## INNOVATIVE TRENDS IN CHEMICAL, PHYSICAL AND BIOSCIENCES 2016 "ITCPB-2016"

# February 9-10, 2016 **SOUVENIER**

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Organized by

Pune District Education Association's Annasaheb Magar Mahavidyalaya, Hadapsar, Pune-411028, Maharashtra, India http://amc.pdeapune.org/ Email Id: plasma\_amm@yahoo.co.in

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## SOUVENIER OF INTERNATIONAL CONFERENCE ON "INNOVATIVE TRENDS IN CHEMICAL, PHYSICAL AND BIOSCIENCES 2016" (ITCPB-2016)

February 9-10, 2016

Organized by Pune District Education Association's AnnasahebMagarMahavidyalaya, Hadapsar, Pune-411028, Maharashtra, India http://amc.pdeapune.org/ Email Id: plasma\_amm@yahoo.co.in Faculty of Science

> Editors Dr. Neha N. Patil Dr. Shrikant B. Jagtap Dr. Bhasuheb S. Bendre

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### International Conference on

#### "Innovative Trends in Chemical, Physical and Biosciences 2016"

#### From the Principal's Desk



It gives us immense pleasure in welcoming you all on behalf of BCUD SavitribaiPhule Pune University, our parent institute Pune District Education Association, Pune and AnnasahebMagarMahavidyalaya, Hadapsar, Pune for the International Conference. The aim of this conference is to highlight the interdisciplinary approach of research in Science and to give exposure to students from the national and international fraternity to some of the latest or even still emerging trends in Basic Sciences.

We are enthused and overjoyed as this important international event is taking place in the Platinum Jubilee year of our parent institute. It is possible only due to the positive and sincere efforts of our management. Our young, dynamic and ever encouraging President Hon. AjitdadaPawar has always guided and supported us in our endeavors. His vision and positive approach has brought leaps and bounds of change in the overall outlook of the institution. This has energized the faculty and the support staff immensely. Honorary Secretary, Treasurer, Assistant Secretary, Deputy Assistant Secretary and the President's Representative are implementing the new educational policies as accordingly.

We are grateful to all the Principals of various colleges under PDEA, teaching and non teaching staff of the colleges who have extended their whole hearted support to the conference. Our special and sincere thanks are to the national and international experts, research scholars, alumni and students who gave us due support and encouragement in organizing the conference. Suggestions and criticism from the participants for enhancing the quality of the conferences will not only be acknowledged but will be appreciated.

We are also thankful to all teaching, non teaching staff and the students for their sincere efforts in making this academic event possible. Once again we are thankful to the BCUD, SavitribaiPhule Pune University for giving us the essential financial assistance without which the success of this conference would have been only a distant dream.

#### Dr. Bhahusaheb S. Bendre

### International Conference on

## "Innovative Trends in Chemical, Physical and Biosciences 2016"

## From Coordinator's Desk



It has been heartening experience to make these two days International Conference on **"Innovative Trends in Chemical, Physical and Biosciences 2016**"sponsored by BCUD, SavitribaiPhule Pune University, PUNE.

The theme of the conference is to provide a common platform for most of the fraternities of Science to discuss the issues pertaining to sciences without the subject boundaries. It also aims to make a broader convention to the educational leaders, science teachers and the academic community.

The conference has been arranged under the able guidance of Principal Dr. B. S. Bendre, who has been the constant source of inspiration and motivation during the preparation for the conference for the last four months. We would like to inform here that this conference would not have seen the light without the able support of all the college staff and students. The active involvement of the delegates in the conference is indispensable to its success.

We also take the opportunity to thank all our trustees of Poona District Education Association, especially our president, Hon. Shree AjitdadaPawar, Hon. Secretary Shree SandipKadam, Dr. V. B. Gaikwad (Director BCUD, SPPU, PUNE) and all the participants without whose contribution this event would not have been successful

#### Dr Neha Nitin Patil

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Conference Programme				
Day I: Tuesday. Date: 09 February 2016				
9:00 to 10:00am	Registration and Breakfast			
Session I				
10:00 to	Inauguration			
11:00am	Chief Guest: Dr. V. B. Gaikwad (Director, BCUD, SavitribaiPhule Pune			
	University, Maharashtra, India)			
	President: Hon. SandipKadam(Hon. Secretary, PDEA, Pune, Maharashtra,			
11.00 / 11.20	India) Plenary lecture · Prof R M C Rajanakse			
am	Department of Chemistry, Faculty of Science, University of Peradeniya,			
am	Peradeniya, Sri Lanka.			
	<b>Topic:</b> Extremely low cost oxygen reduction catalysts for fuel cell applications and an efficient photocatalyst for water splitting			
	Chair: Dr. S. P. Singh			
	Co-chair: Dr. SushmaChaphalkar			
11:30 to 12:00	Plenary lecture: Dr. Satya P. Singh			
pm	Professor and Head Department of BiosciencesSaurashtra University, Rajkot,			
	Tania: Halaalkalinhilia hastoria and astinomyastas and their anyumatic			
	potential			
	Chair: Prof. B. P. Kapadnis			
	Co-chair: Dr. D.M. Mahajan			
12:00 to 1:00 pm: Lunch				
Session II				
1:00 to 1:30	Plenary lecture: Dr. Soumitra Satapathi			
pm	Assistant Professor Department of Physics, Joint Faculty, Center for			
	Nanotechnology, IIT Roorkee			
	Adjunct Professor of Physics, University of Massachusetts Lowell, USA			
	<b>Topic:</b> Harnessing Energy from the Sun: A Green Solution to a Grey Problem			
	Chair: Dr. SushmaChaphalkar			
	Co-chair: Dr.S.D.Aghav			
1:30 to 2:00	Plenary lecture: Dr. Sushma Chaphalkar			
pm	Chief-Coordinator of VidyaPratishthan and School of Biotechnology at			
	Vidyanagari, Baramati.			
	Taria Tras Dista hasha su			
	Chaim Dr. D.M. Mahaian			
	Chair: Dr. D. M. Manajan			
2.00 to 3.00 pr	1 Co-chair: Dr. S.G.Salokne n-Poster presentation			
2.00 to 5.00 pm.i oster presentation				
3:00 to 3:30 pm: Tea				
3:30 to 4:30 pm : Poster presentation				

Conference Programme				
Day II : Wednesday Date:10 February 2016				
Session III				
10:00 to	Plenary lecture: Mr.Vinod Patil			
10:30am	Director, Dyna Biotech,. Pune, Maharashtra, India			
	Topic: Scope, future and opportunities in Microbiology			
	Chair: Dr. Anjana Singh			
	Co-chair: Dr. N. N. Nawani			
10:30 to	Plenary lecture: Mr. Snehal Shekatkar IISER, Pune			
11:00am	Topic: Epidemics spreading			
	Chair: Dr.B.S.Bendre			
	Co-chair: Dr.V.D.Avasare			
11:00 to	Plenary lecture: Dr. Neelu N. Nawani			
11:30am	Professor, Dr. D. Y. Patil University, Pune, Maharashtra, India			
	Topic: Genome analysis of <i>Lysinibacillus</i> B1-CDA, a bacterium that			
	accumulates arsenics"			
	Chair: Prof. R. M. G. Rajapakse			
	Co-Chair: Dr. Anjana Singh			
11:30 to	Plenary lecture: Prof. Dr. Anjana Singh			
12:00 noon	Head Central Department of Microbiology Tribhuvan University, Kirtipur,			
	Kathmandu, Nepal			
	Topic: Trends in Microbiology in Nepal			
	Chair: Dr. N. N. Nawani			
	Co-chair: Dr.V.R.Sapre			
12:00 to 1:00 pm : Lunch				
Session IV				
1:00 to 1:30	Plenary lecture: Prof. Sanjay D. Dhole			
pm	Department of Physics, S.P.Pune University, Pune, Maharashtra, India			
	<b>Topic:</b> Synthesis of metal nano particles by radiation and their application			
	Chair: Dr.V.R.Sapre			
	Co-chair: Dr.S.K.Satpute			
1:30 to 2:00	Plenary lecture: Dr. Vidya D. Avasare			
pm	Dept. of Chemistry, S.P.College, Pune, Maharashtra, India			
	Topic: Prospects and challenges for synthetic chemistry			
	Chair: Dr.AlimSayyed			
	Co-chair: Dr. SurekhaSatpute			
2:00 to	Plenary lecture: Dr. Surekha K. Satpute			
2:30pm	Dept.ofPhysics,SPPU,Pune,Maharashtra,India			
	Topic: Lactobacillus acidophilus derived biosurfactants			
	Chair: Mrs.AshaSalunke			
	Co-chair: Dr. UjwalaKhishti			
2:30 to 3:00 pm: Tea				
3:00 to 4:00	Valedictory Function			
pm	Chief Guest: Prof. P. B. Vidyasagar (Vice Chancellor, SRTM University,			
	Nanded, Maharashtra, India)			
	- Mr. Siddharth A. Salunke (Corporate Director, BioEra Life Sciences Pvt.			
	Ltd)			
	- President: Mr. RajendraGhadage (PDEAs President Representative)			

