



The International e-Conference on
"Emerging Methodologies in Pharma,
Environmental and Life Sciences"

EMETHPELS-2020

18th and 19th June, 2020

Souvenir - Abstract Book

Organized by
Department of Botany, Zoology
and Biotechnology

Government of Maharashtra
ISMAIL YUSUF COLLEGE
of Arts, Science and Commerce
(Affiliated to University of Mumbai)
Re-accredited 'A' Grade by NAAC (CGPA- 3.14)



Government of Maharashtra
Ismail Yusuf College
of Arts, Science and Commerce
(Affiliated to University of Mumbai)
Jogeshwari (East), Mumbai -60, India

INTERNATIONAL e-CONFERENCE

ON

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Environmental & Life Sciences.
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ABSTRACTS



ABOUT THE COLLEGE

Ismail Yusuf College, popularly known as I.Y. College, is a prestigious multi-faculty College owned and managed by the Government of Maharashtra. It is the oldest College in North Mumbai and the fourth oldest College in the city of Mumbai. It was established in 1930 with a big treasure-trove of donation from Sir Mohammed Yusuf Ismail, K.T., on the Jogeshwari Hill. The original campus of the College was spread over 120 acres of land which has now shrunk to 54 acres due to encroachments and the construction of the Western Express Highway, cutting the beautiful hillock on the College campus into two parts. The Campus enjoys the immense beauty of nature with innumerable banyan, palm and other trees, rippling brooks and glittering ponds in the rainy season. The foundation of the College stone was laid by Sir Leslie Orme Wilson, the then Governor of Bombay in 1924.

The vision of the founding fathers shaped up a temple of learning in sandstone in the regal Persian style with arches and spacious corridors, surrounded by countless big abundantly bearded banyans and palms stretching heavenward, dotting the horizon. Beginning with a moderate number of a few hundred students, today, the College has about four thousand students receiving instructions at Junior Level, Degree Level, Post-graduate Level and Research Level in all three faculties, viz. Arts, Science and Commerce. Most of our students are first generation learners with poor economic and weak social backgrounds.

The College is humming with research activities with majority of its teachers equipped with Ph.D. degrees, and many of whom are recognised research guides at the research centres of not only the University of Mumbai but many other universities across the state of Maharashtra. The College has been awarded six patents for its contribution to the field of research and development activities. The College takes special care of socially and economically underprivileged students and students with special needs through remedial coaching, bridge courses and mentoring system. The College organises state and national level seminars, workshops, conferences and lecture series on regular basis.

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MESSAGE



Hon. Shri. Ravindra Waikar
MLA Jogeshwari Constituency,
Former State Minister Higher Education

It is a pleasure to address the International e-Conference on “**Emerging Methodologies in Pharma, Environmental and Life Sciences**’ (EMETHELS-2020) organized by Ismail Yusuf College, an Institute with 90 years of legendary foundation.

Dear friends, higher education has been going through tremendous changes during last few months. We have realized that we have to use online resources for getting connected to each other during lock down. We have started thinking over changing the traditional pattern of examinations, evaluation, administration related work and such other major responsibilities that have to execute through using online ICT tools.

Research and advancement in methodologies is an important aspect to address the global sustainability. We are facing the impact of pandemics and natural calamity like “Nisarga” rainstorm. The studies are to be spearheaded to resolve the issues. Such e-Conference will surely provide platform for multidisciplinary forum to provide an insight into current scenario. I am sure that there will be sharing of research finding, technological advancements and new ideas in diverse facets of sciences. The COVID-19 pandemic across the globe and natural disasters has impacted every one of us. The e-Conference will be great resource for learning and teaching in the period of social distancing. **We will stay connected and move forward together!**

I hereby give my best wishes to Convener Principal Dr. Swati Wavhal, Organizers, the speakers and participants for the great success of this e-Conference!

Thank you one and all!

MESSAGE FROM THE DESK OF CONVENER



Dr. Swati Wavhal

Principal

Ismail Yusuf College of Arts,
Science and Commerce, Mumbai-60

It gives me immense pleasure and I am proud to welcome all the distinguished speakers and participants to the international e-Conference on “Emerging Methodologies in Pharma, Environmental and Life Sciences” (EMETHPELS-20), organized by the Botany, Biotechnology and Zoology department of Government of Maharashtra's Ismail Yusuf College. The college is celebrating its 90th Foundation Year, and to mark the occasion we have organized this e-Conference.

We at Ismail Yusuf College encourage interdisciplinary research and training for both students and faculty. They are dedicated to undertake research projects to obtain scientific knowledge for which we are well equipped with various sophisticated high-end instruments. Our endeavor is to nurture performance-based hands on training on these instruments to the undergraduate and post graduate students.

The various sessions and talks of eminent researchers and distinguished professionals in their respective field will certainly enrich and inspire young minds to find solutions to many global, environmental and health challenges. I am confident that this scientific congregation will provide valuable data and fresh perspectives on new methodologies and experimentation facilities. The conference will be very informative, productive and beneficial for researchers, academicians and students.

I appreciate and congratulate all my staff members at Ismail Yusuf College for taking this initiative and organizing e-Conference during this phase of social distancing and Covid-19 crisis across the globe. They have worked hard and made this conference possible.

I extend a hearty and warm welcome, and my best wishes to all the honored guests, participating delegates and all the faculty members of the college for the great success of this e-Conference and publications.

Thank you.

MESSAGE



Dr. V. N. Magare
Pro-Vice Chancellor SNDT Women's University, Mumbai

It's indeed a great pleasure to witness an International e-Conference being conducted in an unusual manner on the backdrop of Corona! Conference is an endeavor of coming together of the people to think, discuss, deliberate, decide and resolve on a issues which is of immense importance, common concern and common good to them in a rational manner and perspective. Because of prevalence of Corona though the people are moved by common cause and concern, can not come together physically for safety reasons. However, it does not deter the like minded and motivated people like teachers of 'ISMAIL YUSUF COLLEGE' from coming together! They have found out a new way to it, by establishing a dialogue via e-communication vis a vis e-Conference.

Corona has brought the entire humanity including the world of Science at the crossroads for not knowing as to which way one should go and fight and eradicate Corona, tackling it on fronts, of "prevention" and "cure" both these fronts are essentially methodological in nature and approach and as such demand discipline of high degree of precision and accuracy in managing and developing the means found to be effective and efficacious in curbing this pandemic, whether it be production of vaccine or disciplining the people.

For a scientist and the scientific world, the instruments, equipment's, apparatus, tools and techniques serve to a great extent the need of being precise and accurate in their endeavours in finding out answers to the research problems.

The Ismail Yusuf College strengthened with a band of teacher researchers have identified rightly the necessity of discussing this aspect of "sense of proportion" vis a vis precision and accuracy, that manifests into the principle of finding out "Satyam, Shivam and Sundaram" of Science by organizing an International e-Conference on "Emerging methodologies in Pharma, Environmental and Life Sciences".

Thereby, they have provided a platform to the scholar's world over to listen to the experts and authorities in their fields of work, study and training and also to reflect on, respond to, discuss and deliberate on the subjects under consideration. And also, to put up their own work for consideration and assessment of others.

I appreciate and congratulate the IY College, its teachers and the Principal for having organized this International Conference at an opportune time. I am sure that at the end of the Day every one associated with this conference, in any capacity, would find that there is something to be learnt and taken home, I wish all success to the organizers in their endeavour to make this conference a grand success!

Jai Hind!! Jai Maharashtra!!

KEYNOTE SPEAKER



Dr. Rakesh Kumar

Director, CSIR-NEERI, Nagpur, India
Ph.D (Env. Engg.), M. Tech (Env. Engg.)
IIT Mumbai, ISO 14001, Lead Auditor EARA-UK, RAB-USA

About the Speaker

Dr. Rakesh Kumar is Director of National Environmental Engineering Research Institute (NEERI), part of CSIR (Council and Scientific and Industrial Research). He completed his M.Tech in Environmental Science & Engineering from IIT Bombay in 1987 and later got Ph.D. in Environmental Engineering. He is also qualified ISO 14001 EMS auditor through RAB UK and EARA, USA. He is visiting adjunct Professor at CESE, IIT Bombay besides visiting faculty to Drexel University under Obama-Singh Education Initiative.

His main area of expertise is in development of appropriate technology for environmental quality improvement encompassing the field of air pollution, particularly vehicle pollution, hazardous waste management, waste water treatment and disposal besides Climate Change and Health related subjects. Urban environment management is another area where numerous works related to carrying capacity, urban heat island effect, waste management and water sector analysis have been carried out.

He has been awarded the best scientist award, 1994 for NEERI and nominated for CSIR Young Scientist Award, 1995, 1996. He is also the recipient of Commonwealth Commission Award, UK, in 1994. He has been awarded with "Environmental Leadership Award" by US Asia Environmental Partnership and US-AID for the year 2005 for outstanding contribution in improving quality of life for the population of Asia.

In NEERI, he has been awarded with best patent for the year 2005-2006. He has been also awarded distinguished personality by MIDC in August 2007 for his immense help in providing environment friendly direction to MIDC policies. He has been also awarded for Best Patent for Technology Patent by NEERI in 2008-09.

He has been given an award for largest number of technology transfer for low cost waste water treatment -PHYTORID in the year 2012. He has been given VASVIK award for 2012 for his exemplary work for urban environment improvement and sustainable technology "Phytorid" for sewage treatment for better environment.

He has ten patents on pollution control devices, of these two international patents, besides more than 83 papers in national and international Journals, 92 papers in national and international conferences. He has authored three Self Learning Books on various topics of Environmental Science and Engineering, one of them for Commonwealth of Learning, Canada.

He is member of various committees such as member of IAEA, Vienna on the use of radioisotope in surface water pollution studies, Auto Fuel Policy, GOI, Quality Committee of Indian Register of Quality System, IRS, various courts related PIL matter etc. He has worked on various assignments with many international agencies such as WHO, the World Bank, IAEA, UNEP, etc.

SPEAKERS OF THE e-CONFERENCE

Entry of Nanotechnology in Diagnostic arena

Dr. Madhuri Sharon

Director, Walchand Centre of Research in
Nanotechnology & Bio-nanotechnology, India



HPTLC and its applications

Dr. Melanie Broszat

Scientific Business Development Manager,
CAMAG, Muttenz, Switzerland

Enhanced Approaches to Analytical Method Development and
Management in Support of Forthcoming ICH Guidelines

Dr. Stephanie N. Harden

Market Development Manager, Pharmaceutical Development
and Manufacturing EMEA Waters Corporation Switzerland 03



Biopharma with Bioaccord

Dr. Guillaume Bechade

Biopharma Field Marketing Manager Fr St Quentin

Global Challenges in Environmental and Occupational Health

Dr. Arthur Frank

Chair Emeritus & Prof. in Medicine,
Drexel University, Philadelphia, USA



Small Stories Big Impacts: DNA in Life Science Research

Dr. G. D. Khedkar

Director, Paul Herbert Centre for DNA Barcoding &
Biodiversity Studies, Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad, India

CRISPR Genome Editing Technology

Dr. Jacinta Dsouza

Chairperson, School of Biological Science, CBS, Mumbai, India



Advances in Atomic Absorption Spectrophotometry

Dr. Anja Jungnickel

Analytik Jena AG, Germany

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Pollinators of *Rauvolfia tetraphylla* L.

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ABSTRACT

An investigation was conducted to determine the pollinator visiting the *Rauvolfia tetraphylla* L. Several pollinating insects were found to be visiting the flower of *R. tetraphylla* noticed during different times and season of flowering period. All different types of insect pollinators found on the experimental field were collected for identification. They were captured by a sweep net, digital camera and their behaviour noted. A total 37 species of pollinators of *R. tetraphylla* such as Butterflies, Bees, Sunbirds, Wasps and Flies were observed. They belonged to 16 families of 4 Orders, of which lepidopteran species contributed the highest percentage (56.76%) followed by Hymenopteran species (35.13%), Passeriformes (5.40%) and Diptera (2.70%).

Pollinators of *R. tetraphylla* essentially visited flower for rewards in the form of pollens or nectar or both. Hymenopteran insects visited for both nectar as well as pollen while Lepidopteran insects mainly butterflies for nectar only.

Keywords: *Rauvolfia tetraphylla*, Pollinators, Lepidoptera, Hymenoptera, Nectar.

Amalgamation of Fallen Dried Leaf Extracts from Trees with Essential Oil to Make Organic Soap

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ABSTRACT

Natural dyes have gained importance over the last decade as a substitute to synthetic dyes. Use of synthetic dyes are proven to be hazardous and many are reported to be carcinogenic. We often notice that leaves that have fallen from the trees or plants are treated as waste and are discarded. The use of fallen and waste leaves to make dyes may open up a new avenue for dye manufacturers. In the present study, dyes were extracted from leaves of *Terminalia catappa*, *Tectona grandis* and *Eucalyptus apodophylla*. These leaves are known to possess antimicrobial properties. The extracted dyes were subjected to TLC analysis to identify presence of pigments, various phytoconstituents and to check stability of the extracted colours. *Eucalyptus apodophylla* leaves were also used for extraction of essential oil. The extracted pigments were used in making soap along with essential oils.

Keywords: Natural dyes, *T. grandis*, *T. catappa*, *E. apodophylla*, TLC Analysis, antimicrobial Analysis, essential oil, soap making

Biosynthesis of Zinc Oxide Nanoparticles from *Biophytum sensitivum* and Its Applications

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ABSTRACT

Biological methods can be used for the greener synthesis of nanoparticles. Biosynthetic routes provide nanoparticles of better-defined size and morphology and are often clean, safe and cost effective. Among various nanoparticles, zinc oxide nanoparticles (ZnO NPs) are versatile semiconductors that display significant optical transparency and luminescent properties in UV-Visible regions. Zinc oxide nanoparticles (ZnO NPs) have become important in recent years due to their excellent chemical and thermal stability. In this project, zinc oxide nanoparticles were synthesized from the leaves of *Biophytum sensitivum* using 0.05 M Zn (NO₃)₂ solution. A white coloured powdered material was obtained as a result of synthesis. The synthesized nanoparticles have shown absorption peak at 360nm under UV Visible spectroscopy. The detailed analysis of the synthesized nanoparticles in the context of size, morphology and structure were studied using various techniques like scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray diffraction (XRD) and FT-IR. These biosynthesized nanoparticles have also shown antimicrobial activity against gram positive and gram-negative bacterial strains, which were carried out using agar well diffusion method. These Zinc oxide nanoparticles can also be used as a nano fertilizer in zinc deficient soil.

