceutical formulations. Various microbial derived substances are under research for possible application in pharmaceutical industry. Compounds such as Flavonoids extracted from *A. nidulans* could be used for the prevention of oral Candida infections and their biofilm mediated diseases. Different methodologies have been reported for the bacterial biofilm growth and detection. The crystal violet staining method has been reported for the detection of biofilm growth, both in case of treated or untreated culture. Elucidation of extract on pre formed biofilm has also been done.

In this review, we have described various probable strategies to investigate the anti-biofilm effect of microbial products which can be further use in treatment of biofilm generated infections.

Keywords: Biofilm; Anti-biofilm; Drug resistant

B-glucan and its Hypocholesterolemic Effect: A Review

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Abstract

Hypercholesterolemia has been related to an increased risk of heart diseases and stroke. Coronary heart diseases, stroke, and peripheral vascular diseases are all examples of cardiovascular diseases. Diabetes and high blood pressure are also linked to high cholesterol levels. In the worst-case scenario, excessive cholesterol causes fatty plaques to form in arteries all over the body, resulting in atherosclerosis (CVD). Natural products that may prevent or treat various diseases have been identified, including β-glucans. Chemically, β-glucans are heterogeneous non-starch polysaccharides, which form the structural compounds of the cell wall of certain microorganisms, including yeast and algae, and certain protists, including mushrooms and grains, such as oats and wheat. β-glucans may be insoluble or soluble. Insoluble β-glucans fibers consist of β-(1,3/1,4)-D-linked glucose units, whereas soluble viscous β-glucans fibers consist of β-(1,3)/1,6)-D-linked glucose. *Saccharomyces cerevisiae* is a safe and effective natural/herbal cholesterol-lowering option. The Food and Drug Administration has declared beta-glucan from *S. cerevisiae* to be "Generally Recognized As Safe" (FDA). *Saccharomyces cerevisiae* extracts can yield up to 85% beta-glucan. Because beta-glucan has no negative effects, it could be used to treat hypercholesterolemia. The history of glucans is the starting point for this review. The focus then shifts to sources and structure, with comparisons made between the effects of physicochemical qualities and sources on biological processes effects. Glucans are natural chemicals that can help prevent diseases. They've been in high demand for a long time due to their ability to treat a variety of ailments in the history of humanity.

Isolation and Characterization of Azodye Degraders

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Abstract

The industrialization has ushered in new avenues of development which have helped the progress of humans by leaps and bounds .as man enjoy the fruits of industrialization and looks forward to more progress, it has certainly posed a threat to the environment .time and again the bioaccumulation and biomagnification of hazardous pollutant, released from industries have severely affected the ecological balance and posed a detrimental effect to human beings. One such example is environmental pollution due to azodye. Azodyes are used in different industries such as food, textile, printing, and pharmaceuticals. After using the dye, the remaining effluents get mixed with freshwater causing pollution recalcitrant to degradation, leading to carcinogenic effects. Biodegradation is a very good method used for the degradation of azodyes. In this study, the degradation of an azodye such as metal yellow, acid orange, direct orange, was carried out by microorganisms isolated from various sources. Zone of inhibition was checked by the method. Biochemical tests were carried out and Spectrophotometry analysis was carried out for analysis of azodye degradation. Growth curve, genomic DNA isolation, and 16S RNA were carried out to find the species of organism. The degradation percentage of acid orange dye (24%), metal yellow (50%), orange dye (71.42%) were compared. This study shows that the degradation percentage of direct orange dye was greater than the other two dyes. This study thus shows that bacteria can utilize the dyes as their source of energy and help in the treatment of industrial effluents.

Keywords: Biodegradation; *Bacillus* species; Spectrophotometer; Azodye

Micro/Nanorobots (MNRs) as Emerging Novel Carriers for Drug Delivery Syaytem: Application and Challenges

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Abstract

In Recent decades, nanotechnology has been widely used in the fabrication of drug delivery systems. This smart matter-managing discipline paves the way for “Micro/Nanorobots (MNRs)" which have appeared recently as promising techniques for targeted drug delivery in the field of research. Unlike traditional drug delivery, which relies on blood circulation to reach the target, these designed micro/nanorobots can move independently, allowing drugs to be delivered to difficult-to-reach areas. They are shown to have the ability of loading, transporting, and delivering therapeutic cargo directly to disease sites, thereby improving clinical efficiency and minimizing adverse reactions of highly toxic drugs. Under physiological conditions and environments, micro/nanorobots can effectively convert other forms of energy into propulsion and movement, as well as navigate to specific locations. Thus, they are classified according to their respective driving forces, which range from chemical/biochemical reactions to external fields in micro/nanorobots. These small IOT machines have enormous biomedical potential, with a particular emphasis on their advantages and applications for directed drug delivery, precision surgery, medical diagnosis, and detoxification. Although micro/nanorobots have promising visions, their practical applications are still in their infant stage due to some in-vivo barriers and regulatory challenges that must be overcome through extensive research. As an outcome, they will herald a new era in which micro/nanorobot-based strategies will play an important role in active pharmaceutical delivery.