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#### **Abstracts of Speakers**

#### Would fuel cell power for motor vehicles be a reality in the near future?

R.M.G. Rajapakse\*, K.G.C. Senarathna, R.B.D.S. Rajapaksha and C.A. Thennakoon Department of Chemistry, University of Peradeniya, Peradeniya 20400, Sri Lanka

Abstract: Fuel cells are enabling Energy Technology for Worlds Energy Portfolio and utilize the chemical energy change (- $\Delta G_{cell reaction}$ ) of the net redox reaction caused by the reduction of oxygen gas and oxidation of any fuel to electrical energy nFE<sub>cell</sub>. Although fuel cells resemble Galvanic cells in every other aspects, the only difference is that the reactants of fuel cells are supplied externally so as to maintain constant concentration of reactants always in order to provide constant power output. As such, they have the potential to revolutionize the way of powering the world and they offer cleaner and more efficient alternativesto combustion of gasoline and other fossil fuels. Theyhave the potential to replace the internal-combustion engines in vehicles and to provide power in stationary and portable power applications because they are energy-efficient, clean, and fuel-flexible. The simplest and cleanest fuel is hydrogen gas though any organic matter can be used. The operational principle of the  $H_2/O_2$  fuel cell is based on the reduction of oxygen at Pt-Rh catalytic surface and the oxidation of hydrogen at Pt catalyst surfaces. Since both reactions make use precious metals, the cost of fuel cells depend, to a large extent, on the cost of these catalysts. Research efforts are centred on increasing cathodic activity and durability of the cathode. In order to achieve these objectives, four strategies are being employed, which include (i) Lowering the platinum group metal (PGM) content by catalyst engineering particle morphology and crystal structure, (ii) Alloying Pt with less expensive base metals such as Co, Mn, Ni, and others, (iii) Developing novel supports such as non-carbon supports and alternative carbon structures and (iv) Developing Non-PGM catalysts. Major progress in the research in electrocatalyst and support area has been made. Several researchershave demonstrated that Pt alloy compositions have significantly higher performance and durability than Pt alone. A total Pt-loading of 0.4 mg Pt/cm<sup>2</sup> has been demonstrated in a single cell for more than 7,300 hours with voltage cycling, surpassing the 2015 durability targets. Catalysts with the required activity and durability still need to be developed. An example of a non-carbon catalyst support is 3M's nanostructured thin film polymer whisker concept as well as titanium oxide (Aldrich Prod. No. 14021) and tungsten carbide (Aldrich Prod. No. 241881). Our research activities are based on exploring non-platinum electrocatalysts for oxygen reduction and cheap and efficient photocatalysts for water splitting to produce  $H_2$  and  $O_2$  gases needed for fuel cells. In 2010, we published our first catalyst for oxygen reduction based on montmorillonite clay, polypyrrole and Ce(III) nanocomposite, MMT/PPY/Ce(III), [R.M.G. Rajapakse, Kenji Murakami, H.M.N. Bandara, R.M.M.Y. Rajapakse, K. Velauthamurti and S. Wijeratne, ElectrochimicaActa, 55 (2010) 2490-2497.] which was subsequently reviewed in a book [CHALCOGENIDES: ADVANCES IN RESEARCH AND APPLICATION: 2011 Edition by Q. Ashton Acton, PhD, Copyright@2012 Scholarly Edition^TM, Oxford University Press, ISBN: 978-1-464-92064-9]. We now have developed several such MMT/Electronically Conducting Polymer/Reduced form of the ion that is as the Oxidative Polymerization Catalyst. This procedure of synthesis is simple and straightforward and materials used are of extremely low-cost but the composites are effective in reducing oxygen. MMT/PPY/Ag system has been published in Advances in Automobile Engineering 2015. We have developed MMT/PPY/Co(II), MMT/PANI/Co(II) [PANI = polyanilne], MMT/PPY/Fe(II), MMT/PPY/Cu(0) systems and characterized extensively using XRD, XPS, XRF, Electrochemical Techniques, Thermal Analytical Techniques etc. and their applications as oxygen reduction catalysts have been studied. We have also developed C/Pd systems since Pd is considerably cheaper than Pt. To our astonishment, Pd/C system is found to be superior when compared to the same mass loading of Pt/C system in reducing oxygen to hydroxyl ions in Basic media thus standing out as a promising electrocatalyst for alkaline fuel cells. We have also demonstrated that methanol crossover is not a problem when Pd/C catalyst is used instead of Pt/C catalyst thus providing opportunities to be utilized in direct methanol fuel cells also. We have further developed TiO<sub>2</sub>/Nb(V)/Ag composite nanowires by simple wet chemical sol-gel route and found that the material is a superior phocatalyst for water splitting even under diffused indoor sunlight. The introduction of Nb(V) and Ag(0) tend to provide electronic energy levels within the band gap of the material making it a material capable of Infrared Photon Upconversion. The utilization of both visible and infrared portions of the solar spectrum enables the catalyst to split water much faster than those other catalysts so far developed for the same process. If these research outputs would be utilized industrially, the replacement of internal combustion engines in the majority of motor vehicles would not be too far and cleaner and efficient transportation would be a reality in the near future.

## Lactobacillus acidophilus derived biosurfactant and its impact as antiadhesive agent on medical implants

## Surekha K. Satpute<sup>1\*</sup>, Nishigandha S. Mone<sup>1</sup>, Rajendra R. Patil<sup>2</sup>, Ibrahim M. Banat<sup>3</sup> and Arun G.