Keywords: Zinc oxide nanoparticles (ZnO NPs), *Biophytum sensitivum*, gram positive bacterial strains, gram negative bacterial strains, nano fertilizers.

Bioprospecting of Medicinally Important Herbaceous Weeds of Daund Tahsil From Pune District (M.S.), India.

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ABSTRACT

The bioprospecting of plants contributes greatly to environmentally sound development and return benefits to the indigenous tribal people or local people, who are the custodians of these resources. Weeds can be defined as the plant growing in the wrong places from farmer's point of view. In contrast to the cultivated plants, the weed is the invader and uninvited guest in any agricultural fields. Weeds are an excellent example of the successful struggle for existence. The agro ecosystems show association of various types of native and invasive weeds in crop plants. They are harmful as well as useful. Fortunately, majority of weeds are not harmful to cultivated plants with which they are associated. The present paper focuses on bio-prospecting of medicinally important herbaceous weeds collected from Daund Tahsil from Pune district (M.S.), India. Daund Tahsil lies in Pune district extend from 18° 18' to 18 ° 41' North Latitude and 74° 07' to 74 ° 51' East Longitude, covering an area of 1289.86 Sq.Km.. In the present investigation, information of 19 medicinally important herbaceous weeds to treat various common diseases was obtained. Each plant was studied with respect to its botanical name, local name, family name, morphological characters, plant part used in medicine and medicinal uses.

Keywords: Bioprospecting, medicinal plants, herbaceous weeds, Daund Tahsil.

Larvicidal Activity of Methanolic Extract of *Gossypium hirsutum* Linn. (Bt Cotton) Roots Against the Larvae of *Culex Spp.* Mosquitoes

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ABSTRACT

Mosquitoes have developed resistance to various synthetic pesticides and insecticides, making its control increasingly difficult. Insecticides of plant origin may serve as suitable alternative bio control techniques in the future. The present study was to evaluate the larvicidal activity of methanolic extract of *Gossypium hirsutum* L. (Bt cotton) against the fourth instar larvae of *Culex spp.* The methanolic extract shows the effective larvicidal activity after 48-hour exposure at 10000 ppm. Thus, *G. hirsutum* L. (Bt cotton) root extract has the potential to be used as an eco-friendly approach for the control of the *Culex Spp.* Therefore, the present study provides information on the mosquito larvicidal activity of plant extract.

Keywords: Larvicidal, cotton, *Culex spp.*, extract, insecticide.

Potential application of hydrocarbon degrading marine bacteria in biosurfactant production

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ABSTRACT

Major causes of pollution of marine environments are oil spills, shipping activities, effluents of petroleum industries, refineries, terrestrial and freshwater run-off. Evaporation, photo-oxidation or sedimentation of certain oil components are self-cleaning mechanisms in addition to bio degradation by marine microorganisms. Synthetic detergents used to clean up these hydrocarbon contaminants cause environmental damage. Biosurfactants produced by marine microorganisms, especially by bacteria are currently attracting the attention of researchers as these are capable of carrying out complete degradation of various hydrocarbons by increasing the bioavailability of these compounds including poorly soluble polycyclic aromatic hydrocarbons. Marine bacteria are commonly preferred over their terrestrial counterparts due to adaptability to extremes of environmental conditions, production of novel bioactive compounds and resistant enzymes. In the present study, different bacterial isolates were obtained from sea water samples collected from various locations such as Mumbai, Chennai, Uran beach near ONGC plant, Odisha and Goa. Zobell marine broth and Zobell marine agar were used for enrichment and isolation of bacterial isolates respectively. Most of these isolates showed positive haemolytic test but only 15 isolates gave remaining tests positive. Maximum reduction was observed with isolate no 22 (29.36mN/m) which was compared with the control culture broth (73.36mN/m). It was found that these 7 bacterial isolates also showed good positive results for drop collapse test and oil spreading test. In future microbial biosurfactants can be produced on large scale using cheaper carbon sources such as agricultural and industrial waste and can be used for bioremediation purpose.

Keywords: Biosurfactants, hydrocarbon degradation, surface tension reduction.

Virtual Labs: An Effective Tool in Education

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ABSTRACT

The present paper deals with various aspects of application of virtual labs. These labs integrate the ICT tools in the subjects of science, technology and engineering. As a new technological approach, they provide a good platform for online distance learning in various disciplines of Science and Engineering. During the situation of COVID-19 pandemic lockdown, when learner from the virtual-education community cannot use his skills factually in the labs, the virtual labs stand one of the best emerging tools that can overcome some of the potential difficulties in the education sector. These labs exercise to provide effective skill acquisition and hands-on experience. They are widely multidisciplinary in character useful for students of all grades, teacher and research scholar. These labs may be built either by enabling the real lab for remote access or replicating as a fully software-based virtual lab. The latter concept offers advantages over remotely controlled real labs. Providing audio and video streaming of an actual lab experiment and equipment to the students make virtual labs more effective and realistic. Students can also remotely trigger an experiment in an actual lab and obtain result of the experiment through the computer interface. Modeling and carrying out simulations provide a version of the 'real-world' experiment.

Keywords: Virtual labs, online learning, multi-user virtual environments, modeling, skills

Some endemic flowering plants of Rajapur area of Ratnagiri district

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ABSTRACT

Rajapur area of Ratnagiri district was surveyed for herbaceous endemic plants during year 2019-2020. During this survey most endemic plants were located from lateritic plateaus areas of Rajapur viz. *Aponogeton nateshii*, *Corynandra elegans*, *Camptorrhiza indica*, *Ceropegi aananti*, *C. oculata*, *Eriocaulon rayatianum*, *Glyphochloa ratnagirica*, *Iphigenia magnifica*, *Wiesneria triandra*, etc. Some of flowering plants have been described after the name of Konkan region and these plants are also located from Rajapur area viz. *Amorphophallus konkanensis*, *Dipcadi concanense*, *Eleocharis konkanensis*, *Euphorbia concanensis*, *Trithuria konkanensis* etc. Present work includes the prepared checklist of 43 herbaceous endemic flowering plants species of Rajapur area of Ratnagiri district (Maharashtra).

Keywords: Endemic plants, Konkan, Rajapur, lateritic plateaus

Effect of Lockdown on the Environment

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ABSTRACT

This research aims to show the negative and positive effects of Lockdown on the environment. Economics crisis is one of the major effects of Lockdown on the environment. Because of the pandemic situation of coronavirus, all the work is at a halt. The virus has slowed down all the economic activities, and the whole world is going through serious economic crisis. People are in their homes due to the Lockdown and so, in such a situation, the use of domestic energy is increasing. This also becomes one of the major effects of Lockdown on the Environment. In the Lockdown period the whole world has shutdown schools, factories and shops, hence the emission is expected to fall along with low oil demand. The people are going through huge losses due to this Lockdown and it is the major effect of Lockdown on the environment. But Lockdown is only the solution to prevent the spread of coronavirus. But, interestingly there are some positive effects of Lockdown on the environment. The water of sea and rivers is much cleaner and unpolluted than they have been in living memory. When the massive number of tourists visit the beaches, they often pollute the sea water by throwing garbage, swimming and use of motorboats for water sports. Now the clean unpolluted water is beneficial for marine life. During the Lockdown period air pollution dropped suddenly all over the world. This being one of the major positive effects on the environment because of the coronavirus outbreak. As several factories are temporarily shut down and only emergency vehicles are seen on the road; probably, that is why the whole world is pollution free. The present generation, is for the first time subjected to witness such a dramatic change in the environment. So, we may live without food for some weeks and even without water for some days but definitely cannot live without air even for some minutes. Hence in some way or the other the Lockdown is good for the environment.

Keywords: Effect, Lockdown, Coronavirus, environment, crisis, pollution.

A novel method for extraction of Biopolymer [Polyhydroxy-alkanoate - PHA] from kitchen food waste

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ABSTRACT

Over 70% of city's garbage is food waste. According to BMC's latest Environment Status Report, of the 9400 tonnes of trash in the dumping grounds, 73% comprises of food, vegetable, and fruit waste. Food disposed into landfills, rots to become a significant source of methane - a potent greenhouse gas with 21 times the global warming potential of CO₂. Growing and transporting the food that becomes waste causes carbon pollution as 39 million passenger vehicles. The aim of this study was to focus on an eco-friendly production of Polyhydroxy Alkanoate (PHA) at a laboratory scale using complex kitchen waste and common laboratory microbial species like *Bacillus subtilis*. The tremendous amount of food waste from diverse sources is an environmental burden if disposed of inappropriately. Thus, implementation of a bioremediation platform for food waste is an ideal option to pursue by production of value-added products while reducing the volume of waste. The adoption of such process is expected to reduce the production cost of biodegradable plastics (e.g., compared to conventional routes of production using overpriced pure substrates (e.g., glucose). Our research study was focused on the utilization of domestic kitchen food waste for production of Biopolymer. An effort was made to standardize a method for PHA production at the laboratory scale using chemical methods and enzyme technology, and were able to get a recovery of around 40%-90% biopolymer using the modified techniques. The samples with better recovery were sent for infrared (FT-IR) spectroscopic analysis to identify the presence and purity of the PHA in samples.

Keywords: Polyhydroxy Alkanoate (PHA), food waste, biopolymer, FT-IR, enzymes, bioremediation.

Application of Analytical Techniques in Forensic Science: A Review

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ABSTRACT

Forensic Science is an application of all branches of science which helps in crime investigation. It is also known as Science for Justice. Forensic science is application of chemical, physical and biological sciences. Chemical science includes analysis of narcotic drugs, explosive, chemical and toxicology, Physical science includes ballistics, document examination while and biological sciences include biological fluid detection and DNA analysis.

Analytical techniques like GC, GC-MS, GC-HS, HPTLC-Densitometer, HPLC, LC-MS, EDXRF, UV VISIBLE spectrophotometer, FTIR... are used in forensic science. Analysis of crime exhibits is again a challenge to forensic scientist as purification and extraction is required, hence modern techniques like GC, HPLC, GC-MS help in separation, identification and quantification of organic compound present in crime exhibits. Similarly, non-destructive techniques like EDXRF, Raman spectroscopy are very useful when trace quantity of crime exhibit is available. The DNA finger printing helps in paternity, unknown person identification and sexual offences. Scanning electron microscope, velocity analyzer are modern tools for ballistics examination. VSC 5000 helps in the document examination. In the present paper, application of analytical techniques used in Forensic Science is discussed.

Keywords: Forensic Science, analytical technique, chromatography, spectroscopy, explosive analysis, narcotics.

Synthesis, characterization and application of silver nanoparticles as enzyme immobilization matrix

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ABSTRACT

Enzyme immobilization is gaining considerable interest due to the number of advantages over its use in industrial production of variety of products including value added food products, drug and additives. The present study elaborates the green synthesis of silver nanoparticles (AgNPs) and their application as anti-bacterial, anti-cancer, free radical and dye scavenger. The AgNPs were also exploited as enzyme immobilizing matrix for inulinase, *L-asparaginase* and glucose oxidase peroxidase. In this study, AgNPs were synthesized using *Azadirachta indica* (Ai) and *Punica granatum* (Pg) aqueous leaf extracts. These AgNPs were characterized using UV-Vis spectrophotometry (surface plasmon resonance), FTIR, SEM, AFM and EDX analyses. Dynamic light scattering was used to study the average hydrodynamic sizes of both the nanoparticles. Both particles are spherical in shape with average size of 76.4 nm for Ai-AgNPs and 72.1 nm for Pg-AgNPs. The average hydrodynamic size of inulinase immobilized AgNPs was of 145 nm. Pg-AgNPs showed significant photocatalysis of methylene blue dye. Both the nanoparticles showed effective antibacterial activity against food borne pathogen *Bacillus cereus* but were observed ineffective against probiotic *Lactobacillus* strains. Pg-AgNPs were found significant anti-cancer against human colon cancer cell lines (Caco-2) resulted in 40 % cancer cell inhibition in 48 h. Pg-AgNPs were used as immobilization matrix for inulinase, *L-asparaginase* and glucose oxidase enzymes during the synthesis of AgNPs. Recycling study revealed that the inulinase immobilized AgNPs were stable over 4 successive cycles of inulin hydrolysis. In a nutshell, the study elaborates AgNPs as relatively new enzyme immobilization matrix having antibacterial and anticancer properties for immobilization of food grade enzymes.

Keywords: Silver nanoparticles, inulinase, antibacterial, anti-cancer, radical scavenging

Effect of Valproic acid on the regeneration process of *Eisenia fetida*

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ABSTRACT

Valproic acid has been proved as a promising epigenetic drug for cancer. Valproic acid is an HDAC inhibitor that comes under class I. It induces hyperacetylate at H3 and H4 where in H3acetylation takes place at the p21 promoter region thus suppresses the phosphorylation of Retinoblastoma gene, blocking transcription of E2F gene and the cell is arrested at G0/G1 phase. It also activates CDKN1A gene which encodes for cyclin dependent kinase inhibitor p21 which decreases the concentration of Cyclin-CDK complex and cell cycle is arrested.

During regeneration in earthworms, steady and controlled division of cells is required, the accurate balance of CDK proteins required for it. The effect of valproic acid during the segmental regeneration of earthworm was studied. We proposed that valproic acid will slow down the process of regeneration as long as doses are administered. To prove our hypothesis, regeneration assays, that is amputation of earthworms with the administration of various concentrations of valproic acid were done. Also behavioural assays were performed on earthworms, to check the neuronal regeneration time to restore behavioural response towards 300mM NaCl solution with the administration of various concentrations of Valproic acid. Two concentrations were used 1mM and 3mM. For human dose, it was found that 1mM is an effective drug whereas in 3mM the cell lines viability was found to be almost zero. More the concentration, lesser the rate of regeneration was observed. In the future, by administering various concentrations of valproic acid and performing histological assays and western blotting we can develop earthworm as a simple model organism to test various anticancer drugs and to understand the role in oncological studies.