Keywords: Adverse reaction; Detoxification; Medical diagnosis; Micro/Nanorobots; *In vivo* barriers; Precision surgery; Targetaed drug delivery

Co-Processed Excipients: Future in Pharmaceutical Industry

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Abstract

A co-processed excipient is a combination of two or more excipients obtained by physical co-processing that does not represent the formation of covalent bonds. Besides co processing two or more excipients, formulators can produce an excipient with supercilious properties as compared to the individual ingredients. co-processed excipients have received much more attention in the formulation development of various dosage forms such as tablets, capsules, powder, cream, ointments, and others. Co-processed excipients have been developed essentially to address the issues of compressibility, flowability, and disintegration potential, with filler–binder combinations being the most commonly tried. The main aim of co-process excipients is to obtain a product with added value related to the ratio of its price/functionality. There is no single-component excipient that performs all the required performance to allow an active pharmaceutical ingredient to be formulated into a particular dosage form. Co-processed excipient has taken much more attention in the formulation development of various dosage forms, especially for tablet preparation by the direct compressible method. For example, if a material that is used in filler binder has lowor poor disintegration property, it can be co-processed with another excipient that has high porosity and good wetting property because these attributes will increase their water intake, which will aid improve the disintegration of the tablet. No single excipient has all the desired physic-mechanical properties like good compressibility and compatibility for the development of a vigorous drug delivery system. Hence, there is a need to have excipients with multifunctional properties such as no/low moisture sensitivity, superior compressibility, and rapid disintegration ability, good flow-ability. The cost of new excipient development is very high as compared to another excipient so it demands toxicity study also, hence pharmaceutical industries have focused on co-processed approved materials. The performances of excipients can be improved either by co-processing of existing excipients or developing new excipients.

Keywords: Co-processed excipients; Disintegration; Drug delivery system; Tablet

Application of Nanomaterials in Biosensors: A Review

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Abstracts

Recently nanomaterials have developed much interest in the field of biosciences due to the increased need for to control of desired molecules present in the human body. Biosensor device is defined by its biological or bio-inspired receptor unit with unique specificities toward corresponding analytes. Therefore the exciting properties of nonmaterial's have attracted the world scientific community toward their application in various sectors such as, industry, health, food, security etc., The use of nonmaterial's is predicted to enhance the performance of biomolecular electronic devices with high sensitivities and detection limits. In order to increase sensitivities and to lower detection limits down to even individual molecules, nanomaterials found promising due to the possibility to immobilize an enhanced quantity of bioreceptor units at reduced volumes and even to act itself as a transduction element, which converts the output into electrical signal. Due to the enormous application of nanomaterials, this review summarizes the advantages of nanomaterials and the role of components of biosensor has been described in this chapter. Also this chapter has illustrated the fundamentals of nanomaterials and principles of biosensors with various techniques.

A Study on the Effects of Entrepreneurship on India's Economic Growth

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Abstract

Entrepreneurship is one of the most important inputs in the economic development of a country and plays a central role in the economy by establishing firms, which in turn create markets and organizations. They are the people who create new businesses, which help create new jobs for people and help in intensifying competition, with the help of technology they master in increasing productivity and thus, contribute in the development of the country, followed by economic growth. The aim of this paper is to study the relation between entrepreneurship as an intellectual capital and economic development in India. Promoting Entrepreneurship and bringing out schemes for their sustainability will: **Support capital formation**: By mobilizing the idle savings of people. Entrepreneurs employ their own funds as well as borrowed capital for setting up their enterprises. **Generate employment opportunities**: Entrepreneurship can be the solution to unemployment which is a persistent problem for underdeveloped nations. **Promotes regional development**: Entrepreneurs help in setting up of industries in less developed and backward areas thereby remove regional disparity. **Reduces concentration of economic power**: Entrepreneurship encourages redistribution of wealth and income in the interest of the country and circulates it to more people and geographic areas, thus giving benefit to larger sections of the society. A sample of 30 Entrepreneurs from Raipur (C.G) will be analysed on various parameters. Study will be based on primary data only where observation and interview techniques will be used. Questionnaires will be filed up by the entrepreneurs on information like government support, challenges and obstacles they faced, financial viability of start up and other. The paper will analyse the responses through SPSS and MS Excel. The finding obtained will be helpful to the upcoming entrepreneurs and will initiate many more start ups.