Banpurkar<sup>1\*</sup>

<sup>1</sup>Department of Physics, <sup>2</sup>Department of Biotechnology, Savitribai Phule Pune University, Pune – 411007 <sup>3</sup>School of Biomedical Sciences, University of Ulster, Coleraine, BT52 1SA, N. Ireland, UK

Abstract: The probiotic bacterium, Lactobacillus acidophilus NCIM 2903 produces cell free (CF) and cell associated (CA) biosurfactant (BS) in simple fermentation medium (FM) with reduction of surface tension (SFT) from 55 to 28 mN m<sup>-1</sup> after 72 hrs of incubation at 30°C/150 rpm. The FM containing (g/L) peptone (10), yeast extract (10), beef extract (10) and tri-sodium citrate (5) pH of 6.5 was used for BS production. We are also involved in optimizing FM using renewable substrates like whey, mahua (Madhuca indica) to enhance the yield of BS. After complete fermentation process, the pH of FM changed from 6.5 to 8.7. CFBS and CABS reduced SFT of phosphate buffer saline (PBS, pH 7.0) from 72 to 27 and 26 mN  $m^{-1}$  with a critical micelle concentration (CMC) of 621 µg ml<sup>-1</sup> and 23.6 mg ml<sup>-1</sup> respectively. Both types of BS also reduced interfacial tension (IFT) of water insoluble liquids and also display good spreading capacity (evident from reduction in contact angle on various surfaces). BSs found to be highly stable at neutral to alkaline pH conditions and at different temperature (4-121°C). Chemical characterization of BS revealed a glycolipid (CFBS) and glycolipoprotein (CABS) type. Emulsification index revealed both types of BS as wetting, spreading agent which is important to produce physically stable emulsions and surfactant blends for applications. Structural elucidation of both types of BS by using FT-IR, NMR (<sup>1</sup>H and <sup>13</sup>C) and MS is in process. The CFBS was found to be effective to inhibit adhesion of biofilm formation on medical devices including contact lenses, urinary catheter. Microfluidics based study ensured the ability of BS to restrict the adhesion of pathogenic biofilm forming microbes. Current work has a potential to use both types of BS as antimicrobial, anti-biofilm and antiadhesive agent in biomedical industries. Acknowledgements: Dr. Surekha K. Satpute expresses special thanks of gratitude to DST, Government of India, for financial support {SR/WOS-A/LS-1076/2014(G)}.

### Nepalese scenario of Entamoeba histolytica and Giardia lamblia

#### Dr Anjana Singh

Abstract: Diarrhoeal diseases are considered as the killer disease in Nepalese children under five years of age. According to the report of Department of Health services of the fiscal year 2013/2014, the incidence of diarrhea is 629 among 1000 children under five years of age. The incidence rate has increased in comparison to the previous years. The main etiological agents for the causation of diarrhea are Entamoebahistolyticaand Giardia lamblia among the protozoan though other causes of diarrhoea has also been reported. Poverty and its accompanying factors such as lack of sanitation, malnutrition, illiteracy and overcrowding are all causes and consequences of protozoal infections in the country. The diagnosis of protozoal infections is solely dependent on direct microscopic examination though some investigators have attempted to follow concentration technique, copro-antigen detection and molecular techniques for the detection of the pathogens. The mainstay of the management of diarrhoeal disease in Nepal is oral rehydration therapy supplemented with Zinc tablets along with the metronidazole tablets. Due to lower access of the patient to health care facilities, the mortality has been increasing day by day. In the current study we have attempted to review the infection rate of Entamoebahistolytica and Giardia lamblia among Nepalese children since 2005 till date.

Key words: Diarrhoeal disease, Entamoebahistolytica, Giardia lamblia, Nepal

Corresponding author: Prof DrAnjana Singh

Head, Central Department of Microbiology, Tribhuvan University

## Human Bones, Bone Defects and Custom-made Prostheses for Orthopaedic Transplants

H.J. Suraweera, A.P. Mahawithana, A. Pinidiyaarachchi, R. Darshanayapa, M.P. Ranaweera, S.R. Herath, K.R.B. Herath, S. Pathirana, C.K.Pathirana, H.M.N. Bandara, T. Herath, R.P.V.J. Rajapakse, P. Gamagedara, S.L. Wijesinghe, S.P. Dunuweera, P.V.V. Jayaweera and R.M.G. Rajapakse Bioprosthesis Group, Teaching Hospital and University of Peradeniya Peradeniya 20400, Sri Lanka

**Abstract:** Custom-made prostheses are required for substituting defected bones of orthopaedic patients and are prohibitively expensive due to tedious procedures involved in their manufacturing. In order to design a custom-made prostheses, the CT scan, MRI and X-ray data of the defected bone have to be obtained in various angles.

Such data should then be converted into 3-D figures using purposely developed computer programmes. The 3-D objects thus created on computer screens have to be used in designing prostheses. Perfect design of the prosthesis should then be fed to manufacturing machines capable of cutting stainless steel or medical grade Ti-6Al-4V alloy bars to the required dimensions and shapes with 1 micron accuracy. The alloy prostheses so fabricated have to be made biocompatible, osteo-integrating, non-toxic and corrosion-resistant in corrosive biological fluidic environments. This should be done by depositing hydroxyapatite nanoparticles of the dimensions similar to those are present on actual bones, on the surfaces of the prosthesis made of medical implant alloys. Finally, their toxicity, corrosion-resistance and cell adhesion properties have to be studied. Having confirmed biological safety of the implants they then have to be sterilized prior to transplant in human bodies. In order to accomplish the above tasks we have formed a so called "Bioprosthesis Group of University of Peradeniya" which comprising of Biologists, Chemists, Computer Scientists, Design Engineers, Nanotechnologists, Orthopaedic Surgeons and Production Engineers. We have already manufactured two such prostheses: an elbow joint of a 11-year old girl and a knee of a 55-year old male patient were corrected using these prostheses. We are currently making the third prosthesis to replace cancerous bone of a patient. We have also designed and developed telescopic prostheses to tackle the problem of brittle bone disease. Out orthopaedic unit has 300 such children with this brittle bone disease and we are in the process of manufacturing prostheses to help raise these children. In this presentation, we reveal the steps in the manufacture of such custom-made prostheses and the chemistry behind making them biocompatible, osteo-integrating, non-toxic and corrosionresistant.

### Harnessing Energy from the Sun: A Green Solution to a Grey Problem

**Abstract:** With an increase in the demand for energy, there is a significant worldwide interest and initiative for the development of renewable and sustainable alternatives. Recently, significant progress has been achieved in the development of excitonic solar cells (XSC) devices and they are being perceived as a viable low cost alternative energy source. XSC device encompasses a matrix of beneficial attributes including broad spectrum of readily tailored materials and ease of device fabrication to suit roll-to-roll large volume production. In this talk, I will explain how nanomaterials like graphene, CNT etc and natural materials like Indian fruits and organic dyes can be used to fabricate low cost XSC devices. The morphology optimization protocol and device physics will be discussed in details.

### **Career Opportunities in Microbiology**

#### Vinod Patil

#### Director Dyna Biotech, Pune, Maharashtra, India

Abstract: Microbiology is the study of minute living organisms, which cannot be seen with the naked eye mostly comprising of bacteria, viruses, archaea, fungi and protozoa. These organisms are the dark matter of the biological world. Microbiology includes fundamental research on the biochemistry, physiology, cell biology, ecology, evolution and clinical aspects of microorganisms, including the host response to these agents. Microbiology has tremendous scope and a very bright future. Microbiology is one such branch of science which has made many imaginations a reality. The innovations in this field has given the ability to human being to see tiny invisible organisms of unbelievable size less than 0.2 micron or even less and to study every detail of it. The scope of microbiology is immense due to its ability to control all critical points of many fields like Medical, Diary, Pharmaceutical, Industrial, Clinical, research, water industry, agriculture, nanotechnology, chemical etc. With the new dimension of thinking, today microbiologist can easily discover new drugs, produce advanced vaccines, antibiotics and other recombinant products. Hundreds of enzyme properties, antibiotic properties within microorganisms are being detected daily and are applied in various fields for the well-being of human life. Who knows your imagination of isolating organisms from extreme condition can give new drugs for today's burning issues and diseases and can save thousands of patients life's all over the world. This is possible due to the contribution of mankind towards microbiology. The career opportunities to choose from as a microbiologist will depend on the level of education and training you receive. To make a career in microbiology, the candidate must be very strong in both basic and applied aspects of microbiology including special skills in laboratory techniques. For example, if their focus is on the fermentation industry, a strong background in industrial microbiology or fermentation technology is a must. For students pursuing pathology, add-on training in various lab investigations is a must. Microbiology is offered at three levels ---UG, PG and PhD. Students pursuing UG in microbiology can work at science laboratories and pathology labs. Students who want to upgrade their skills can opt for various certificate, diploma and short-term courses in different disciplines of microbiology offered by various universities and RandD centers. Microbiology graduates can pursue PG in microbiology. Once they complete their course, they can work in microbiology based industries like pharmaceutical, dairy, breweries, distilleries, enzyme, etc. A Masters degree would qualify them for a career as a laboratory supervisor or an instructor at a community or junior college. A doctoral degree is almost always required for higher level positions in microbiology and other sciences. Alternatively, they can also pursue their