Keywords: CDKN1A gene, histone proteins, regeneration, Cyclin-CDK complex, valproic acid

Study of the Teratogenic Effects of Herbicide Glyphosate on Chicken embryo *Gallus gallus domesticus*

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ABSTRACT

Pesticides can benefit the crops but can seriously harm the environment. Glyphosate is the most widely used herbicide in the world. There has been an ongoing debate about the adverse effects of Glyphosate on humans and environment. Several studies suggest the neural defects and cranial abnormalities during development in animals from the areas where Glyphosate based herbicides (GBH) are widely used. The purpose of this study is to have an embryological approach in determining the harmful effects of low concentrations of glyphosate in chicken embryo development. Eggs of *Gallus gallus* were injected with several concentrations of commercial glyphosate herbicide and incubated. The treated embryos showed high amount of abnormalities in cephalic development, stunted eye development and decrease in mass as compared with the control uninfected embryos. This suggests that glyphosate is responsible for causing alteration in the phenotypes. Range test showed that the lethal concentration of glyphosate was 1 ppm. The number of abnormalities observed was directly proportional to the concentration of glyphosate injected. With high concentration, the viability of the embryos decreased. Parameters like eye-diameter of the embryo, length, and weight were directly proportional to the concentration of glyphosate.

Keywords: Glyphosate, chicken embryo, teratogenic effects

Assessment of Resident and Migratory bird species in Bhigwan Bird Sanctuary, Maharashtra

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ABSTRACT

"Assessment of resident and migratory birdspecies in Bhigwan Bird Sanctuary, Maharashtra" topic was taken for the present study. Bhigwan Bird Sanctuary is located on Pune-Solapur Highway. The assessment of birds was done during the period of November 2019 to March 2020 to observe, identify and determine the bird species diversity. This wetland area, nearby grass lands and agricultural fields provide large area for foraging, hunting and straining for food and water. It also supports nesting and roosting grounds for variety of resident as well as migratory bird species.

All birds were observed at fixed locations using binocular (10x25 Compact Folding Binocular Telescope, Brand: Tom Best) and photographed using Nikon Camera. Identification of birds' species was confirmed by reference books and by expertise.

Forty-Four bird species belonging to twenty-nine families were recorded. The names of the birds found in this sanctuary are Painted Storks, Bar headed Geese, Demoiselle cranes, greater Flamingo, Eurasian Spoonbill, Great Stone Plover, Yellow wattle Lapwing, three varieties of Kingfisher, two varieties of Owl, Rosy starling, Snipes, Harrier, Tern, stint, Dove, Stone Curlew, Roller, Pea Fowl, Greater Spotted Eagle, shrike, Crane, Francolin, Redshank and the fastest bird the Peregrine Falcon. The critically endangered bird species Sociable Lapwing was found in this sanctuary.

The observations showed that this area supports common to critically endangered species of the birds. The sanctuary is open for tourism, It may be suggested that some areas of the sanctuary especially for migratory birds be preserved from human interference and hence it will be conducive for increasing and preserving bird population.

Keywords: Resident Bird, Migratory bird, critically endangered species, wetland.

Study of HPTLC Fingerprinting, Antimicrobial activity, Antioxidant activity, Antifungal activity and Phytochemical analysis of *Spermadictyon suaveolens* Roxb.

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ABSTRACT

Spermadictyon suaveolens Roxb. is a member of the family *Rubiaceae* also known as Ban champ or Jitsaya. Traditional medicinal practitioner uses it to treat diabetes, skin irritation, diarrhea as well as rheumatoid arthritis.

The HPTLC study was carried out to develop chemical fingerprint. Solvent system of toluene: chloroform: ethanol (4:4:1) was used along with anisaldehyde sulphuric acid. Another, HPTLC fingerprint for flavonoid profile was developed using solvent system of toluene: chloroform: ethanol (4:4:1) and was derivatized in DPPH (2,2-diphenyl-1-picrylhydrazyl) The antioxidant activity of all separated flavonoid fractions was evaluated using DPPH (2,2 Diphenyl-1-picrylhydrazyl). Four flavonoids fractions exhibited excellent antioxidant activity. Antibacterial activity of stem extracts was studied using well diffusion method and extracts have shown good antibacterial activity against gram negative, gram positive bacteria as well as fungal infection. Various phytochemicals were found to be present in different extracts of stem of *Spermadictyon suaveolens* Roxb.

Keywords: HPTLC, antioxidant, DPPH, phytochemicals

People Participation to Save Chinese Ferret Badger-An Investigation in Dooars Region of West Bengal Through Visual Encounter Survey (VES)

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ABSTRACT

Chinese Ferret Badger (*Melo gale moschata* Gray, 1831) Family *Mustellidae* widely distributed in South East Asia and listed in schedule I Part I of Indian Wildlife (Protection) Act. Up to date literature specially by Zoological Survey of India suggest that in India its distribution is restricted in North Eastern Part of India especially Naga hills. Since Dooars region of West Bengal having intricate connection with Assam state, visual encounter survey (VES) was conducted from July 2010 to November 2013, basically in erstwhile Alipurduar subdivision and Malbazar subdivision of Jalpaiguri District. As part of survey we approached the forest villagers and tea garden workers of Kumar gram, Kalchini, Alipurduar Block I, Madarihat, Falakata, Malbazar, Meteli and Nagrakata as they are always in contact with forest areas which is the ideal habitat of this nocturnal creature of the Universe. Altogether, 2665 respondents were interviewed about the occurrence of Chinese Ferret Badger in their surrounding directly or indirectly. Surprisingly, 77.86% respondent put positive consent. Since Chinese Ferret Badger still are not having any identified detrimental role in human society, moreover they play positive role by killing insect and rodent pest, species specific comprehensive conservation programme is recommended for the safeguard of this species. Our survey also highlights initiative of mass awareness programme as a matter of urgency specially for tribal's who are taking the flesh of the Chinese Ferret Badger as a source of food, fur and medicine.

Keywords: Conservation, Visual Encounter Survey, nocturnal, fossorial.

Studies on Role of Trichome Density in Foliar Dust Retention

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ABSTRACT

Urban plants play a vital role in monitoring and controlling Air Pollution in busy cities like Mumbai. Morphological peculiarities of urban plants facilitate them to reduce the dust pollution significantly. The current study is an attempt to determine the correlation between foliar trichome density and dust capturing capacities of some selected plant species in Mumbai. Dust was studied by using a previously constructed Dust Chamber and artificially blowing dust. Dust Fall Index (DFI) and Dust Retention Index (DRI) of selected plant species were calculated. The plants having a greater number of trichomes showed higher dust capturing capacities. Following plants showed remarkable dust capture with respect to their Trichome density *Nerium odorum* Aiton., *Hyptis suaveolens* (L.) Poit., *Malachra capitata* Linn., *Calotropis gigantia* (L.) W. T. Aiton., *Ficus hispida* L.f., *Ziziphus jujuba* Mill and *Ricinus communis* L.



Figure 1. Dust Chamber

Keywords: DFI, DRI and Trichome density.

Ficus johannis Boiss. Subsp. *afghanistanica* (Warb.) Browicz.: A New Report to the Flora of Maharashtra State, India

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ABSTRACT

Ficus is one of the most diverse and largest genus in angiosperms with 850 species (Berg & Corner, 2005; Chaudhary *et. al.* 2012 & Sudhakar *et.al.* 2017) of family *Moraceae* commonly known as 'figs' predominantly found in tropical and subtropical regions of the world. The Asian and Australian regions are the richest in occurrence with 500 species followed by Africa and the America. In India, still it is represented by 115 taxa (approximately 89 species with 26 infraspecific taxa; Roxburgh (1832), Chaudhary *et. al.* (2012) & Sudhakar *et.al.* (2017). Maximum diversity of *Ficus* species in India is found in the Northeast region followed by Peninsular region and the Andaman & Nicobar Islands. As per the existing classification, Indian species of *Ficus* belongs to all six subgenera under 12 sections and 15 subsections (Tiwari *et al.*, 2014). In Maharashtra State the *Ficus* species are represented by 22 species (Flora of Maharashtra State Vol. II Singh *et al.*, 2001).

The present paper gives a new distributional record of *Ficus johannis* Boiss. subsp. *afghanistanica* (Warb.) Browicz., of *Moraceae* family for Maharashtra states. It also deals with detailed description to facilitate easy identification and the ecological notes with reference to conservation, special habit, flowering & fruiting period.

Keywords: New report, *Ficus johannis*, *afghanistanica*, Maharashtra, India.

Study of Ex-situ Phytoremediation potential of native plant species to different heavy metals

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ABSTRACT

Laboratory scale pot experiment was conducted to study the Phyto remedial potential of three native plant species *Alternanthera sessilis*, *Ipomea carnea* and *Paspalum conjugatum* from Mumbai region. The four cuttings from each plant species were sown at equidistance in each pot containing 2kg of soil and vermicompost in 2:1 ratio. After acclimatization and sufficient growth of plant for 6 weeks, the pots were treated with Cr, Fe, Ni, Cu and Zn in the concentration of 25ppm, 50ppm and 100 ppm for 60 days. The harvested soil and plant material separated into roots and shoots dried 70°C and ground into a fine powder. The heavy metal concentration was detected by an acid-digestion method using ICP-AES. Bioaccumulation Factor (BCF) and Translocation Factor (TF) of *I. carnea*, *A. sessilis* and *P. conjugatum* were also studied to evaluate their potential for phytoremediation. The results show that all these three plants have great potential to withstand at high concentration of Cr, Fe, Ni, Cu and Zn. The sequence of tolerance and accumulation are Fe>Zn>Cr>Cu>Ni and *P. conjugatum* has more potential than *I. carnea* and *A. sessilis* to accumulate these heavy metals. These plant species can be utilized for phytoextraction of these metals and can be used to construct artificial wetland to treat the industrial wastewater and soil.

Keywords: Heavy Metals, phytoremediation, *Alternanthera sessilis*, *Ipomea carnea*, *Paspalum conjugatum*

Impact of Covid-19 on the Environment

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ABSTRACT

After World War II, mankind faced the most hazardous, deadly and crucial pandemic outbreak which threatened mankind. The COVID-19 is considered as the most drastic global health issue. A new infectious disease had emerged in Wuhan, Hubei part of China, was further named by the World Health Organization as COVID-19 (Coronavirus Disease 2019). The causative organism was identified which is able to target the respiratory system causing the respiratory difficulties. This was found to be a new class of Coronavirus, known as SARS-CoV-2 and found to be responsible for the respiratory disease which has spread globally. According to the WHO, 6080963 are confirmed cases and 431192 deaths over time occurred (WHO as of 1 June, 2020). Though mankind is threatened by this pandemic outbreak, there have been some beneficial impacts on the environment. This research is totally based on the positive and negative impact of COVID-19 on the environment. The study emphasizes the difference in the environment before and after the outbreak of COVID-19. This paper includes the positive impact such as improved air quality, clean water, lakes and beaches, reduced noise pollution as well as negative or secondary aspects like the reduction in recycling, increased medical wastes, etc. The study also helps to reduce further endangering and activities in the environment and to live simple life without over disturbing the environment.

Keywords: COVID-19, Impact, pandemics, global health, environment

Bio- Pesticides in Mosquito Control

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ABSTRACT

Mosquitoes have always been mankind's dangerous enemy. Conventional chemical pesticides provide quicker kills and subsequently are highly effective in controlling the target pest populations. Needless to say, due to their heavy residual toxicity, their overuse predisposes mankind to a more serious health hazard by way of contaminating his water, his land and even the air that he breathes. As alternatives to conventional chemical pesticides, bio-pesticides reduce the selection pressure for the evolution of pesticide resistance in pest besides offering a host of benefits. The mosquito larvicidal and growth regulating activity of neem has been widely established and acknowledged. On the other hand, synergistic effects of the extracts of *Annonas quamosa* and *Pongamiaglabrain* mosquito control is less evidenced. The laboratory colonized mosquito larvae were subjected to different concentrations of the extracts of neem, *Azadirachta indica* (N 100 %) independently and *Annona squamosa* (A) and *Pongamia glabra* (P) combined in as A 50 % : P 50 % so as to evaluate the sensitivity of the early fourth instar larvae of *Culex quinquefasciatus*, *Anopheles stephensi* (Liston) and *Aedes aegypti*(L.) by conducting 'Acute Toxicity' tests. The orders of the 'species susceptibility' for both the extracts were as follows: Ae. aegypti> C. quinquefasciatus> An. stephensi. The 'A 50 %: P 50 %' extract was significantly more effective than the 'N100%' extract, suggesting a suitable substitute to 'Neem'

Keywords: Bio-pesticide, Phyto pesticides, biocontrol.

Statistical analysis of air pollutants during lockdown period of Mumbai city

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ABSTRACT

According to WHO report, 80 % population residing in urban areas are affected due to the air pollution and recognized as risk to public health problems. Keeping this in view statistical analysis of air pollutants in and around Mumbai city was carried out in the present study, from January 2020 -May 2020, using Microsoft Excel 2007 and Statgraphic Centurion. Air pollution data was collected from Maharashtra Pollution Control Board site. Five locations selected for the study were: Powai, Kurla, Sion, Worli and Nerul regions. The study included: to find out the average concentration and percentage of reduction of air pollutants, ANOVA using two factor and multivariate including coefficient of correlation and cluster analysis. Results revealed 50 percent reduction in air pollutants in all five locations and a strong relationship observed with reference to Particulate matter and NO_2 . During lockdown period ozone showed positive correlation with Particulate matter indicating emergence of secondary pollutant in absence of primary pollutant NO_2 . Cluster analysis using dendrogram depicted formation of one cluster indicating common source of emission with reference to the air pollutants. The present study indicates that with minimal traffic, closed industries, absence of construction work, air quality has improved but complete lockdown is not the solution to get cleaner air. Thus, we need to look for solutions which could improve air quality in a sustainable way.