Keywords: Employment; Economic development; Entrepreneurship; Regional development

g-C_3N_4 Photocatalyst-Mediated Organic Transformations

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Abstract

The g-C_3N_4 photocatalyst-mediated chemical transformation of organic compounds has been recognized as a crucial source for building anticipated bonds in synthetic compounds. This article highlights C-N catalyzed visible-light-promoted approaches for the oxidation of alcohols, and the formation of carbonyl compounds, considering several coupling reactions g-C_3N_4 has been used for the modification of structures and properties of C_3N_4 by nanostructures, hetero-junction construction, and the addition of dopants, thus improving the photocatalytic activity. Herein, we focus on the application of Graphitic carbon nitride as a photocatalyst in organic synthesis. The transition metal catalysts such as Pd, Ni, Au, V and Ru, catalysts, have been used for the oxidation of alcohols. g-C_3N_4 photocatalysis can be further expanded for driven in the visible reason organic transformation by the combination with organocatalysts and molecular photocatalysts.

Keywords: Nanostructures; Organic Compounds; Organic transformation; Photocatalyst

Nanotechnology in Dentistry

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Abstract

Nanotechnology has emerged as a new science which deals with the physical, chemical, and biological properties of structures and their components at nanoscale dimensions. Nanodentistry is the application of such nanoparticles and technology within the field of dentistry. Nanotechnology offers a broad range of innovations and improvement in prevention, diagnostics, and treatment of oral diseases. Nanotechnology has various dental applications as nanorobotics, nanodiagnostics, nanomaterials, nanosurgery. Recent advances in nanomaterials have brought nanocomposites, nanoimpression, and nanoceramic into the domain of clinical dentistry. Nanoparticles are used in Oral cancer for targeted delivery of anticancer therapeutics directly and selectively to tumor cells sparing the health cells.. This paper highlights the applications of nanoscale technology in the field of dentistry.

Keywords: Dentistry; Nanoparticles; Nanotechnology

In-Silico Vaccine Designing for Vancomycin Resistant *Staphylococcus species*

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Abstract

Vaccination is an important step in prevention of bacterial infections including MRSA and VRSA. Epitope based vaccine designing is one of the strategy to identify the potential candidate vaccine. Bioinformatics tools which search for the most suitable epitope from a vast set of antigen that are being encoded by bacterial genome. This mode of vaccine designing is rather more economic, precise, easy, less time consuming and moreover harmless as compared to other vaccine designing strategies available in market. Conserved sequences of VRSA Proteins retrieved were undergone for several steps in order to find out the efficiency of the conserved protein sequences as a vaccine against *Staphylococcus species*. These steps includes Epitope prediction, Antigenicity test of selected peptides, secondary structure prediction of conserved sequences, T cell epitope binding with MHC (I & II) and TAP molecules. We got better results in binding studies for all the three (MHC I , MHC II , and TAP) molecules, indicating that the conserved sequences has the potential to act as a successful vaccine. Finally 3D structure of the conserved sequences was determined through SWISS-MODEL.

Keywords: *In-Silico* vaccine designing; *Staphylococcus species*; Epitope prediction

3D QSAR Analysis on Substituted Oxadiazolines Derivatives as Potent Anti-Hiv Agents

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Abstract

In the present article, k nearest neighbour molecular field analysis (kNN-MFA) method was used to develop a three dimensional quantitative structure activity relationship (3D-QSAR) model. In this study 21 derivatives of Oxadiazolines having anti HIV activity were used. The best 3D QSAR model was developed by means of random selection method with 75% to create training and test set followed by stepwise forward backward and multiple regression method. The predictive internal as well as external values were in range of q2 =0.9900 and r2 = 0.9965 respectively. In presented model one electrostatic and three steric descriptors played crucial role for the activity. The counter map/ plot of this model further helps to understand the relationship of structural feature of derivative of Oxadiazolines and its biological activity this would be applied for designing of new potent anti HIV agents containing Oxadiazolines as lead.