PhD programme. After a few years of experience, one can start a pathology laboratory. Students who complete PhD can take up teaching at universities and PG colleges. They can also take up a post-doctoral research with good fellowship and contingency grants offered by funding agencies like UGC, CSIR, ICMR, DBT, etc. In addition to the laboratory and technical jobs, there are several other career paths one can take with Bachelors degree in microbiology such as research assistant, food, industrial or environmental microbiologists, quality assurance technologists, sales or technical representative, clinical and veterinary microbiologists, medical technologists. Combining microbiology with another discipline, such as education, business, or journalism, provides an even wider range of career options. Such career options would include teaching in high school, scientific sales, science writing for the general public, public relations, or regulatory affairs. Completing a Bachelors degree in microbiology also provides the necessary foundation to continue an education in the medical, veterinary, dental or legal fields. Today microbiologists are required in top organizations like NASA for identification of any life form for their various missions like the recent Mars curiosity mission and many more. The scope is immense; just what is needed is right application of knowledge. With such a scope in microbiology what today's students, professionals need is just a change of their mindsets, a change in their imagination, a thinking beyond circle, rest knowledge, innovation and technology will take care to make them successful. Job is a way to apply knowledge but innovation and imagination is a way to destination and Einstein rightly said that "imagination is powerful than knowledge". In India, microbiology is offered by several universities without any specialization. This equips students to choose from a variety of specializations. With a number of branches, and an increase in the demand for qualified microbiologists, fresher's have a good scope in India. Globally, bacteriology, virology, immunology, applied microbiology, microbial biotechnology, medical microbiology, food and dairy microbiology, veterinary and agricultural microbiology are emerging specializations. Students will have to find job openings in newspaper classifieds, job banks on the internet, or professional journals. The college may also provide with placements or one can also apply directly to colleges and universities, medical centers, private firms, and government agencies that hire microbiologists.

#### Synthesis of Metal Nanoparticles by radiation and their Applications

S.D. Dhole

Department of Physics, S. P. Pune University, Pune-411007

Abstract: Metal nanoparticles such as Silver, Gold, Copper were synthesized by irradiating solutions, prepared by mixing AgNO<sub>3</sub> + PVA(Polyvinyl alcohol), HAuCl<sub>4</sub> + PVA, CuSO<sub>4</sub> + PVA, with 6 MeV electrons. Nanoparticles of metal in the form of different colors were observed in the solution after a critical electron fluence of 1 x  $10^{13}$  e<sup>7</sup>/cm<sup>2</sup> and further coloration was observed from yellow to dark brown as increase in the fluence upto  $10^{15}$  e<sup>-</sup>/cm<sup>2</sup>. The electron irradiated solution and thin coating cast from them were characterized using the Ultraviolet-visible (UV-Vis), X-ray diffraction (XRD), Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM) techniques. During electron irradiation, the process of formation of the silver, gold, copper nanoparticles appeared to be initiated at an electron fluence of 2 x  $10^{13}$  e<sup>7</sup>/cm<sup>2</sup>. This was evidenced from the solution, which turned vellow, pink, dark brown and exhibited the characteristic plasmon absorption peak around 455nm, 531nm and 628nm respectively. Silver, gold, copper nanaoparticles of different size in the range of 60-10nm, 15-3nm and 30-16nm, with a narrow size distribution could be synthesized by varying the electron fluence from  $2 \times 10^{13}$  to  $3 \times 10^{15}$  e<sup>7</sup>/cm<sup>2</sup>. The results of the XRD measurement indicates that the diffraction peak could be indexed as the FCC silver, gold copper systems. TEM Micrograph also supports this finding. The UV-Visible absorption spectra shows a gradual blue shift in the plasmon (excitonic) peak, which attributes to the decrease in the average particle size with increasing electron fluence. Some results of the semiconductor (CdS), magnetically doped semiconductors nanoparticles and diffusion of metal nanoparticles in polymers and glass will also be discussed. Various applications of synthesized materials have also been studied. Main emphasis was on to study the antimicrobial activities of these materials against gram positive and gram negative bacteria.

## Genome analysis of Lysinibacillus B1-CDA, a bacterium that accumulates arsenics

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Abstract: An arsenic resistant bacterium Lysinibacillus sphaericus B1-CDA was investigated for its genetic composition and evolutionary history with parallel sequencing. The genome assembly was subjected to

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comparative analysis with other known Lysinibacillus genomes. Assembly of the sequences revealed a genome of ~4.5 Mb in size that comprises ~80% of the chromosomal DNA. The ordered contigs contains abundant regions of similarity with other Lysinibacillus genomes and identifiable genome rearrangements. By using RAST and Blast2GO analyses we have found genes responsive to several metals such as arsenic, nickel, cadmium, iron, manganese, chromium, cadmium, lead, cobalt, zinc, silver and mercury. Predictions by RAST and Blast2GO revealed that the B1-CDA genome contains additionally a total of 123 proteins involved in binding and transport of metal ions. Further, B1-CDA contains many other proteins (approximately 30) that catalyze binding and transport of the metal ions such as metalloendopeptidase, metalloexopeptidase, metallocarboxypeptidase and metallochaperone. The genetic mechanisms of the isolate could be used to cope with arsenic toxicity.

**Keywords:** Toxic metals, Bioremediation, Lysinibacillus sphaericus B1-CDA, Genome, sequencing, de novo assembly, Gene prediction.

### **Prospects and challenges in synthetic chemistry**

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The goal of our research laboratory is to explore the fascinating synthetic organic and organometallic chemistry for diversified applications. Prevent-Diagnosis-Cure remains the main objective of our lab along with this we are keen to provide new methodologies for the synthesis of chiral and important organic compounds. To achieve the goal of our lab, we have been dealing with synthesis of chiral ligands, CORMs (CO releasing molecules) and tripeptied as neuroprotective agents, post-translational protein (K-RAS) modification (Figure 1), synthesis of nanoparticles and synthesis of fluorescent compounds for sensing purpose. The important challenges and thrust areas of the research in chemistry and the ongoing research in my group will be presented in the conference talk.

#### Haloalkaliphilic bacteria and actinomycetes and their enzymatic potential

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Abstract: Our studies over the years have focused on the distribution, diversity and enzymatic potential of haloalkaliphilic bacteria and actinomycetes from the saline habitats of Coastal Gujarat, India. These bacteria and actinomycetes have been characterized with respect to their morphological features, biochemical properties, secretion of the extracellular enzymes, antibiotic resistance-sensitivity, plasmids, 16S rRNA gene homology and DGGE profiling. The 16S rRNA gene homology suggested that some of these organisms are new, while others had above 97 % sequence homology with the bacteria reported from other saline habitats of the world. Literature suggests that most of the studies on these organisms have focused on the diversity and phylogeny, while adaptation, enzymatic properties and other biotechnological potential are less attended. Our results suggest that among the enzymes, alkaline proteases are widely distributed in these organisms and have common and unique features; such as salt dependent temperature profile, resistance against urea denaturation and catalysis under the combination of extreme conditions. Many of the protease genes are cloned and expressed in Escherichia coli as host and recombinant enzymes characterized. More recently, metagenomics has gained attention for retrieving novel gene sequences from the uncultivable majority. In this direction, we established protocols for the extraction of the inhibitors free total genomic DNA from various saline habitats for different molecular applications. Diversity of the protease genes retrieved from the cultivable organisms and metagenome using degenerative primers is amply reflected.