Keywords: Lockdown, air pollution, Maharashtra Pollution Control Board

Variability in Some Groundnut (*Arachis hypogaea* L.) Cultivars on The Basis of Biochemical Analysis

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ABSTRACT

Groundnut (*Arachis hypogaea* L.) is an important legume cash crop for the tropical farmers. The unique feature of this plant is of quick adaptability to wide variety of climatic condition. Groundnut contains 50% edible oil, 28% digestive protein and 20% carbohydrates. It is dietary source of vitamin E, phosphorus, Mg, Ca, Zn, Fe, riboflavin and potassium. It is used as diet of animals in the form of seed, fodder hay and straw. Biochemical analysis is rapidly expanding field and is a key component of modern drug discovery. Peanuts are the rich source of organic and inorganic components. To investigate contents of agronomical importance the biochemical characters of groundnut in 6 varieties named as JL-501, JL-977, JL-24, JL-286, JL-220, JL-578 were studied. Groundnut is one of the most important legume crops which is good dietary source of carbohydrates. Legumes contain higher amount of fats. Proteins are one of the major nutrients in the human diets Nitrogen is one of the iPhenol are one of the most important secondary metabolites which provide a defensive mechanism to plant and its parts against fungal pathogen, important key factors which regulate the yield of crops. In our present research program we examined nutrient composition of seeds and observed that almost all varieties may be used and may serve as promising variety in developing a new hybrid by taking crossing program. From our results, it may be concluded that cultivar JL-286, JL-501, JL-220 possesses rich source of all nutrient material. Hence, all these varieties might be more beneficial to farmers for getting a good yielding variety with more nutritive characters.

Keywords: *Arachis hypogaea*, biochemicals, leguminous plant, nutritional value.

Physicochemical and phytochemical investigation of *Nymphaea nouchali*

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ABSTRACT

Nymphaea nouchali stem extracts and its dissolvable fractionates were exposed to physicochemical and fundamental phytochemical screening utilizing standard tests. The present investigation manages the phytochemical examinations of *Nymphaea nouchali* stem including physicochemical analysis. The subjective chemical assessments uncovered the nearness of different phytoconstituents like curcumin, flavonoid, terpenoid saponins, phenolic mixes, sugars, tannins and glycosides in the stem extracts of the plant. The existence of different bioactive segments affirms the use of *Nymphaea nouchali* for different diseases by customary experts. The investigation exposed the individualities for the specific crude drug which will be helpful in distinguishing proof and control to debase of the raw drug.

Keywords: *Nymphaea nouchali*, physicochemical analysis, extraction techniques, phytochemical screening

Index Based Bio-Monitoring Using Macroinvertebrates

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ABSTRACT

The present study is an attempt to generate information on comprehensive water quality assessment and macroinvertebrate biodiversity of the River Vainganga in Gondia district using trophic dynamics and the sensitivity of macroinvertebrates to the pollution – an aspect of bio-monitoring. Different levels of sensitivity of the macroinvertebrate species to different abiotic factors determined their assemblages and diversity. A perusal of spatiotemporal results suggested by FFGs, %EPT, BMWP and ASPT scores indicated very good river water quality, acceptable for all purposes. These indices proved to be the emerging and significant tools, providing an important insight into the health of the river and append the knowledge and understanding of the management strategies. The higher values of %EPT and BMWP and ASPT scores at upstream sites than downstream sites and dominance of sensitive species indicated very good water quality. The percent composition of functional feeding groups indicated dominant predators followed by collectors, shredders and scrappers revealed clean and good conditions of the river. The number of macroinvertebrate families encountered was normally higher during winter followed by summer and monsoon. This study offers an essential step to address the consequences of present and future threats of contamination and provide a basis for future action at all levels. These indexes intended for an ecological integrity assessment of biodiversity of macroinvertebrate fauna which in turn provided useful bio-indicators of bio-monitoring approach in order to provide a complete spectrum of information for appropriate water management of freshwater bodies.

Keywords: Biotic indexes, trophic dynamics, biodiversity, water quality, River Vainganga

Phyto chemical screening and antibacterial Activity of Hibiscus *Rosa sinensis* leaf extract

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ABSTRACT

In the present study, fresh leaf extracts of Hibiscus *Rosa sinensis* were prepared of various classes of phyto chemical by subjecting to different tests. Results revealed that all the extracts of Hibiscus contained alkaloids, flavonoids and tannins, saponins terpenoids were absent in all the leaf extracts of Hibiscus. Extraction of Hibiscus was high in ethanol than methanol and distilled water extracts. Bioassay results revealed that crude ethanol of Hibiscus leaves exhibited antibacterial activity only against *Staphylococcus aureus*, and *E. coli* compared to 10% and 5% extract concentration by using agar cup method. Thus, the presence of bioactive phyto chemical could lend the antibacterial potency to the Hibiscus leaves and therefore, could be utilized not only for their high nutritional value but also as a medicinal plant.

Keywords: *Staphylococcus aureus*, *Escherichia coli*, nutrient agar, agar cup method.

Medicinally important *Ganoderma* species from Amravati region

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ABSTRACT

India has a rich treasure of natural resources and macromycetes is one of them. Studies on wild mushrooms with special reference to their edibility, utility and medicinal value with the early references on larger fungi may be beneficial for humanity. Amravati is endowed with Satpuda ranges. It is surrounded by Melghat Tiger Reserve Forest and Pohara Forest. Due to suitable geographical and favourable climatic conditions, wide and rich mycoflora is hidden in these regions. As yet, this remains unexplored. Many periodical surveys were conducted of Amravati region for mycofloristic studies. During surveys, two medicinally important *Ganoderma* species were reported from Amravati region. These species are-*Ganoderma lucidum* and *Gannoderma applanatum*. These two species are very common and were collected from Melghat, Pohara forest and nearby Amravati region. Both the species are wood decaying and found on stems of *Acacia*, *Delonix*, *Caesalpinia*, *Tectona*, *Tamarind*, *Azadirachta*, *Butea* and *Ficus* species. These *Ganoderma* species are valuable due to the variety of its biological activities such as anti-tumor, anti-viral, anti-HIV, anti-hepatotoxic, cardio vascular and immunomodulating properties. Collected specimens were deposited in the Botanical Museum, Department of Botany, Shri Shivaji Science College, Amravati.

Keywords: *Ganoderma* species, medicinal properties, Amravati region.

Study of Histopathology of some tissues of *Macrobrachium rosenbergii* (de Man), exposed to pesticides, Chlorpyrifos and Dimethoate, individually and synergistically

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ABSTRACT

Macrobrachium rosenbergii (de Man), the giant freshwater prawn, occupies an important place as a culture aquatic organism only next to the Indian Major Carps(IMC), especially in the riverine regions of coastal India. The prawns grow to a length of 12 inches or more, the males being longer and identified by their long blue chelae. They live in almost all freshwater bodies and descend into brackishwater regions to breed. The Post Larvae (PL) and juveniles ascend the rivers again, to reach freshwater regions. On their upward journey, they enter streams, rivulets, fields, mangroves, ponds and other freshwater bodies. It is in this region that many fishermen collect them for the purpose of selling them as seed to farmers for their culture. The Vaitarna River is one such place which is the habitat of the giant freshwater prawn *Macrobrachium rosenbergii*. This River has its origin in the Trimbak Hills in Nasik District in North West Maharashtra and empties into the Arabian Sea. On their ascend up the river the juveniles enter banana plantations and rose nurseries on the banks of the River Vaitarna. These plantations and nurseries use the organophosphorus pesticides Dursban (Chlorpyrifos) and Rogur (Dimethoate), to control pests on the farms at various intervals. The pesticides affect the growth, physiology and body metabolism of the juveniles and adult which are actually non-target organisms and also enter the human food chain to cause disturbances in body metabolism, since they are harvested after the rains and sold in the local markets. Therefore, the present study is an attempt to assess the damage to the gills, hepatopancreas and nerve fibres of the prawn *Macrobrachium rosenbergii* were exposed individually and in combination (synergistically) to Chlorpyrifos (C) and Dimethoate (D), namely C:D (1:1), C:D (1:3) and C:D (3:1). The histopathological study revealed significant damage in the tissues caused due to the pesticides, more observed in combination than individual exposed prawns.

Keywords: *Macrobrachium rosenbergii* (de Man), Chlorpyrifos, Dimethoate, Individual, synergism, histopathology, gills, hepatopancreas, nerve fibres.

Blood Cancer (Leukemia) New Pentostatin Analog (Br, CH₂OH, CH₂CH₃) Design Through Binding Affinity Calculation

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ABSTRACT

Leukemia is a cancer of blood forming tissue also known as blood cancer. Now a days molecular modeling method has been used for modeling a new molecule for blood cancer. PENTOSTATIN is a drug that is already designed and used against many cancer conditions. The present study provides a working drug of developed software with much heavier and complex function. The result of a drug designing greatly benefits to the whole bioinformatics community. For this work Pentostatin analog was used to check binding activity against blood cancer. We use a HYPERCHEM software for drawing of this drug and also used for modification of drug by replacing different functional groups like BR, CH₂OH, CH₂CH₃ at R group position. Molecule designed as such were optimized using different algorithms and their affinity was checked with protein. The binding free energy of the protein was calculated by performing docking process. The docking process was done with the help of GOLD software. The molecule with minimum binding energy will have the maximum binding affinity. Thus, from the results obtained it is clear that ligand "(CH₂CH₃, i.e. 152.010)" has the maximum binding affinity and this molecule is determined as the best lead molecule target computationally.

Keywords: Drug design, cancer, molecular modeling, computational analysis, bioinformatics

Species of Mushroom Found in Ismail Yusuf College Campus

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ABSTRACT

Ismail Yusuf College, is a prestigious and multi faculty college. It is the fourth oldest college of Mumbai. "IY College", as it is popularly known, is managed by Government of Maharashtra. It is the oldest college in North Mumbai. It was established in 1930 with a large donation from Sir Mohammed Yusuf Ismail, K.T. on Jogeshwari Hill.

The campus enjoys immense beauty of nature with innumerable Banyan, Palm, Mango and other trees. Rippling brooks and glittering ponds in the rainy season. Campus of Ismail Yusuf College is Semi Evergreen as it was a part of Sanjay Gandhi National parks Flora and Fauna. College campus also has ponds, small streams. A dense forest was constructed at Ismail Yusuf College by using Japanese Technique known as Miyawaki. In this dense forest 200+ different species of plants are present. Temperature tends to stay a little lower than the city because of a large green cover. During winters, dense fog can be seen and night temperatures below 20°C is common. Due to its natural green cover and presence of lake and elevation to some extent, rainfall varies greatly as what the city sees. The most southern part of the city (Colaba) receives an average of 2200mm of rainfall annually, the northern part (Santacruz) receives 2500 mm and the College campus, which is just 7 km away from Santacruz, receives more than 2800 mm annually. During rainy season many different species of Inedible Mushrooms are found throughout the College campus. They are as follows: *Pleurotus ostreatus*, *Lepiota cristata*, *Polystictus*, *Ganoderma lucidum*, *Clavulina cristata*, *Marasmius mushroom*, *Pycnoporus cinnabarinus*, *Clavulinopsis laeticolor*, *Stemonitis splendens*, *Agaricus bisporus*.

Keywords: Biodiversity, mushrooms, fungus campus

The Application of Pollen Physiological Properties as a Tool for Monitoring the Status of Environment Contamination

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ABSTRACT

Pollen grains act as a male gametophyte and are the male partner in sexual reproduction. Pollen with good viability and germination ability is necessary for productivity and vigour. But pollen grain as a gametophyte is very susceptible to its surroundings and depicts the deviation from its normal physiological behaviour.

The survival of growing world population is supported by the supply of agriculture products. Amongst the various agricultural products, the seed crops are much significant. The successful assumed yields of the crop depend on the physiological qualities of the pollen grains. But it was reported that applications of some agrochemicals including insecticides, fungicides, herbicides, rodenticides, molluscides, and nematicides adversely affect the pollen physiology. The reports on fungicide application (2011) showed the reduced percentage of pollen germination and length of germ tube elongation. The applications of fungicides Beam and Keratene was found to adversely affect the pollen physiology. Lowest germination percentage (0%) was obtained in the basic medium supplemented with fungicides, whereas highest germination percentage (100%) was recorded in basic medium used as control. The study (2003) on nut crop Almonds that has a fruit set of only approximately 30% of the total number of flowers reported that fungicides Iprodione and Cyprodinil caused server collapse in stigmatic papillae and stigmatic cells. Thus the study report suggests that pesticides are detrimental to flower development, pollen function and fruit set. It is of great concern that interference of pesticides can cause an abnormality like bursting of pollen grains and pollen tubes. Pollen is a delicate structure of flower which shows the evident effects on various physiological factors due to changes in surrounding. The proposed study aims to utilize such properties of the pollen grains as a tool to monitor the status of environmental contamination.

Keywords: Pollen, pesticides, germination, pollutants

Seasonal Fluctuations of Rice Ladybird Beetles: Bio-control Agents

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ABSTRACT

A survey of rice fields of Eastern Vidarbha of Maharashtra (India) was made in order to study the seasonal fluctuations of coccinellids (ladybird beetle) during two consequent seasons of kharif and rabi. Out of 13 predatory coccinellid beetles, 6 species viz. *Adalia bipunctata*, *Coccinella septempunctata*, *C. transversalis*, *C. magnifica*, *Epilachna varivestis*, and *Hormonia octamaculata* were recorded as dominant predators during kharif season. During rabi season (December-May), out of 9 predatory coccinellids reported, only 4 beetle species like *Coccinella novemnotata*, *C. linnaeus*, *Hormonia quadripunctata*, *H. axyridis* and *Pyrota insulate* were found to be the dominant.

Coccinella transversalis, the most dominant coccinellid predator, first appeared in the 1st week of August at 21 DAT and its highest number (7.5 beetles / m²) was recorded in the 2nd week of September at about 56 DAT during kharif season. During rabi season, the most dominant coccinellid predator, *Hormonia octamaculata* reached its highest peak (11.5 beetles / m²) in the 4th week of March at about 49 DAT.

The Shannon's diversity index (H') of coccinellid predatory beetles in the *kharif* and *rabi* season was found to be 4.19 and 3.64 respectively. The minimum species diversity (3.64) was observed during rabi and the maximum diversity (4.19) was recorded during kharif season. The Simpson's dominance index (D') of coccinellid beetles varied from 0.08 to 0.10. The minimum species richness (0.08) was recorded during *kharif* season and maximum (0.10) was reported during rabi season. The species evenness index (J') during 2 cropping seasons varied from 0.45 to 0.52. The minimum species evenness (0.45) was noted during rabi and the maximum (0.52) was recorded during kharif season.

Keywords: Coccinellids, Eastern Vidarbha, Kharif, Rabi, seasonal fluctuation.