Keywords: 3D-QSAR; kNN-MFA; Anti HIV; Oxadiazolines derivatives; Multiple regression method

Casticin a Novel Molecule for Treatment of Cancer

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Abstract

Casticin (polymethylflavone) is derived mainly from *Vitex* species of the family Verbenaceae. Its anti-cancer qualities, andeven its molecular mechanism of action, have received considerable attention. Casticin's anticancer properties have been studied in a variety of malignancies, including breast, oral, bladder, lung, leukaemia and hepatocellular carcinomas. Through many signaling pathways like FOXO3a/FoxM1, PI3K/Akt, NF-κB and STAT3 casticin inhibits invasion, migration and proliferation and induce apoptosis (casticin-induced, ROS-mediated and mitochondrial-dependent). It displays casticin's ability to act as a chemopreventive agent against a variety of cancers. Besides anti-cancer property casticin also have anti-inflammatory activity by minimizing the inflammatory responses in chondrocytes stimulated with IL-1 β, through NF-κB signaling pathway. Thus, casticin may serve as a potential anti-inflammatory agent. Casticin is wearing anti-cancer property by number of mechanism of actions like casticin inhibited the proliferation and induced apoptosis of Cancer cells, and the anti-tumor action of casticin was mediated by the mitochondrial-dependent apoptosis and the activation of JNK signaling pathway. In this article, our aim was to review the pharmacological and therapeutic applications of casticin with specific emphasis on its anticancer functions and related molecular mechanisms.

Keywords: FOXO3a/FoxM1; PI3K/Akt; NF-κB; Chemopreventive; Mitochondrial-dependent apoptosis

Synthetic Nanomaterials: Hazards and Risk

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Abstract

Nanotechnology is widely used in different region. Nanotechnologies will produce different types of nano size particle but it wills more successful when it is safe for a surroundings, health and safety standpoint. Due to lesser size, nanoparticles are caused toxicity in living organism. Generally surface area of nanoparticles is produced free radicals which are responsible for toxicity. Nanoparticles are caused acute pulmonary, oral toxic, skin problem, sensitivity, effect on genes, risk for aquatic plants and animals. Some organizations are timely investigating the risk and hazards effect of nanoparticle. In this work we conclude the mechanisms of entrance into the body, cause at the cellular level, and probable impacts to community.

Keywords: Entry routes; Hazard identification; Nanotoxicology; Nanoparticle characterization; Reactive oxygen; Risk assessment

Drug Delivery System Based on Phyto-Vesicles (Phytosomes) for the Bioavailability Enhancement of Herbal Sources with Emphasis on its Patents

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Abstract

Studies on herbal flavonoids and other hydrophilic natural chemicals have shown that they can be used to treat skin problems, several categories of cancer, anti-aging, and countless supplementary extents of therapeutics and protective medication, including cancer prevention. When it comes to bioavailability, the hydrophilic and unusual chemical structure of this class of chemicals represents a substantial difficulty. A revolutionary formulation method, phytosomes, is being developed in India and around the world to address these issues. Medicine, pharmaceuticals, and cosmetics all stand to benefit greatly from it. Pharmacokinetics and pharmacological parameters have improved as a result of the new technology. As a result, it can be used to treat a wide range of illnesses in both humans and animals, as it is both safe and effective. Improved bioavailability of herbal extracts can be achieved by the use of the phytosomes method. In phytosomes technology, phosphatidylcholine is used to bind the components of an herbal extract. To increase the bioavailability of herbal extracts for therapeutic purposes, a new delivery system for drugs is being applied to phytopharmaceuticals. Several plant extracts, some of which have been partially purified or fractionated, have been found to have substantial pharmacological or health-promoting characteristics after a thorough literature review. It is possible to standardize plant extracts and formulate them as phytosomes for systematic research into any new or enhanced applications.

Keywords: Phytosomes; Bioavailability; Phosphatidylcholine; Herbal extract

A Review on Amelioration Strategies for Salinity Stress in Plants

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Abstract

High salinity is the major abiotic stress faced by the plants which disrupts nutrient and water uptake from the soil, lowering plant quality and productivity. The stress condition severely affects the physiological and biochemical processes of the plant. Plants exhibit various adaptative responses in order to tolerate the stress conditions. It synthesizes different sugars, sugar alcohols, amino acids as well as secondary metabolites to balance the osmotic disturbance. However, different plant species have varied tolerance which can be improved by different strategies like exogenous treatment of metabolites and by genetic engineering of genes. Different types of naturally occurring metabolites like amino acids, antioxidant enzymes, hormones, sugars, vitamins and polyamines have been reported to be used in exogenous treatment of plants. Moreover, there are several studies which have reported the improvement of plant tolerance to salinity stress conditions by manipulating the genes coding for the enzymes that are involved in the synthesis of metabolites, antioxidant enzymes and enzymes for membrane lipid biosynthesis. Therefore, the present review focuses on the various strategies and approaches for the improvement of plant salt tolerance.

Keywords: Salinity; Adaptive response; Metabolites; Osmotic stress; Tolerance