Keyword: Molecular Phylogeny, haloalkaliphilic bacteria, alkaline proteases, metagenomics, saline habitats

### How can a paradox of friendship help us to fight an epidemics?

#### Snehal M. Shekatkar IISER Pune

**Abstract:** Complex networks are mathematical structures consisting of discrete points connected by lines and can be used to study many complex physical systems like human brain, human society, traffic jams, World Wide Web, citation patterns, ecological food webs as well as mathematical structures like natural numbers. In this talk I will give a general introduction to complex networks, in particular social networks and will discuss how the epidemics like Ebola, spreads in a society. The dynamics of this spreading pattern is highly dependent on the underlying structure of social networks which is usually thought to have a scalefree topology. I will then discuss how this scale-free nature makes the direct vaccination of individuals almost ineffective and would suggest a better strategy based on a paradox of friendship.

## **Invited Talk on Tree Biotechnology**

#### Sushama Chaphalkar

Vidya Pratishthan's School Of Biotechnology, Baramati-413133

**Abstract:** Medicinal plants form the major natural resource base of the Indian indigenous healthcare tradition and conferred with rich plant diversity. Within this mammoth biodiversity of trees 27 Aradha Vruksha fined a special place. For known and unknown scientific and therapeutic purpose exsitu conservation of these 27 trees take care of food, fiber, fertilizer and fuel for given community. Therapeutic uses can be defined by circumventing studies providing molecular, biochemical, micropropogative and immunological studies of these huge genomes. Case study of Syzygium cumini is being presented here. The interesting facetes leading to conclusions remarks is being come out at VSBT. This is first ever report includes cDNA library, biochemical organic and inorganic fingerprinting, micropropagation protocols, suspension cultures, phylogeny of endophytes for their novel metabolites details of immunological studies by FACS. Accession numbers (GR881943, GR881944, GR556838, GR556839, GR556840, and GR505438) has been obtained for six EST sequences in dbEST database from NCBI. The total number of aldehyde and ketone is 4 and 10 respectively; protocol for micropropogation was successful and 8 isolates of endophytic bacteria named as Bacillus megaterium, Terribacillus saccharophilus, Kocuria sediminis shows the production of bioactive compounds and antimicrobial peptides for enhancement of tree immunity. Experiments on glactosylated RBCs shows increasing concentration of monocytes, granulocytes, lymphocytes.

**Keywords**: Aradhya Vruksha, Syzygium cumini, Phytochemical, cDNA library, FACS, Endophytic bacteria, Micropropogation.

#### 1. Agriculture, Forestry and Horticulture

## **Biodegradation of Dimethoate from pesticides contaminated agricultural** soil.

## Ganvir V.N., Ashwini Udagi and Shweta Singh

Waghire College Saswad

Abstract: Soil was collected from two different locations namely, Saswad and Baramati which was sprayed with Dimethoate for past few years. In vitro studies were carried out using nutrient broth inoculated with soil for enrichment and isolates were obtained using Davis Mangolis medium supplemented with Dimethoate (4ml/L).Pesticide degrading microorgnamisms were isolated and identified on the basis of morphology, biochemical tests and by using Bergey's manual of determinative bacteriology. The isolated organisms were belonged to Pseudomonas spp. Minimum inhibitory concentration and Minimum bactericidal concentration was determined for all isolates.TLC was performed to check pesticide degradation and degraded metabolites of the pesticide. The isolated organisms were subjected to different concentrations of Dimethoate i.e. 3%,11%,19%. All isolated Pseudomonas spp were found to degrade Dimethoate up to higher concentration (approx: 19% in medium). This research work can help in bioremediation of pesticides contaminated agricultural soil. Keywords: Dimethoate, Biodegradation, Pseudomonas spp.

## Effect of integrated weed management on growth yield of upland rice (Oryza sativa l.)

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Abstract: An experiment entitled "Integrated weed management in upland rice (Oryza sativa L.)" was conducted during Kharif 2013. The object of experiment is to "Study the efficacy of different weed control methods and to evaluate the most suitable and economical weed management practice for controlling weeds in upland rice". Weed intensity at 60 DAS and dry matter at harvest were significantly lower in weed free check followed by two hand weedings at 20 and 40 DAS, respectively. It was followed by pre-emergence application of butachlor 50% EC @ 1.25 kg a.i. ha<sup>-1</sup> + hand wedding at 40 DAS. Maximum dry matter of weed and weed intensity observed in weedy check . Similar trend was observed in respect of yield contributory character namely, Number of panicles m<sup>-2</sup>, Number of grains panicles<sup>-1</sup>, Grain weight plant<sup>-1</sup> and 1000 grain weight i.e. test weight (g). Maximum values of yield attributing characters were observed in weed free check and two hand weedings at 20 and 40 DAS. It was followed by pre-emergence application of butachlor 50% EC @ 1.25 kg a.i.  $ha^{-1}$  + hand wedding at 40 DAS. The maximum grain yield (76.96 q  $ha^{-1}$ ) and straw yield (109.38 q  $ha^{-1}$ ) of rice was observed in weed free check and it was followed by two hand weeding at 20 and 40 DAS (73.53 and 104.33 g ha<sup>-1</sup>) respectively. The next best treatment was pre-emergence application of butachlor 50% EC @ 1.25 kg a.i.  $ha^{-1}$  + hand wedding at 40 DAS (71.44 and 102.27 q  $ha^{-1}$ ) respectively.

Keywords: Integrated, weed, Upland Rice, Growth and Yield.

## **Comparison of Ten Silicon Extractants for Estimating Plant Available** Silicon

#### A.A. Patil, A.G. Durgude and A.L. Pharande

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Abstract: Silicon is the second most abundant element (27.72%) after oxygen in the earth crust. Available to plants as monosilicic acid [Si (OH)<sub>4</sub>]. Silicon plays significant role in imparting both biotic and abiotic stress resistance and enhances grain productivity. The research was conducted during kharif 2013 at central farm, M.P.K.V., Rahuri. The field experiment was laid out in split plot design having fourteen treatment combinations replicated thrice. The main treatments were soil types Inceptisols and Vertisols, sub treatments were levels of silicon, T<sub>1</sub>: Absolute control, T<sub>2</sub>: GRDF (100:50:50 kg ha<sup>-1</sup> N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O + 5 t ha<sup>-1</sup> FYM), T<sub>3</sub>: GRDF + Si @ 25 kg ha<sup>-1</sup>, T<sub>4</sub>: GRDF + Si @ 50 kg ha<sup>-1</sup>, T<sub>5</sub>: GRDF + Si @ 100 kg ha<sup>-1</sup>, T<sub>6</sub>: GRDF + Si @ 150 kg ha<sup>-1</sup> and T<sub>7</sub>: GRDF + Si @ 200 kg ha<sup>-1</sup>. The ten silicon extractants were used to assess suitable silicon extractant by correlating the extractable soil Si with nutrient uptake and yield of upland paddy grown on Inceptisols and Vertisols. The Vertisols showed significantly highest grain yield (37.01 q ha<sup>-1</sup>) and straw yield (42.13 q ha<sup>-1</sup>) of upland paddy over Inceptisols. The application of GRDF + Si @ 200 kg ha<sup>-1</sup> recorded significantly highest grain yield  $(41.85 \text{ g ha}^{-1})$  and straw yield  $(47.63 \text{ g ha}^{-1})$  of upland paddy over all the levels of silicon. The significantly highest total nutrient uptake was recorded by Vertisols viz., P, K and Si (41.11, 96.09 and 235.49 kg ha<sup>-1</sup>, respectively) over the Inceptisols. The application of GRDF + Si @ 200 kg ha<sup>-1</sup> recorded significantly highest total nutrient uptake viz., N, P, K and Si (148.37, 46.47, 115.81 and 283.56 kg ha<sup>-1</sup>, respectively) over all levels of silicon. The silicon extractant Tris buffer pH 7.0 (1:10) in Inceptisols showed positively highest and

significant correlation with grain yield (r= $0.870^{**}$ ), grain Si uptake (r= $0.887^{**}$ ), straw yield (r= $0.852^{**}$ ) and straw Si uptake (r= $0.919^{**}$ ). However, 0.5 M Acetic acid (1:2.5) in Vertisols showed positively highest and significant correlation with grain yield (r= $0.810^{**}$ ), grain Si uptake (r= $0.852^{**}$ ), straw yield (r= $0.850^{**}$ ) and straw Si uptake (r= $0.929^{**}$ ).