Photocatalytic Activity of Zinc Oxide Nanoparticles for Dye Degradation

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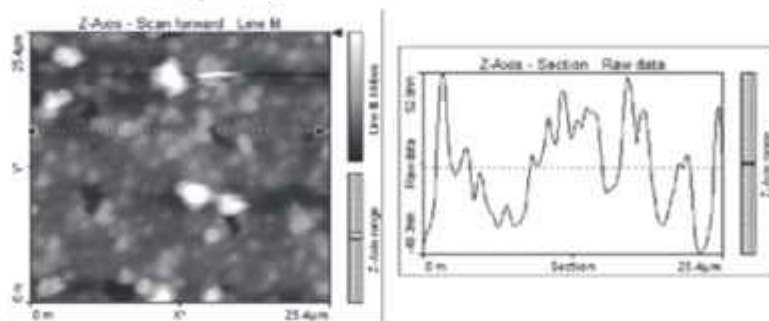
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ABSTRACT

Biosynthesis and photo catalytic activity of Zinc oxide nano particles (ZnONPs) for degradation of organic dyes from dyeing industry was studied. The ZnONPs were synthesized using a Neem seeds (*Azadirachta indica*) aqueous extract and zinc acetate as precursors. The morphology of ZnONPs were done by using UV-visible and Atomic force microscope. The photo catalytic degradation of organic dye i.e. methylene blue (MB) dye was examined using ZnONPs under solar as well as ultra violet light irradiation on the MB dye. This method stands out primarily due to the fact that it is eco-friendly and eliminate the shortcomings of conventional methods. These particles are anticipated to have extensive applications in various dyes industries to treat their effluent. The resulting data demonstrated a photo catalytic efficiency towards the removal of the selected organic dyes.



Keywords: Zinc oxide; Biosynthesis; organic dyes; Neem seed; Photo catalyst

Assessment of biotic response to heavy metal contamination

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ABSTRACT

Concentrations of Lead (Pb), Copper (Cu), Magnesium (Mg), and Iron (Fe) were evaluated from plant which was in critical habitat. The concentrations showed a general pattern of $Mg > Fe > Pb > Cu$ in plant organ. Based on computed bioaccumulation indices, Plants could be used against heavy metal contamination. Such ecosystem is an ecologically important ecosystem that will limit the spread of trace metals to the surrounding environment. The plant was able to bioaccumulate and survives despite of the heavy metal contamination. The luxuriant growth of it is evident of its adaptability even under polluted conditions.

Keywords: Accumulation, adaptability, ecosystem, ecology.

Synthesis, crystallographic and magnetic properties of Ni doped Magnesium ferrite nanoparticles

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ABSTRACT

The present work focuses on the synthesis, structural, microstructural and magnetic studies of the nanocrystalline nickel doped magnesium ferrite ($Mg_{0.6}Ni_{0.4}Fe_2O_4$). The sample of $Mg_{0.6}Ni_{0.4}Fe_2O_4$ nanocrystalline spinel ferrite was synthesized by sol-gel auto combustion method using citric acid ($C_6H_8O_7$) as a fuel and the prepared sample was sintered at 600°C for 5 hrs. The structural properties were estimated from X-ray diffraction (XRD) studies. The microstructural studies were investigated through Field Emission Gun Scanning Electron Microscopy (FEG-SEM) technique. X-ray patterns confirmed the formation of single-phase cubic structure. The magnetic properties were investigated by vibrating sample magnetometer. The crystallite size of synthesized ferrite nanoparticle is within the range of 10-35 nm. The saturation magnetization was 27.43emu/g.

Keywords: Nanocrystalline, sol-gel, XRD, FEG-SEM.

Isolation of bio plastic producing bacteria for management of congress weed

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ABSTRACT

Congress weed *Parthenium hysterophorus* is the most devastating and hazardous weed available in most parts of the India. The weed management strategy recommends the use of weed as starting material for production of value-added products. Hence, the present study was planned to isolate the bacteria from soil with ability to produce bioplastic (Poly-hydroxybutyrate) using Congress weed. Out of 50 isolates, 17 isolates showed bioplastic production ability but only 4 isolates showed bio plastic production in the presence of Congress weed hydrolysate. The modified crotonic acid method was used for selection of an efficient bioplastic producing bacteria and production conditions were optimized. The selected *Bacillus spp.* was found to produce bioplastic with 2% concentration of congress weed hydrolysate in presence of sucrose as a synthetic carbon source. FTIR analysis confirmed the extracted PHB as poly-hydroxybutyrate. Thus, the present study concludes the effective way of management of Congress weed into eco-friendly bio plastic by bacteria.

Keywords: Poly-hydroxybutyrate, Congress weed, *Bacillus spp.*

Screening of 2, 4-D Induced Teratogenic Influence on Developing Chick Embryos

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ABSTRACT

2,4-D is a commonly used herbicide worldwide. These are chemical analogues of auxin, a plant growth hormone that produce uncontrolled and lethal growth in target plants. In the present study teratogenic effect of 2,4-Dichlorophenoxy sodium salt 80% WP was tested on chick embryo using fertile eggs. Bioassay test was conducted using different concentration of 2, 4-D. Initially range finding test was conducted using different concentrations range of 100, 80, 60, 40, 20, 10, 5, 4, 3, 2, 1 ppm to check LC₅₀ Dose. Based on these results another set of concentration as Set 1: 1 to 10 ppm (with 1ppm interval) and Set 2: 0.1 to 1 ppm (with 1ppm interval) was used to check the phenotypic effects.

Development is badly affected by 2,4-D as reflected by aborted and unfertilized chick embryos Based number of aborted eggs LC₅₀ dose lies between 5 to 10 ppm. Absence of eye balls and limb buds in developing chick embryo was reported above 7 ppm. It may be as a consequence of over expression of SHH gene that encode sonic hedgehog protein. Sonic hedgehog regulates the formation and development of eye (Marigo, 1995).

Formation of tumour at abdomen region was reported at 0.9 ppm concentration. Besides these, cutaneous melanoma is also distinct at cephalic and abdominal region. The development of skin derived melanoma (cutaneous melanoma) may the result of development of weaker immune system of the embryo. It means 2, 4-D has been altered the organization of immune system. These all degenerative symptoms clearly indicate that 2,4-D is altering SHH gene causing over expression of sonic hedgehog protein.

Keywords: 2-4-D, Teratogen, chick Embryo, sonic hedgehog

Production of Biosurfactant by Organism Isolated from Dates by Using Petrol and Its Activity Against Biofilm Produced By *Candida* and *E.coli*.

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ABSTRACT

This research was conducted for production of biosurfactant by the organism isolated from dates (*Phoenix dactylifera*). Its activity checked against biofilm formed by the *Candida* and *E. coli*. The organism was isolated from enriched dates sample in saline suspension. The culture was isolated on LBD (lactic bacteria differential agar) medium and incubated at RT for 48 hrs. Gram staining and biochemical test were carried out. Colonies were inoculated into MSM (mineral salt medium) with petrol for biosurfactant production and incubated at RT for 5-6 days. Petrol was found to be degraded in MSM medium then biosurfactant was extracted and purified in solvent system ethyl acetate: methanol (4:1). After extraction its antimicrobial activity was checked against *S. aureus*, *E. coli* and *Candida*. It shows zone of inhibition against *Candida* and *E. coli* thus bio film was formed in Catheter (*Candida*) and IV set (*E. coli*) and incubated at RT for 24 hrs. After incubation the Catheter and IV set was washed 3 times with saline. For every wash, spread plate was carried out and incubated at RT for 24 hrs; gradient growth was observed. For checking bio surfactant activity towards bio film, the catheter and IV set was cut into small pieces and incubated overnight at RT with bio surfactant and saline. After incubation spread plate was done and the growth was obtained in gradient form. After agitating the tube with bio surfactant, spread plate was carried out which showed matt growth. The organism was characterized as NFB and found to be *Bacillus thuringiensis* (Bt).

Keywords: Biosurfactant, *Candida*, *E. coli*, *Bacillus thuringiensis* (Bt), 16s RNA sequencing.

Effect of *Azospirillum* on Quantity of Saponin in Roots of *Chlorophytum borivilianum* (Safed musli)

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ABSTRACT

Saponins are naturally occurring glycosides widely distributed in plants. Saponin consists of a sapogenin as the aglycone moiety and a sugar. The sapogenin may be a steroid or a triterpene and the sugar may be glucose, galactose, a pentose, or a methylpentose. It exhibits antimicrobial properties, guarding your body against fungi, bacteria and viruses. At the same time, they improve immune function by stimulating the production of T-cells. Additionally, they act as antioxidants and scavenge oxidative stress and so saponins are used in some vaccines. This chemical compound contains the 27 carbon atoms forming the core structures; spirostan and furostan. The present study deals with the influence of symbiotic association of *Azospirillum* (the nitrogen fixing bacteria) with root nodules of *C. borivilianum* on amount of saponin content in *C. borivilianum*. To increase the percentage (amount) of saponin, the treatment of nitrogen fixing bacteria was given. The symbiotic association of nitrogen fixing bacteria in root nodules of plants help to increase the amount of biologically active constituents of plant and thereby increase the fertility of soil.

Keywords: Saponin, *Azospirillum*, Nitrogen fixation, *Chlorophytum borivilianum* (Safed musli), medicinal plants

Some Endemic Plant Species New Addition to the Khandesh Region of Maharashtra State

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ABSTRACT

Khandesh is a part of Maharashtra, situated at North Maharashtra and composed of three districts namely Nandurbar, Dhule and Jalgaon. The region has good diversity of the plant species as it contains terrain of Satpura and Tapi river. During plant exploration of Khandesh in 2013-2015, authors collected some interesting endemic plants from Khandesh which were never reported to the flora of Khandesh. Thus, in present communication such plant species are reporting as a new record to the Khandesh region of Maharashtra.

Keywords: Khandesh, Addition, endemic species, Angiosperms.

Development of Orally Disintegrating Tablets Comprising Controlled Release Multiparticulates of Drug Pregabalin.

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ABSTRACT

The aim of the present work is to prepare multiparticulates of drug Pregabalin to prolong residence time in stomach and to sustain the release of drug, along with the unique benefit of mouth-dissolving by compressing the multiparticulates in orally-disintegrating tablet. Pregabalin is an anticonvulsant drug used for neuropathic pain and as an adjunct therapy for partial seizures. Absorption of pregabalin extended-release formulation is limited by permeability with absorption occurring in upper gastrointestinal tract with little or no drug absorption occurring beyond hepatic flexure. For optimization of Pregabalin-loaded multiparticulate drug delivery system (floating microspheres), the Quality by design (QbD) approach is used. Two different methods are used for the pharmaceutical formulation of floating microspheres. The resulted multiparticulates are characterized for their size, morphology, encapsulation efficiency, bouncy and drug release pattern. Based on the analytical and organoleptic test results as well as the blend uniformity, selected batches of each formulation are compressed with the suitable disintegrating agent at several pressures to give tablets that readily disintegrated in water. The formulation (ODT) evaluated for various parameter as well as *in-vitro* drug release. The selected formulation is also subjected to stability studies.

Keywords: Multiparticulate drug delivery system, mouth-dissolving, pregabalin, floating microspheres, Quality by design (QbD).

Drug Repositioning: A New Strategy to Reuse Existing Medication

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ABSTRACT

New drug approvals have slowed, patents on blockbuster drugs are expiring, and costs associated with developing new drugs are escalating and yielding fewer viable drug candidates. As a result, pharmaceutical firms have turned to a number of alternative strategies for growth. One of these strategies is “drug repositioning/repurposing”- finding new ways to deploy approved drugs or abandoned clinical candidates in new disease areas. Drug repositioning is the process of using a drug for an indication different from the initial indication. This is a complex approach that may be predicted and carried out, at least in part, with a systematic method. Drug repositioning (or repurposing) is the process of using a drug for an indication different from the initial indication. This is a complex approach that, in principle, may be predicted and carried out, at least in part, with a systematic method. Virtual screening is one of the systematic methods for conducting drug repositioning with the aid of computational methods. Virtual screening is one of the systematic methods for conducting drug repositioning with the aid of computational methods. At present, in the U.S approximately 30% of newly FDA approved drugs are repositioning only. It is very challenging to develop new drugs for the treatment of rare diseases because the number of patients suffering from these diseases are very limited and are distributed over a vast geographical area. The concept of drug repositioning is known to regulators, and applicable regulatory frameworks have been defined in the EU and the US.

Keywords: Clinical trials, collaboration, drug development, drug repurposing, drug testing, patent

Role of Herbals against Covid 19

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ABSTRACT

Herbal plants are systematically used in Traditional System of Medicines including Unani, Ayurveda and Chinese. About 8000 herbal remedies have been documented in AYUSH of India. They are considered to be safe or with minimal side effects as compare to synthetic allopathic medicines. The novel coronavirus (COVID-19), the unexpected pandemic is an unprecedented challenge for public worldwide. Coronaviruses are a huge group of viruses identified to cause illnesses that vary between the common cold and more severe diseases to include severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). It is the third zoonotic coronavirus breakout that allows human-to-human transmission and raising globally health concerns issues. The COVID-19 pandemic has set a new era rolling which is going to have long lasting implications. The influx of COVID-19 has caused severe panic among people worldwide. As there is no vaccine discovered yet. The researchers throughout the world engaged in the development of new therapies against COVID 19. In India, the Ministry of Ayush has given some intervention for enhancing immunity by using herbs. *Chyavanprash*, is one of the immunity boosters consuming by people. It contains many wild plant ingredients. The herbal medicines have potential to improve the symptoms including decreasing body temperature, cough and breathing difficulties, decreasing dosages of corticosteroids, improving absorption of pulmonary infiltration and improving quality of life. The researchers have documented many plant species such as *Lycoris radiate*, *Artemisia annual*, *Pyrrhosia lingua*, *Lindera aggregate*, *Angelica sinensis*, *Panax quinquenfolius*, *Scutellaria baicalensis*, *Atractylodes macrocephala* and *Withania somnifera* for the treatment of viral flu diseases. The bioactive compounds and crude extracts of officinal plants have numerous bioactivities. Thus, the screening of the active principles from herbals should researched for antiviral activities against this deadly COVID-19.

Keywords: COVID-19, AYUSH,

Antimicrobial Activity of Fenugreek *Trigonella foenum graecum*(Linn) Seeds Extract Against *Escherichia coli* and *Staphylococcus aureus*

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ABSTRACT

Fenugreek is a medicinal plant known for its various pharmacological properties, including its anti-bacterial activity. The purpose of this study was to screen phytochemical compound present in crude fenugreek seeds extracts and evaluate their potential activity against *E. coli* stain and *S. aureus* isolated from a laboratory. Aqueous and organic (chloroform, ethanol, distilled water and methanol) extract was prepared from powdered fenugreek seeds. Bacterial growth inhibitory effects were evaluated at three concentration (2.5, 5 and 10 mg/ml) by measuring the diameter of the inhibition zone using an agar well diffusion method. No anti-bacterial effect was demonstrated by the aqueous extract of fenugreek seeds.

Keywords: Fenugreek seeds, solvent extract, growth inhibitory effect, inhibition zone, *Escherichia coli*, *Staphylococcus aureus*.

Antifungal activity and GC-MS analysis of *Chaetomorpha* and *Padina*

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ABSTRACT

The antifungal activity and chemical constituents of *Chaetomorpha media* and *Padinatetrastromatica* collected from Kunkeshwar, Sindhudurg district of Maharashtra. Food poisoning method was used to determine the antifungal activity of extractable matter against a *Fusarium oxysporum* and *Rhizopus artocarp*. The methanolic extract of *Padina* inhibited the mycelial growth of *F. oxysporum* (12.39mm) and *R.artocarp* (15.63mm). GC-MS analysis of *C.media* and *P. tetrastromatica* Indicate the existence of different constituents revealing ecological impact. The methanolic extract of *Chaetomorpha media* and *Padina tetrastromatica* 8 and 5 compounds were identified. The compound with the highest concentration was *n-hexadecanoic acid* followed by phytol. Most of the identified compound reported in the present study were responsible for antifungal potential.

Keywords: Antifungal, *Chaetomorpha media*, *Padina tetrastromatica*, *Fusarium oxysporum*, *Rhizopus artocarp*. GC-MS analysis

Bioremediation Biodiversity Documentation Technology: Rapid and Reproducible Assays for Evaluation of Bioremediation Potential of Microbes Isolated from Stressed Environments

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ABSTRACT

Anthropogenic activities pollute aquatic and soil environments with chemicals such as halogenated pesticides, nitroaromatic compounds, petroleum hydrocarbons, phthalate esters, solvents and heavy metals. Bioremediation is a safe, environment friendly, cost-effective technology for cleaning up contaminated sites, using bacteria. However, bioremediation has limitations such as availability to microorganisms, chemicals not amenable to biodegradation and low solubility. In accordance to same, the following approaches were experimented to enhance the research. Bio flocculation test: Bio flocculants produced by microorganisms, are high molecular weight polymers, biodegradable, environmentally friendly serving an alternative to chemical flocculants. To determine Bio flocculation Efficiency, rapid test was performed using Kaolin clay suspension (Kaolin & CaCl₂) + bio flocculant from potential isolates. Antibiotic sensitivity test (AST) was performed.

INT (p-iodonitrotetrazolium) assay was employed for evaluation of potential isolates for degradation of oil and petroleum hydrocarbons found in oil spills. Metagenomics is a tool to access the biodiversity of native environmental samples. It is a standard technique characterizing the genetic diversity of samples regardless of the availability of laboratory culturing techniques and understanding biological diversity.

Keywords: Bioremediation, Bio flocculation, Antibiotic sensitivity test (AST), chromium, petroleum, diversity

In vitro evaluation of antimicrobial activity of *Moringa oleifera* extracts against pathogens causing wound infection

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ABSTRACT

A break or wound in the skin makes a favorable environment for the invasion of bacterial pathogens. Variety of Gram positive and Gram-negative organisms cause wound infection. Conventional drugs have been used to treat them, but their overuse has led to an increase in development of MDR pathogens. Thus, it has become the need of the hour to develop newer drugs to treat them preferably without the pathogens developing resistance against them. *Moringa oleifera* has been used since ages for treating various diseases. It is a rich source of variety of phytochemicals and can serve as a potential therapeutic agent.

Wound pathogens were isolated from samples collected from open wound lesions of patients from Central hospital, Ulhasnagar. Pathogens were isolated and identified on the basis of Bergey's manual. Presence of MDR were confirmed by antibiotic Disc diffusion test. The leaves, bark and seeds of *Moringa oleifera* were used to prepare acetone and aqueous extracts. In vitro antimicrobial activity was evaluated qualitatively by Agar ditch plate method and quantitatively by Agar dilution method.

Among the isolates there was a high prevalence of Gram-negative pathogens (70%). Staphylococcus spp. were predominant in Gram positive isolates (20%). Of total isolates, 20% were MDR pathogens. There was high amount of glycosides present in different extracts of *Moringa oleifera* followed by tannins and flavonoids in both acetonic and aqueous extracts. The aqueous leaf extract had broad spectrum and the highest antibacterial activity.

Keywords: Wound infection, *Moringa oleifera*, antimicrobial, phytochemicals

Indigenous water purification system for agriculture purposes

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ABSTRACT

Small scale farming practices include the agriculture of green leafy vegetables that are considered to be rich in Fe, Mg, comprise fibers and are good for vitamins. Vegetables are grown in waste lands of the urban areas often utilize wastewaters of domestic and industrial origin. Heavy metal load due to inlet of industrial effluents and sewage water leads to bioaccumulation of metals in plants and vegetables that enters the human body. Apart from the essential elements, the heavy metals in food cause various disorders including neurological and genetic, instead of preventing nutrient based current generation problems such as early balding, digestive problems, weak immunity. Qualitative and quantitative analyses of Spinach sample collected from drainage water irrigated fields of Goregaon, Mumbai indicated the presence of heavy metals Pb, As, Cd, Hg, Fe, Ni, Co, Ag and Mo in high concentration (except Ag). During the current study an indigenous filter has been developed of low budget cost and farmer friendly which can reduce the heavy metal load from such irrigation waters. The filter is made of environmentally friendly, reusable materials and 95% functionally efficient.

Keywords: Heavy metals, bioaccumulation, water filter, filter fabrics, water pollution.

Screening of Sitopaladi Churna: An Analytical Approach

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ABSTRACT

Ayurveda is a science of life with a holistic approach to health and personalized medicine. It is one of the oldest medical systems, which comprises thousands of medical concepts and hypothesis. Sitopaladi churna is a polyherbal formulation of Ayurveda used for the treatment of cough, cold, pneumonia, tuberculosis, viral respiratory infection, chest congestion. The aim of this research was to authenticate Sitopaladi churna to assess the quality, purity, for their therapeutic value. The Sitopaladi Churna was prepared and analyzed by various parameters including organoleptic character, microscopic evaluation, phytochemical tests, physicochemical tests, thin layer chromatography (TLC), and High-performance thin-layer chromatography (HPTLC) fingerprinting using Piperine as a standard. The fingerprinting was performed to check the presence of Piperine which is one of the major constituents of Sitopaladi Churna formulation to validate whether the formulation contains all the specified ingredients. The fingerprinting is also used to check any adulterants. These findings will be useful towards establishing pharmacopeial standards for crude drugs as well as for formulations which are gaining relevance in research on traditional medicinal systems.

Keywords: Sitopaladi churna, Physicochemical test, TLC, HPTLC.

An Assessment of Marine Environment and Its Impact on Coastal Processes and Landforms

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ABSTRACT

The hydrosphere is the water portion of our planet. This dynamic mass of liquid is continuously on the move, from the ocean to the air, to the land, and back again. The global ocean is obviously the most prominent feature of the hydrosphere, blanketing nearly 71 percent of Earth's surface and accounting for about 97 percent of Earth's Water. The Indian coasts have a long series of tropical mangrove forests which may act as source as well as sink under a given set of environmental conditions. Water from the oceans, and to a much lesser extent from the continents, is constantly evaporating into the atmosphere. Winds transport this moisture often over great distances. Condensation is the process wherein water vapor changes to the liquid state. As more and more molecules escape from the water surface in the closed container, the steady increasing vapor pressure in the air above forces more and more of these molecules to return to the liquid. Marine climates are considered relatively mild for their latitude because the moderating effect of water produces summers that are warm but not hot and winters that are cool but not cold. In contrast, continental climates tend to be much more extreme. Present study carried out the assessment of marine environment, challenges to marine ecosystems and coastal processes and landforms. This research paper deals with different aspects related to the oceans.

Keywords: Hydrosphere, Indian coasts, tropical mangrove forest, wind transport, marine climates

A Note on Molluscan Diversity of Nighoj Potholes (Kund) (M.S.) India

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ABSTRACT

The Nighoj Kund is world famous for naturally made potholes on Rock River bed of Kukadi River. This pothole recorded in Guinness book of world record. The Kund is present at the Nighoj village, Tal- Parner. These potholes are spaced between 3 km long on river bed and 10 to 15 Mts., widths and more than 30 Mts., in depth. The present study is carried to find out the diversity of fresh water mollusca of Nighoj, Kund or Potholes, Maharashtra State, India. The results of the study show that the molluscan species found from various sites of potholes or Kund water belong to different families of Phylum Mollusca such as *Viviparidae*, (03species), *Lymnaeidae*, (02 species), *Physidae*, (01), *Bullinidea*, (01), *Thiaridae* (02 species), *Planorbidae*(01) all are belonging to Class Gastropoda and *Unioidea* (02 species) of Class Bivalvia are found from Kund water during study period. The group of Mollusca is most diverse and dominant benthic fauna of water bodies. The mollusca play a key role in the aquatic ecosystem.

Keywords: Bivalvia, Mollusca, Nighoj, potholes, Kund, Kukadi.

Extraction and characterization of tannins from *Cassia tora* Linn leaves

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ABSTRACT

Cassia tora Linn is a medicinal plant used as laxative for the treatment of leprosy and various skin disorders belongs to family Caesalpinaceae used in Ayurved and Siddha system. It is common weed of rainy season and even blooms in hot arid environment of drought prone area of Baramati. It is rich in tannins and other biomolecules which may help in its medicinal potential. The objective of this study is to extract tannins from normal and oven dried method and to characterize the extracted tannins using UV and FT-IR methods. *Cassia tora* Linn is growing in waste places thus tannin extraction and its characterization further utilized for its bioprospecting potential.

Keywords: *Cassia*, tannins, weed, extraction.

Preparation and Analytical Evaluation of an Ayurvedic formulation: Nisha Amalaki Churna

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ABSTRACT

Ayurveda is one of the traditional medicinal systems with an established history of many centuries. The primary focus of Ayurvedic medicine is to promote good health and prevent illness, rather than fight disease. Authentication of an herbal formulation is essential in order to access the quality of drugs, based on amount of their active principles, physicochemical standards and pharmacognostic parameters. In this study, preparation and physicochemical analysis of Nisha amalaka churna - an Ayurvedic formulation was carried out. Nisha amalaka churna is a mixture of *Curcuma longa* (Turmeric) and *Embilica officinalis* (Amla powder) in equal proportion. Amla is a traditional remedy that may help keep blood sugar at the steady level and prevents spikes after meals. Consuming turmeric root extract can help in reducing insulin resistance that leads to rise in blood sugar levels. It also improves the functioning of Beta cells. It has anti-diabetic properties. Various quality control parameters including physicochemical, phytochemical analysis; analysis using modern analytical techniques like UV spectrophotometry, TLC, HPLC and HPTLC; microbiological test and qualitative determination of heavy metals were carried out for raw materials as well as for finished formulation. The parameters studied for formulation can be used as a reference in developing pharmacopoeial standards.

Keywords: Ayurveda, Nisha amalaka Churna, physicochemical, phytochemical, Standardization, Analytical evaluation.

Treatment of Water Using Organic Waste Matter of Papaya and Apple

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ABSTRACT

High toxicity in potable water has perturbing effects on health globally due to the presence of various suspended impurities and anions such as chromate, lead, zinc, and arsenate. Water treatment has extortionate rates and requires low cost biomass which is affordable and efficient at the same time. The present work is done to note the effect of organic waste viz. papaya seeds and apple peels in the treatment of water. We avail ourselves to papaya seeds and apple peels as a substrate on account of its biodegradability and availability for our investigations. Sun-dried and crushed papaya seeds were used to coagulate the suspended and dissolved solids in the water samples as well as to reduce turbidity. Apple peel which is dried (sun-dried or oven-dried) adsorb chromium one of the most favorable toxic heavy metals to get bound. Both the experiments were carried out with coagulant dosage of 1.0, 1.5 and 2.0 g/L in lake water and industrial effluent for papaya seeds and double distilled water incorporated with 1mg/mL of Chromium chloride and industrial effluent as test for apple peels. Various physico-chemical tests were carried out to observe different parameters such as BOD, COD, turbidity, TDS, TSS, heavy metal concentrations, etc. and notable differences were observed in the pre-treatment and posttreatment samples. The best coagulant dose for papaya was found to be 1.5 g/L in which BOD and COD level were also decreased substantially after treatment. In case of apple peels too, satisfactory outcomes were observed and 2 g/L was found as notable dosage. These investigations have important implications for how along with other coagulants with papaya seeds and adsorbents or modified apple peels can be successfully be used as an effective natural coagulant or adsorbent on wide-reaching scale for treating water.

Keywords: water treatment, heavy metals, papaya seeds, apple peels, suspended particles, chromium.

Study of Phytochemical analysis, Antimicrobial activity, Antioxidant activity of various extracts of *Catharanthus roseus* flower petals

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ABSTRACT

More than 3000 plant species that have reportedly been used for the treatment of various infection agents and diseases. Plants have proof to be significant natural resource for effective broad spectrum of activity with greater emphasis on preventive action. They are still the primary health care system in some parts of world. Plant derived compound have always played an important role in the development of several clinically useful antimicrobial agents.

Catharanthus roseus is an important medicinal plant of the *Apocynaceae* family. *Catharanthus roseus* is an important medicinal part of novel pharmaceuticals since most of the bacterial pathogens are developing resistance against many of the currently available antimicrobial drugs. *Catharanthus roseus leaves* have shown to exhibit antibacterial activity against wide range of bacteria.