Keywords: Silicon extractants, upland paddy, yield, nutrient uptake, Inceptisols and Vertisols.

## "Effect of Organic and Inorganic Nutrients on growth and Yield of Soybean (Glycine max l.)"

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**Abstract:** An experiment entitled, "Effect of organic and inorganic nutrients on growth and yield of soybean (Glycine max L.)" was conducted during kharif, 2014 at Post Graduate Research Farm, College of Agriculture, Kolhapur. The objectives of experiment were to study the effect of organic and inorganic nutrients on growth and yield of soybean and to find out the suitable combination of organic and inorganic nutrient practice in soybean. The experiment was laid out in a RBD with 7 treatments viz., T<sub>1</sub>-No fertilizers, T<sub>2</sub>- 50 % RDF + FYM 5 t ha<sup>-1</sup>, T<sub>3</sub>- 50 % RDF + V.C t 2.5 t ha<sup>-1</sup>, T<sub>4</sub>-75 % RDF + FYM 5 t ha<sup>-1</sup>, T<sub>5</sub>-75 % RDF + V.C 2.5 t ha<sup>-1</sup>, T<sub>6</sub> - FYM 5 t ha<sup>-1</sup> + V.C 2.5 t ha<sup>-1</sup> and T<sub>7</sub> -100 % GRDF. Yield attributing characters viz., number of pods plant<sup>-1</sup>, seed weight plant<sup>-1</sup>, seed yield (29.22 q ha<sup>-1</sup>) and straw yield (36.01 q ha<sup>-1</sup>) were significantly higher in the treatment 100 % GRDF. Quality parameters viz., protein (44.31 %) and oil (18.70 %) content and GMR (Rs.100706 ha<sup>-1</sup>), NMR (Rs. 61045.51 ha<sup>-1</sup>) and B:C ratio (2.56). **Keywords:** FYM, GRDF, vermicompost, seed, oil, protein.

#### Management of Fusarium wilt of safflower through biopriming

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**Abstract:** The experiment on biopriming against management of Fusarium wilt of safflower was conducted with a view to increase the germination of seed by inhibiting the wilt causing pathogen Fusarium oxysporum f. sp. carthami through biopriming. The seed samples of safflower were collected from Solapur and Ahmednagar districts and the sample showing the highest incidence of wilt by blotter test will be used for further study. The seeds of safflower were soaked overnight (12 hrs) in 1% concentration of bioagents. The seeds were then bioprimed with Trichoderma viride @10 g/kg seed, Trichoderma harzianum @10 g/kg seed, Pseudomonas fluorescens @10 g/kg seed, Bacillus subtilis @10 g/kg seed, T. viride+ Pseudomonas fluorescens @ 5 g each /kg seed, T. harzianum+ Pseudomonas fluorescens @ 5 g each /kg seed, and Trichoderma viride+ Bacillus subtilis@ 5 g each /kg seed, T. harzianum+ Bacillus subtilis@ 5 g each /kg seed along with untreated control. The results revealed that the biopriming of seed of safflower with T. harzianum+ Pseudomonas fluorescens @ 5 g each /kg seed was found effective in reducing the incidence of Fusarium wilt (72.97%), increasing the seed germination (19.48%), Seedling Vigour Index (15.19%), field emergence (16.22%) and reducing the wilt incidence (77.78%) over untreated control.

Key wards- Safflower, Biopriming, Fusarium wilt

#### **Role of Bacillus spp. in plant growth promotion**

#### A.B. Gunjal and B.P. Kapadnis\*

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**Abstract:** Increasing use of chemical fertilizers resulted in several negative effects on agriculture and environment. Biological approach is now considered as an alternative way of reducing use of chemicals in agriculture. The plant growth promoting rhizobacteria isolated from the maize roots were characterized and identified based on the morphological, physiological and biochemical characteristics, subsequently authenticated by the 16S rDNA nucleotide sequencing. These isolates were identified as Bacillus circulans and B. subtilis. These were studied for the plant growth promoting traits. The indole acetic acid production by Bacillus circulans and B. subtilis was found to be 8.50+0.02 and  $12.50+0.00 \mu$ g/ml respectively, whereas the gibberellins production was 8.00+0.36 and  $6.40+0.02 \mu$ g/ml respectively. Bacillus circulans and B. subtilis showed antifungal activity against Fusarium graminearum (MTCC 1893) and Alternaria solani (MTCC 2101) with % inhibition 79.29+1.75 and 45.36+0.29 respectively and B. subtilis against Phoma glomerata (MTCC 2210) with % inhibition 71.13+2.09. The exopolysaccharide production was seen by Bacillus circulans which was 0.63+0.01 g/ml. B. subtilis showed the formation of acetyl methyl carbinol and diacetyl compounds and also showed 1-aminocyclopropane-1-carboxylate deaminase activity which was  $410.00+0.00 \mu$ g/ml. The bacterization of seeds with Bacillus

circulans and B. subtilis enhanced the germination and vigor index of maize, wheat, jowar and bajra. Significant increase in the plant growth viz., root length, shoot length and dry weight over control was observed. Bacillus circulans and B. subtilis isolated from the maize roots can be used for the plant growth promotion and also to increase the productivity, which is a biological means, thus ultimately reducing the use of chemical fertilizers which will be useful in agriculture.

Keywords: Antifungal activity, Indole Acetic Acid, Biological, Chemical fertilizers, Vigor index

## Factors influencing in Electroporation mediated transformation in sugarcane

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Abstract: In order to develop a high-efficiency and reproducible transformation protocol for sugarcane, we provide the direct method i.e Electroporation mediated transformation (EMT) using sugarcane var. Co86032 and Q117. Transformation protocol was carried out by using suspension cells as target material. Various combinations of electric volt and transformation buffers are optimized. Transformation efficiency was measured by transient GUS expression in this method. For efficient transformation energy input with combination of electroporation buffers had a critical influence on transgene expression and higher transformation levels,  $10.0\pm2.0\%$  for Co86032 and  $4.0\pm2.3\%$  for Q117 were achieved with 330V.cm-1 for 70µs and without hypoosmolar buffer. Hypoosmolar buffer play important role in electroporation transformation results no significance damage is sustained by the cells and induced pores. However, increasing the voltage required increasing the concentration of hypoosmolar buffer and achieved higher transformation. Electric voltage and electroporation buffer were positively correlated with each other and affect transformation efficiency. The conditions determined in this study will be useful for providing an ideal starting point for establishing a procedure for stable transformation in sugarcane

Keyword: Sugarcane, Electroporation, suspension culture

## Effect of various doses of Trichoderma viride on seedling vigour index of chickpea

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**Abstract:** The growth parameters of chickpea i.e. root-shoot length and seedling vigour index was significantly increased with Trichoderma viride seed treatment. Higher root-shoot length and seedling vigour index was observed in variety Digvijay followed by WR-315, Vijay and JG-62 with 8 g of Trichoderma viride seed treatment followed by 6 and 4 g of per kg of seed. Maximum root-shoot length and seedling vigour index was observed in sterile soil than the wilt sick soil. Disease incidence of chickpea was reorded at 30 and 60 DAS. The variety JG-62 showed 100 per cent susceptibility towards Fusarium wilt at 20-25 DAS in wilt sick soil. Trichoderma viride @ 8 g per kg of seed treatment gave maximum control of chickpea wilt followed by 6 and 4 g.