Aim of the present study is to investigate the antimicrobial activity, antifungal activity, phytochemical analysis of different extracts of *Catharanthus roseus* flower petals. Also, enzymatic and non-enzymatic (hydroxyl radical scavenging method) was employed to analyse the antioxidant property. Qualitative analysis of phytochemicals reveals the presence of Flavonoids, Alkaloids, tannins, Saponins. All the extracts have shown good antibacterial activity against bacteria as well as *Candida albicans*.

Keywords: Antibacterial, phytochemical, antioxidant.

Simultaneous Estimation of Ofloxacin and Tinidazole from Pharmaceutical Dosage Formulation by Spectrophotometric Methods

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ABSTRACT

Two simple, sensitive, accurate, precise, rapid and economical methods were developed for the estimation of Ofloxacin and Tinidazole from combined tablet dosage form. First method is based on simultaneous equation and second method is based on Q-analysis (absorbance ratio method). Ofloxacin and Tinidazole show absorbance maxima at 300 nm and 275 nm in 0.1N Methanolic-HCl (20:80) respectively. The linearity was obtained in the concentration ranges of 1-20 µg/ml for Ofloxacin and 3-60 µg/ml for Tinidazole with Regression Coefficient (R^2) greater than 0.999. In the first method concentration and subsequently amount of drug determined by using simultaneous equations and in second method concentration and amount of drugs determined by using ratio of absorbance at Iso-absorptive point (which was found to be 286 nm) and at λ_{max} of one of the drug. The results of analysis have been validated statistically and subsequently by assay and recovery studies.

Keywords: Ofloxacin, Tinidazole, absorbance ratio, iso-absorptive point, regression coefficient

Qualitative analysis of phytochemicals and anti-bacterial studies of *Solanum nigrum* roots

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ABSTRACT

India is one of the twelve mega diversity countries of the world with a rich diversity of biotic resources. The world is now looking towards India due to its rich biodiversity of medicinal plants and abundance of traditional medicinal systems. In traditional societies, nutrition and health care are strongly interconnected and many plants have been consumed both as food and for medicinal purposes. Medicinal plants are natural sources of compounds that can be used against many diseases today. *Solanum nigrum* is one of the important medicinal plant which is generally known as black nightshade and is perennial shrub found in wooded areas. *Solanum nigrum* is recommended for prevention and treatment of gastric ulcers, cardiac pain, blood purifier, etc. It is also used successfully for inflammation, liver diseases and certain infectious diseases. In present study, in-vitro anti-bacterial studies of methanol extract of the roots of *Solanum nigrum* were investigated. The phytochemical screening of the extracts revealed the presence of Saponins, Resins, Lactone, Cardiac-glycosides, Terpenoids, Alkaloids and Coumarins. The results obtained from agar well diffusion method indicate that, methanolic root extract of *Solanum nigrum* showed the spectrum of inhibition on *E. coli* and *Klebsiella pneumonia*. Thus, results of phytochemical and anti-bacterial studies have proven that, the *Solanum nigrum* acts as potent plant for developing new medicine.

Keywords: *Solanum nigrum*, Phytochemical, Anti-bacterial study, medicinal plant, alkaloids.

Therapeutic protein: New Age Biomolecule Identification from Cockroach Brain Tissue.

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ABSTRACT

Therapeutic proteins are the new age alternatives to control diseases in medicine. With the increasing prevalence of drug resistant bacteria in the human population, discovery of alternative molecular control is the need of the hour. Insects are considered to harbor drug resistant and pathogenic bacteria and are also able to produce antimicrobial proteins as the first line of their defense mechanism. Several such proteins are identified to play multiple functions in in-situ and ex-situ conditions and known as moonlight proteins. Current study witness's identification and characterization of two such proteins from the brain tissue lysate of American cockroach *Periplaneta americana*. Proteins were characterized using chromatographic technique combined with orbitrap mass spectrometer. *In silico* analyses of these proteins indicated significant interactions with membrane protein of drug resistant bacteria and non-structural protein of SARS-CoV-2. This gives a ray of hope that these proteins can be considered as antibacterial and antiviral controls in future medications.

Keywords: Drug resistant bacteria, multifunctional protein, mass spectrometer, *In silico* protein-protein interaction.

HPTLC fingerprinting: A tool for simplified analysis of terpenoids in medicinal plants

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ABSTRACT

Terpenoids constitutes important class of plant secondary metabolites with significant bioactivity. The identification and profiling of such secondary metabolites validates therapeutic activities exhibited by the medicinal plants. HPTLC is an accepted analytical method for the analysis of medicinal plants by WHO and pharmacopoeia across the globe, including the United State Pharmacopoeia. The methanolic extracts of *Abrus precatorius* L., *Sapindus trifoliatus* L. and *Embelia ribes* Burm. F. were developed on the HPTLC system to study the diversity of terpenoids like compounds like steroids and sterols under different development conditions. Steroids were separated using n-Butanol: methanol: water (3:1:1 v/v/v) and Anisaldehyde Sulfuric acid as spray reagent. Sterols were separated on chromatogram by using chloroform: ethyl acetate (4: 6 v/v) as solvent system and 10% methanolic sulphuric acid reagent was used for derivatization. Profile of 09 polyvalent phytoconstituents were separated during the analysis of sterols and steroids individually. The HPTLC analysis successfully demonstrated that phenolic secondary metabolites can be effectively separated using the same extract under different development conditions.

Keywords: HPTLC, steroids, sterols, *Abrus precatorius* L., *Sapindus trifoliatus* L. and *Embelia ribes* Burm. F.

Development of HPTLC Fingerprints of Saponins of *Bauhinia purpurea* L. from Different Geographical Regions of India

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ABSTRACT

The chemical fingerprinting analysis approach using HPTLC profile has become the most potent tool for quality control of herbal medicines because of its simplicity and reliability. The present study was aimed to establish the HPTLC fingerprints of saponins for the leaf and bark of *Bauhinia purpurea* L. collected from three different geographical regions of India viz., Mumbai (Maharashtra), Mangaluru and Bengaluru (Karnataka). Preliminary phytochemical screening was done followed by the HPTLC studies. Chloroform: acetic acid: methanol: water, (6.4:3.2:1.2:0.8) (v/v) was employed as the mobile phase for the separation of saponins. The derivatization reagent used was Anisaldehyde Sulphuric Acid reagent was suitable to generate more bands of saponins. A better separation of saponins was observed at 540 nm after derivatization. The chromatographic fingerprint developed for this medicinally important plant *Bauhinia purpurea* L. revealed the composition and diversity of saponins in the bark and leaf from all the three geographical regions. It can be concluded that HPTLC fingerprint analysis of bark and leaf extract of *Bauhinia purpurea* L. can be used as a diagnostic tool for the correct identification of the plant as well as a phytochemical marker. Such fingerprints can be employed for detection of regional variation of the plant under study. The saponin bands can be used to discover bioactive products that may serve leads for the development of the new pharmaceuticals that address hitherto for unmet therapeutic needs.

Keywords: *Bauhinia purpurea* L., HPTLC fingerprints, Saponins.

An Introduction of Biosurfactants and Their Role in Bioremediation: A Review

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ABSTRACT

In the recent years, with rapid industrialization a wide scope of organic contaminants has been introduced in the environment which have become a major threat to the human health because they can bound themselves very easily to the soil particles when they come in the contact with soil. Hydrophobic contaminants are of unique concern because these cannot be removed easily because of their low solubility in water. An ecofriendly and alternative technique that may be used for the desorption of these contaminants in place of the conventional system of remediation is to use biosurfactants. Biosurfactants or microbial surfactants are the amphiphilic compounds that are produced on the living surfaces, predominantly on the microbial cell surfaces or excreted extracellularly. These molecules have both hydrophobic and hydrophilic components that provides them the ability to get accumulated between the fluid phases, thereby reducing surface tension and interfacial tension at the surface as well as interface. Earlier biosurfactants attracted the attention as hydrocarbon dissolving agents and were considered as a potential replacement for the synthetic surfactants like sulfonates, carboxylates and sulfate acid esters in pharmaceutical, food and oil industries. These synthetic surfactants are not only toxic but are hard to degrade too. To replace these synthetic surfactants, biosurfactant production needs to be cost-effective, therefore it is important to develop culture conditions with low-cost materials using efficient biosurfactant-producing microbial strains. Although extensive studies have been made on the bacteria for the biosurfactant production, yeasts are also found to be potential biosurfactant-producing microorganisms. The unique structure and diverseness of biosurfactants makes them an interesting group of compounds for potential use in a wide variety of industrial and biotechnological applications. This review describes a brief introduction of biosurfactant, microbes and yeast producing biosurfactants and their role in bioremediation.

Keywords: Biosurfactants, bioremediation, bacteria, yeast

Symbiotic Microbes of Mangrove Flora- Sources for Anticancer Drugs

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ABSTRACT

L-Asparaginase is an enzyme which have specific applications in the treatment of diseases like cancer. It catalyzes the hydrolysis of L-asparagine to L-aspartate and ammonia. The removal of L-asparagine in the serum deprives tumor cells required quantities of asparagine for growth, thus controlling tumor growth effectively. Microbial Endophytes are important components of plant micro-ecosystems.

During the present study mangrove plant samples were collected from two selected locations of Mumbai to isolate endophytic fungi. 60% of the fungal isolated indicated positive response for L-Asparaginase enzyme and further activity was assayed using modified Wriston's method. Maximum activity of 1U/min was observed by the isolate GAI S9 of *Acanthus* spp. as well as 0.97U/min and 0.96U/min were observed in isolates BPAR3 and BPAR2 respectively of *Rhizophora* spp. Study revealed the mangrove associated fungi has a promising source of medicinally important enzymes.

Keywords: L-asparaginase, Endophytic fungi, Mangroves, Wriston's method

Production of Gallic Acid from Tannic Acid by Normal Flora of Soyabeans and Coffee Beans and Production of Tannase by *Aspergillus niger*

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ABSTRACT

The main purpose of research was to produce gallic acid from tannic acid by normal flora of coffee beans and soya beans. The organism was grown in MSM medium (mineral salt medium) at room temperature for 5 days then transferred to fresh MSM medium in which tannic acid was present, incubate for 5 days at room temperature. The organism was isolated on fresh MSM plate and was characterized by biochemical test and partial 16s RNA sequencing by NFB LAB. The inoculated crude of both samples was extracted by ethyl acetate and methanol to detect gallic acid by HPTLC (high performance thin layer chromatography) and by spectrophotometric method using Rhodanine as reagent. The tannase enzyme was prepared by collecting fungal mycelia mixed with standard and sand frozen overnight. Then the enzyme was extracted as supernatant after centrifugation. The presence of gallic acid was detected by comparing with standard markers.

Keywords: Soya beans, coffee beans, Std. Gallic acid, tannic acid, *Aspergillus niger* strain, rhodanine

Effect of Pathogen and Normal flora with Biofilm formation and Gel clot test

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ABSTRACT

The main criteria of this research was to find the physiological effect of Pathogen and Normal Flora by Biofilm formation and Endotoxin test. In this study, the pathogen was isolated from green chutney and the normal flora of gut was isolated from the stool sample of 1-year old baby on (HE) Hektoen Enteric agar. Simultaneously, the biochemical test was performed for confirmation of an organism. The disc diffusion method was performed with different Antibiotic disc. The interaction of Normal Flora and Pathogen on each other was studied using Antibiotic and without Antibiotic by Cup Plate diffusion Method. In this study ,we exposed Normal Flora and Pathogen to UV Rays for different time intervals and AST (Antibiotic Sensitivity Test) were again followed. The main criteria of this research was Biofilm formation and blood in syringe, IV(Intravenous) set, were used Endotoxin production produce by the gram-negative bacteria cell wall was carried out by using gel- clot method. The purity of water sample with some gram positive and gram negative and as well as some fungal culture was studied. The Endotoxin production of a different organism was tested by using LAL (Limulus Amebocyte Lysate) reagent. The water sample did not show the positive result for Endotoxin.

Keywords: Gel Clot, Endotoxin, biofilm, LAL(Limulus amebocyte Lysate), assay test.

Antioxidant Potential of Aqueous Extracts of Immature Fruit And Developing Shoot Of *Solanum torvum* (Swartz)

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ABSTRACT

The role played by free radicals which are highly reactive oxygen species has become increasingly relevant in various degenerative diseases. Focus on natural antioxidants in medicinal plants is gaining momentum in present days, reflecting the immense value of Ayurveda, Naturopathy and Siddha medicines in treatment of ailments. The present study deals with the antioxidant potential of aqueous extract of *Solanum torvum* immature fruits and developing shoot which contribute to the scavenging of free radicals. In vitro antioxidant potential of aqueous extracts of *Solanum torvum* immature fruits and developing shoot was assessed by 1,1-Diphenyl-2-Picrylhydrazyl (DPPH), Superoxide anion and Nitric oxide (NO₂) at various concentrations (200 µg, 400 µg, 600 µg, 800 µg and 1000 µg). A significant antioxidant potential was found in the aqueous extracts of *Solanum torvum* immature fruits in the present study.

Keywords: *Solanum torvum*, immature fruits, developing shoots, in vitro antioxidant activity, DPPH, Superoxide anion and nitric oxide

Evaluation of Quality of Subsurface Water used for Domestic purpose in Ulhasnagar and Badlapur Region

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ABSTRACT

Water is essential for survival of all living creatures. Water quality is an indispensable feature for mankind since it affects human health and quality of life. The present study is aimed to assess the quality of subsurface water from two areas each of Ulhasnagar and Badlapur region. The samples were collected at interval of 15 days for six months. Collected samples were analyzed for organoleptic and physico-chemical parameters as well as detection of entomopathogens. The organoleptic parameters were found to be satisfactory. The study revealed that the physico-chemical parameters of all water samples were in optimum range and were safe for domestic uses. Samples from Station 1 of Ulhasnagar showed contamination of microbes. Water sources in these areas are needed to be protected from the jeopardy of contamination and proper treatment is required prior to consumption.

Keywords: Subsurface water, Organoleptic parameters, physicochemical parameters, Ulhasnagar, Badlapur.

HPTLC Studies to develop fingerprint and evaluation of antioxidant activity, antibacterial activity, phytochemical screening of *Caryota urens* L. seeds extracts.

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ABSTRACT

Caryota urens L. is a member of the family *Arecaceae* also known as Toddy, fishtail or Jaggery palm. Traditional medicinal practitioners use parts of this plant to treat gastric ulcer, migraine headaches, snake bite poisoning as well as rheumatic swellings.