### Seed Borne Mycoflora of Minor Millets

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**Abstract:** Seed samples of different varieties of minor millets viz., finger, kodo, foxtail and little millets grown during kharif season were collected and tested for seed borne mycoflora by employing standard blotter paper method. Seeds of finger, foxtail and kodo millets carried ten fungi whereas little millets seed carried eight fungi belonging to seven and five genera respectively. Maximum association of seed borne fungi was recorded in finger millet and minimum was observed in little millets seed. Curvularia lunata, Drechslera nodulosa, D. tetramera and Fusarium spp. were the predominant fungi. Among these, only D. nodulosa was found transmissible from seed to plant causing seedling blight and other fungi were responsible for seed rot. Out of nine seed treatment fungicides, Thiram + Carbendazim (0.3%) and Carbendazim (0.1%) proved effective in reducing seed borne fungi and improving seed germination.

### Soil Arthropod Diversity – A Comparison between Conservation and Conventional Systems

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Abstract: For a period of one year soil arthropods were monitored at fortnight interval, in conventional and conservation plots of pigeon pea in University of Agricultural Sciences, Dharwad. A "functional" group of taxa which included in the study was defined to provision of biological pest control and nutrient cycling services of that system. Comparisons between i) tillage systems (6) and ii) cropping systems (5) were performed in terms of total abundance and diversity. Strip plot techniques were used with the main and sub variables respectively for tillage and crop systems. While, a part of the study depicts mainly the pigeon pea ecosystem arthropod diversity. Further, Araneae (7.48 per 100g of soil) and Collembola (8.74 per 100g of soil) in meso, coleopteran (6.32 per trap) and formicidae (3.43 oer trap) in macro arthropods were the most abundant taxa. Diversity was assessed overall using Shannon wiener index (H') and at every interval with the slight variation has present an exponential increase and slower decrease over peak crop growth. Overall, conservation tillage systems showed significantly higher arthropod diversity (H'= 0.720) and abundance (mean= 6.37 per 100g of soil). Broad bed and furrow with mulch in conservation tillage has the biggest fraction of arthropod variability (48%) and diversity (H'= 0.592). Land management systems were the factors which actually determining arthropod community composition, along with the basic necessitated weather parameters by recording higher population during rainy months. At a glance, conservation agriculture systems would favor soil arthropod diversity along with its abundance and their colonization.

Keywords: soil arthropods, diversity, conservation tillage, mulching, H' index

## Efficacy of Konkan Annapurna Briquettes (KAB) with different coating materials on yield and quality of Cucumber [Cucumis sativus (L.)]

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Abstract: The present investigation entitled "Efficacy of Konkan Annapurna Briquettes (KAB) with different coating materials on yield and quality of Cucumber [Cucumis sativus (L.)]" was conducted at Central Experiment Center, Wakawali during kharif season 2013-2014. The field experiment was laid out in Factorial Randomized Block Design. The four coating materials viz.,  $C_0$  – Non coating,  $C_1$  – Wax coating,  $C_2$  – Jaggary coating, and  $C_3$  – Tar coating was applied to Konkan Annapurna Briquette along with three sub treatments of application time i.e  $B_1 - \frac{1}{2}$  at sowing,  $B_2 - \frac{1}{2}$  at sowing and  $\frac{1}{2}$  at 30 days after sowing and  $B_3 - \frac{1}{3}$  at sowing, 1/3 at 30 days after sowing and 1/3 at 60 days after sowing. Total twelve treatment combinations were taken in the experiment. It was observed that the application of tar coated Konkan Annapurna Briquettes (KAB) in three times @1/3 quantity of briquettes at sowing time, 1/3 quantity of briquettes at 30 days after sowing and 1/3quantity of briquettes at 60 days after sowing was found promising to enhancing the cucumber fruit yield, higher vine length, number of fruits vine<sup>-1</sup>, girth of fruit, length of fruit. It was also observed that the quality of the cucumber fruit increased in terms of ascorbic acid. The tar coated Konkan Annapurna Briquettes (KAB) was found to be superior for the slow release of the nutrients up to 45 days after application in the incubation study. UB-Godavari forms of briquettes .i.e. are promising source of N, P2O5 and K2O fertilizers as compared to straight fertilizers for enhancing green cucumber fruit yield of Sheetal variety of cucumber in lateritic soil. Amongst the three types of coated briquettes, the tar coated briquettes application was found to be superior for increasing cucumber fruit yield applied in three times @1/3 quantity of briquettes at sowing time, 1/3 quantity of briquettes at 30 days after sowing and 1/3 quantity of briquettes at 60 days after sowing @ 5 briquettes per plant at an interval of 30 days after sowing.

## Effects of Tillage and levels of Fertilizer on growth, Yield and Quality of Lablab Bean (Lablab purpureus L.)

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**Abstract:** An experiment entitled, "Effects of tillage and levels of fertilizer on growth, yield and quality of lablab bean (Lablab purpureus L.)" was conducted during Rabi, 2014 at Agronomy Farm, College of Agriculture, Dapoli,Ratnagiri.Theobjectives of experiment were to study the effect of tillage and levels of fertilizer on growth, yield and quality of lablab bean and to find out the suitable combination of methods of tillage and levels of fertilizer in lablab bean.The experiment was laid out in a split plot design with 9treatments viz.,Main plot treatment (Methods of tillage)T<sub>1</sub>- Conventional tillage, T<sub>2</sub>- Conservation tillage, T<sub>3</sub>- Minimum tillage, T<sub>4</sub>- Zero tillage and Sub plot treatment (Levels of fertilizers)F<sub>0</sub>- Control, F<sub>1</sub>. 100% RDF through line application, F<sub>2</sub>. 75% RDF (Deep placement), F<sub>3</sub>. 75% RDF (deep placement) + foliar spray 2% DAP (at flowering and pod filling), F<sub>4</sub>. 100% RDF (placement below seed).Yield attributing characters viz., number of pods plant<sup>-1</sup>, weight of pods plant<sup>1</sup>, number of grains pod<sup>1</sup>, 100 seed weight, grain yield (15.07 q ha<sup>-1</sup>) and straw

yield (37.01 q ha<sup>-1</sup>) were significantly higher in the treatment combination  $T_1F_4$  (conventional tillage with 100% RDF) is significantly superior over rest of treatments. **Keywords**: tillage,fertilizer,foliar spray 2% DAP, yield

## Efficacy of ZnO nanoparticles for increase in germination efficiency of groundnut

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Abstract: Groundnut is widely cultivated oilseed crop in India. It has been proved that zinc has a substantial positive effect on the yield of this crop. Today nanoparticles are being extensively used in agriculture as nanoformulation of fertilizers. In view of the above observation, an experiment was initiated to observe the effects of nano zinc on the germination efficiency of groundnut. A preliminary field experiment also augmented the possible role of Zn nps on early flowering as well as yield of the crop. Certified seeds TAG-50 of groundnut were primed with various concentrations of ZnOnps and parameters like germination percentage, length of root and shoot and vigour index was studied. Analysis of macro and micronutrients of the seedlings revealed that the treated plants showed higher content of zinc along with other micronutrients.Biochemical analysis of the seedlings as well as plantlets showed considerable effect of nps as compared to the control plants. Based on the results of this experiment, we can conclude that lower concentrations of ZnO nanoparticles could be effectively used for enhancing the germination and yield of groundnut.