The extracts obtained from powder by sonicating powdered seeds in methanol and petroleum ether. Extracts was then subjected to qualitative examination for the phytoconstituents like alkaloids, phytosterols, saponins, tannins and flavonoids. Methanolic extract have exhibited presence of various secondary metabolites. Antibacterial activity was screened against *E. coli*, *S. epidermidis*, *S. paratyphi* and fungal strain *Candida albicans*. Methanolic extract showed more activity against selected strains of bacteria and fungus. The HPTLC fingerprint of the fruits of *Caryota urens* L. is not reported (ICMR volumes) till 2019. The HPTLC study was carried out to develop chemical fingerprint. Solvent system of toluene: chloroform: ethanol (4:4:1) was used along with anisaldehyde sulphuric Acid. 8 bands were noticed on the chromatogram at 366 nm after derivatization.

Keywords: HPTLC, antibacterial, phytochemical screening.

Identification and Isolation of β -Sitosterol in *Lepidium sativum* Linn

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ABSTRACT

Plants are used as medicines since ancient period. About 80% of medicines in the Indian system of medicines are derived from plant material. *Lepidium sativum* Linn (Brassicaceae) is an annual herb locally known as "Halon" in India but commonly known as Garden cress. In plants, more than 200 different types of phytosterols have been reported. The most abundant being β -sitosterol (24- α -ethylcholesterol), campesterol (24- α -methylcholesterol) and stigmasterol. Plant sterols may possess anti-cancer, anti-atherosclerosis, anti-inflammation and anti-oxidation activities. The present study was carried out in *Lepidium sativum* for identification, isolation and quantification of β -sitosterol. Solvent system of chloroform: glacial acetic acid: methanol and water (64:34:12:8) was found suitable for separation of β -Sitosterol, anisaldehyde sulphuric acid reagent was used as derivatizing agent. The presence of β -Sitosterol was confirmed and quantified during the present study. Diversity of phytosterols was revealed during HPTLC studies which further supplements the therapeutic use of this plant.

Keywords: *Lepidium sativum* Linn, HPTLC, phytosterols, β -Sitosterol

Synthesis, Characterization and Biological Evaluation of Some New Quinoline Analogues as Anti-breast Cancer and Antibacterial Agents

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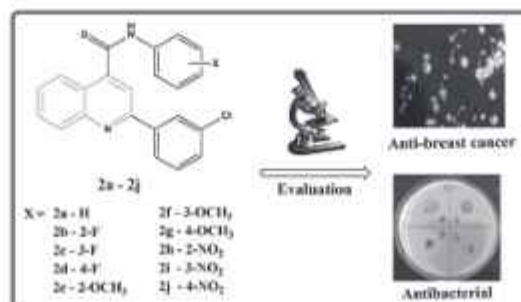
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ABSTRACT

A series of new quinoline analogues (**2a-2j**) were synthesized from 2-chloroquinoline-4-carboxylic acid as a starting material through two steps in good yields and confirmed by spectral characterization viz ¹H-NMR, ¹³C-NMR, FT-IR and MS. All synthesized compounds were evaluated for their anticancer activity against triple-negative breast cancer cell line (MDA-MB-231) using MTT assay and antibacterial activity against Gram-positive bacteria (*Staphylococcus aureus* 6538p and *Bacillus subtilis*) and Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*) using agar well diffusion method. Results indicated that, in vitro anticancer evaluation, IC₅₀ values of all target compounds (**2a-2j**) were found to be in the range of 8.24-46.71 μM. All compounds exhibited significant anti-breast cancer activity as compared to standard cisplatin but not comparable to doxorubicin HCl and trends were observed with varied substituent (X) nature and position. Compound **2j** exhibited better promising anti-breast cancer activity among various synthesized molecules. *In vitro* antibacterial evaluation, all final compounds (**2a-2j**) showed less potency as compared to standard streptomycin. Compounds **2c**, **2f**, **2h**, **2i** and **2j** exhibited moderate antibacterial activity against all tested organisms.



Keywords: Anticancer, Gram-negative, Gram-positive, MDA-MB-231, Synthesis.

Analysis of Potential Biosurfactant Extracted from Soil and Effluent Derived Persuasive Bacterial Isolates

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ABSTRACT

Biosurfactants are structurally comprehensive surface-active compounds produced during the metabolic and energy gaining processes of micro-organisms. They generally belong to the class of glycolipids or lipopeptides and offer numerous advantages over conventional chemical or synthetic surfactants viz; digestibility, biocompatibility and bioavailability. The application of Biosurfactants for environmental clean-up is an eco-friendly alternative to the conventional complex bioremediation programs.

The present study is aimed to analyze the biosurfactant extracted from effective bacterial isolates screened from effluent polluted water and soil samples collected from dumping sites near textile industries for evaluation of its dye degrading ability.

Soil and water samples were collected from strategic locations in and around Thane District. Biosurfactant producing organisms were isolated on suitable agar medium and detected using haemolysis test. Emulsification Index (EI) was calculated and ability of the extracted biosurfactant to emulsify hydrocarbons was determined. The optimization studies were carried out to determine optimal temperature, pH, substrate type, substrate concentration and culture conditions.

Biosurfactant extracted under optimal fermentation conditions from the selected positive culture will be used for further characterization. Large scale production strategies of some new series of biosurfactants effective for degradation of water and soil natural resources polluted due to industrial effluents from textile industries will emerge from the successful culmination of this project.

Keywords: Biosurfactant, characterization, effluent, environment, optimization

Isolation of Bacteria from Oral Cavity and Antimicrobial Activity of Different Toothpastes

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ABSTRACT

Antimicrobial effects of different toothpaste were determined by using agar cup method. The four different toothpastes under study were Meswak, Sensodyne, Colgate, Maxfresh and Vedshakti, Plaque samples were collected from oral cavity of human and were plated on nutrient agar plate and then MSB agar (*Mitis salivarius*), blood agar, MacConkey agar. Biochemical test were performed to identify the characteristics of microbes along with gram staining.

Keywords: Antibacterial sensitivity, dental plaque sample, agar cup method, MSB agar.

Phytochemical, Antifungal and Antibacterial activity of extracts of aerial roots of *Ficus benghalensis* L.

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ABSTRACT

Natural products are a source of synthetic and traditional herbal medicine. They are still the primary health care system in some parts of world. The therapeutic efficacies of many indigenous plants, for various diseases have been described by traditional herbal medicine practitioners. More than 3000 plant species that have reportedly been used for the treatment of various infection agents and diseases. Plant derived compound have always played an important role in the development of several clinically useful antimicrobial agents. *Ficus benghalensis* is an important medicinal plant of the Moraceae family which has been used to treat a wide assortment of diseases including diabetes. This plant is widely used in the preparation of herbal hair oil which keeps the scalp healthy and promotes hair growth.

Present study is carried out to investigate the phytochemical analysis, antibacterial and antifungal activity of various extracts such as methanol extract, acetone extract of aerial roots of *Ficus benghalensis*. Phytochemical analysis of phytochemical screening reveals presence of alkaloids, phenols, flavonoids, sterols, tannins and saponins. Bacterial and fungal strains which can cause skin infection were selected for screening of antimicrobial activity. Ethanol extract has shown good activity against all selected strains as compare to acetone extract.

Keywords: Phytochemical analysis, *Ficus benghalensis*, aerial roots

Covid-19 and Its Effects on Economy and Environment

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ABSTRACT

The Corona Virus which started in December 2019, also called as COVID-19 which stands for 'CO' as corona, 'VI' for virus and 'D' for Disease, '19' denotes the year. It is denoted as new virus which was linked to the same family of viruses which is Severe Acute Respiratory Syndrome (SARS). The outbreak started from Wuhan, Hubei province and it was spread in China. Since people were not aware of the severity of the illness and there was no travel restrictions virus started spreading the whole world. As soon as people in China realized the severity of the virus by early January interventions were introduced like testing and isolation of suspected cases and also introduced travel restrictions on other cities across Hubei Province in China. In just around 2 months the epidemic spread across the world. On March 11, 2020 the World Health Organization (WHO) declared the spread of COVID 19 as a pandemic. Till March end 303000 confirmed cases were measured across the world and approximately over 10,000 deaths in 150 countries were counted. It was affecting the older adults and people with serious health conditions. China started the lockdown and it affected the consumption and production and it also affected the supply chain and affected the companies across the globe. Many people lost their jobs due to lockdown; schools were shutting down. Even increase in the cases across the world other countries started to go into the lockdown including closing borders and travel restrictions, closing schools and shopping malls and marriage halls and closing non-essential entertainment like cinemas, restaurants and bars to maintain social distancing. When lockdowns were introduced the panic buying of goods created shortage in the markets for goods. which caused the economic crisis, affected the share prices in the world and lead to recession.

Keywords: COVID, epidemic, SARS, pandemic, World Health Organization, Recession.

Phytochemical and Invitro Antioxidant Study on *Catharanthus roseus* Source

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ABSTRACT

Cancer is the most dreaded six letter bomb afflicting mankind in the worst possible way. Ayurveda is the Indian traditional system of medicine which focuses on the medical potential of plants and we have been blessed with the boon of plants producing exceptionally promising anti-cancerous activities. The most successful higher plant material used in Cancer chemotherapy are alkaloids of *Catharanthus roseus* genus consists of eight species of which seven are native to Madagascar and one, *C. pusillus*, to India. *Catharanthus roseus*, Madagascar periwinkle is one of the few pharmacological plants that has a various role in herbal and traditional medicine for various diseases. In the present study, phytochemical constituent of aqueous and ethanolic extract of *Madagascar periwinkle* was investigated. The phytochemical analysis revealed the presence of phenol, flavonoids and alkaloids such as Vincristine and Vinblastine are used for the treatment of various types of cancer breast cancer, skin cancer. The recent year statistics according to the National Health Profile shows the increase risk of cancer up to 324% in India. According to the Indian Council Medical Research, death toll due to cancer is expected to rise up to 8.8 lakh by the year 2020.

Keywords: Phytochemicals, alkaloids, steroid, phenol, anticancer activity, chemotherapy, antioxidant, cancer.

Study of Antimicrobial Activity, Antifungal Activity, Antioxidant Activity and Phytochemical Analysis of *Sphagneticola trilobata* L.

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ABSTRACT

Sphagneticola trilobata L. commonly known as Wedelia is a plant of the *Asteraceae* (Sunflower) family. It is widely cultivated as an ornamental ground cover. It rapidly forms a dense ground cover, crowding away and preventing other plant species from regenerating. This species is widely available as an ornamental plant and is therefore likely to spread further. Pharmacological reports revealed that parts of the plant have antioxidant, analgesic, anti-inflammatory, antimicrobial, wound healing, larvicidal, antidiabetic, and hepatoprotective activities. Flower of *Sphagneticola trilobata* L. is not much studied for presence of phytochemicals or pharmacological activities. The aim of the present study is to investigate the antibacterial activity, antifungal activity, phytochemical analysis of different extracts of *Sphagneticola trilobata* L. flower. Enzymatic and non-enzymatic study (hydroxyl radical scavenging method) was employed to analyse the antioxidant property. Qualitative analysis of phytochemicals reveals the presence of Flavonoids, Alkaloids, Tannins, and Saponins. All the extracts have shown good antibacterial activity against bacteria as well as *Candida albicans*.

Keywords: Antimicrobial, antioxidant, phytochemical.

Green Bean Coffee as Nutrient Source for Insecticide Degrading Bacteria

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ABSTRACT

The main criterion of this research was to isolate organism from green coffee bean which can degrade insecticide (chlorpyrifos). Coffee bean crushed and inoculated in MSM medium incubated at static condition for 1 week then transferred to fresh MSM medium, of one-week incubation each. The organism was isolated on MSM agar medium and colonies were characterized by cultural and biochemical test (CSIR-NCL Pune by 16srRNA sequencing). The organism was found to resemble *Enterobacter chuandaensis* and was exposed to different concentration of chlorpyrifos (2%, 1%, 0.5%, 0.3% and 0.2%) and spectrophotometer analysis was done. Colony 3, on day 6 was found to be better degrading bacteria than compared to others at absorbance 530nm and best result of degradation was obtained in 0.5%. Result showed that coffee bean was an adequate nutrient source for bacterial growth and it significantly enhanced chlorpyrifos biodegradation.

Keywords: Coffee, insecticide, biodegradation, *Enterobacter chuandaensis*

The Biological Diversity Act 2002, Conservation, Management and Sustainable Use Of Bioresources And Its Role In Empowering Village Economy

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ABSTRACT

Biological diversity management and conservation is indispensable amid threat of climate change, anthropogenic factors and consumerism. Therefore, first multilateral effort was made in 1992 with the signing of United Nations convention on biodiversity. Being signatory to be in compliance, India promulgated Biological Diversity Act, 2002 (BDA). The purpose behind the enactment of BDA is conservation of biological diversity, sustainable use of its components, fair and equitable sharing of benefits arising from genetic resources and preventing biopiracy. With this in view, it provides for the establishment of three tier institutions at national, state and local level. Access and benefits sharing guidelines given by National Biodiversity Authority changes the way biological resource related intellectual property would be accessed and commercialized. This project is an attempt to conscript the role of BDA in conservation, management, sustainable use of bio-resources and empowering people in the villages, creating better employment opportunity and better prices for bio-resources.

Keywords: Biological, Anthropogenic, Bioresources, Access and benefits sharing, convention on biodiversity, Biopiracy

Instrumentation Facility



Applicator (Linomat 5 and Auto Sampler 4)



Development

(Automatic Development Chamber-ADC 2
Automatic Multiple Development Chamber-AMD 2)



Documentation (HPTLC Visualizer and Scanner)



**HPTLC-
Interface**

**Liquid Chromatography-
Mass Spectrometry System (LC-MS)**

(HPTLC Laboratory, Department of Botany)

**Spectrophotometer Laboratory, Instrumentation Facility
(Department of Chemistry)**



GCMS



**FT-IR SPECTROPHOTOMETER
WITH ATR**



**60 MHz NMR
SPECTROPHOTOMETER**



**FLUORESCENCE
SPECTROPHOTOMETER**



**UV-VISIBLE
SPECTROPHOTOMETER**



MICROWAVE SYNTHESIZER



**Atomic Absorption Spectrophotometer (AAS)
(AAS Laboratory, Department of Zoology)**



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