Keywords: ZnO nanoparticles, priming, nanoformulation

## Berry quality of wine grape variety Cabernet Sauvignon affected by potassium application

#### Jinal Lodaya, Ajaykumar Upadhyay, Ajaykumar Sharma and Ravi Mulik

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Abstract: Grape growing and wine making in tropical belts of India is achieving new heights. Impact of mineral composition of soil on grape quality and on the organoleptic properties of wines is well proved. Grape berries are very rich in potassium which is an essential macronutrient for grapevine and grape berry growth and development. Early in the season, when the growth rate is high, much of the potassium accumulates in the leaves. After véraison, a sharp increase in berry potassium is observed as a result of potassium redistribution from leaves to berries. But excessive levels of potassium in berries at harvest may reduce the quality of must and have a negative impact on wine quality, particularly on red wines. Potassiumhas been implicated inreductionin tartaric acid in juice with overall increase in the pH of wine. To standardized potassium requirement for Cabernet Sauvignon on 110R rootstock in relation to quality parameters of berries, present investigation was carried out during 2014-15 at ICAR-NRC for Grapes. Pune. The experiment was laid out as per RBD havingfive graded doses of potassium as sulphate of potash viz. 0, 50, 100, 500, 600 kg K<sub>2</sub>O/ha per year with irrigation water. Each treatment was replicated 4 times. In case of control, more glucose (117 mg/g) noted than fructose (113 mg/g). More fructose content than glucose was noted with application of potassium. Applications of potassium decreased tartaric and malic acid content. Maximum caftaric acid (53.3 ppm), chlorogenic acid (86.7 ppm), epicatechin (34.7 ppm) and qucertin hydrate (251 ppm) was noted when dose of 100 kg/ha of potassium was applied. Increasing trend in content of K, Ca, Na and Cu was noted. Acidity of juices was increased with increasing potassium application. Almost same trend was noted in case of pH values. The effect of potassium applications on quality parameters of berrieswere clearly observed in this study. **Keywords:** Vitis vinifera L., potassium sulphate, pH, juice, acidity, phenols

### Evaluation of genetic diversity in groundnut mutants (Arachis hypogaea L) using seed protein electrophoresis.

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**Abstract:** Seed storage proteins of nine mutants of groundnut genotype (CTMG-6-1) were analysed using sodium dodecyl sulphate polyacrylamide gel electrophoresis with a view to assess genetic diversity. Based on the relative mobility of total soluble seed protein using SDS-PAGE, 80 bands were detected in this experiment, which were used for examining the diversity among mutants. In detected 80 bands, 51 major bands were found to be monomorphic whereas, remaining 29 bands were polymorphic in nature. The banding pattern revealed variation among the mutants whereas little polymorphism was detected within the mutants. Relative mobility value of protein on polyacrylamide gel (SDS-PAGE) for these mutants under study showed substantial variation for seed protein profiles among the mutants of groundnut. The high yielding mutants exhibited bands having Rm

values ranging from 0.20 to 0.98 along with varying banding pattern within the group confirming the complex nature of the trait. With this study, it may be concluded that the SDS-PAGE is an effective tool for evaluating genetic diversity among the genotypes or mutants. Also electrophoretic pattern may be used for rapid screening of available material for the traits under investigation.

Keywords: SDS-PAGE, Relative mobility, groundnut, mutants.

## Effect of mutagens on seed quality characters in groundnut (Arachis hypogaea L).

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Abstract: An experiment was conducted during 2012-13 to study polygenic variability on seed quality traits in groundnut (Arachis hypogaea L.) through mutagens. Groundnut genotype (CTMG-6-1) was treated with gamma radiation (20, 30 and 40 kR) and ethyl methane sulphonate (EMS- 40mM and 60mM) for studying seed germination, seedling length, seedling dry weight, seedling vigour index (SVI) and electrical conductivity. It was observed that the germination percentage, speed of germination index, seedling length and seedling vigour index decreases with increasing the doses and concentrations of gamma rays and EMS in  $M_1$  and  $M_2$  generations when compared to control. The LD50 (Lethal dose) value was determined based upon the seed germination percentage. Seedling length and seedling vigour index observed higher in  $M_2$  generation as compared to  $M_1$  generations. Also revealed that the increase in the doses of mutagenic treatments of gamma rays and EMS, electrical conductivity of seeds were increased.

Keywords: EMS, Gamma ray, groundnut, seed quality

## Toxicity of insecticides on natural enemy (Chrysoperla carnea) in soybean (Glycine max L.)

#### M.V.Matti and R.O.Deotale

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**Abstract:** Studies were under taken to determine the effect of different treatments on natural enemy (Chrysoperla carnea) population in soybean kharif 2014-15 at the College of Agriiculture, Nagpur. Highest population of grubs were noticed in neem oil, neem seed extract and Beauveria bassiana and lowest number of grubs were noticed in chemical treatments viz., Fenevlarate, indoxcarb, spinosad, emamectin benzoate at 7 and 14 DAT. Thus biopesticides and botanicals play an important role in insect pest management as they are best alternative to chemical insecticides against major defoliators on soybean.

Keywords: Chrysoperla carnea, Grain yield, ICBR.

## Forms of Potassium of Representative Soil Series of Sub-Montane Zone of Maharashtra

#### M.V.V.I. Annapurna and B.S. Kadam

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**Abstract:** The representative soil series of order Entisols, Inceptisols and Vertisols collected from agriculture college Kolhapur and different research stations of Sub-montane zone of Maharashtra were assessed for different forms of potassium and its distribution. The water soluble K contributed very lowest fraction than the rest of all forms of potassium (i.e. 0.23 % of total K). From the mean values higher water soluble K was noticed in Vertisols followed by Inceptisols and Entisols. Higher value of water soluble K was observed in surface layer and decreased with depth. Exchangeable K, non-exchangeable K and lattice K contributed 2.87, 8.97 and 87.81 per cent of total K, respectively. From the mean values, highest exchangeable K, non-exchangeable K, lattice K and total K were noticed in Vertisolsfollowed by Inceptisols and Entisols. There was no any specific trend noticed with respect to depth wise distribution of different forms of potassium.

Keywords: Water soluble K, exchangeable K, non-exchangeable K, lattice K, total K and Sub-montane zone.

## "Effect of mechanical and chemical weed control measures on growth, yield and quality of sesame" (Sesamum indicum L.)"

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**Abstract:** The trial was laid out in a randomized block design. There were ten treatments which were replicated thrice. The treatments mainly comprised of Pendimethalin PE ( $T_1$ ), Pendimethalin PE with HW at 15 DAS ( $T_2$ ), Pendimethalin PE with HW at 30 DAS ( $T_3$ ), Pendimethalin PE with HW at 45 DAS ( $T_4$ ), Quizalofop-ethyl PoE ( $T_5$ ), Quizalofop-ethyl PoE with HW at 45 ( $T_6$ ), HW at 30 DAS ( $T_7$ ), HW with hoeing at 45 DAS ( $T_8$ ), HW at 15, 30 and 45 DAS ( $T_9$ ) and Weedy check ( $T_{10}$ ). Results revealed that, the treatments viz., HW at 15, 30 and 45 DAS (weed free), Pendimethalin with HW at 30DAS and Quizalofop-ethyl with HW at 45DAS produced higher growth, yield attributes, grain and straw yield (q ha<sup>-1</sup>) as compared to rest of the treatments under study. Nutrient uptake by weeds was significantly less under HW at 15, 30 and 45DAS, Pendimethalin with HW at 30DAS while, maximum in weedy check. This particular combination i.e. Pendimethalin with HW at 30DAS showed great promise in respect of enhancing highest net return (Rs.20,467) and B: C ratio (1.54). On the basis of results obtained during study, it can be concluded that the herbicides with one manual weeding gives better results as compared to use of herbicides alone. The treatment Pendimethalin with HW at 30DAS was found to be most effective and economical treatment in respect of growing sesame crop.

Keywords: Sesame, weed control

## Evaluation of Drought Stress Tolerance in Wheat (Triticum Aestivum I.) Genotypes under Hydroponic Culture

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**Abstract:** Drought stress is the most significant environmental stress in agriculture worldwide and improving their tolerance and yield under drought is a major goal of plant physiologist. An experiment was conducted at Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri. In this experiment the twenty five wheat genotypes were screened under PEG (-0.6MPa) induced osmotic stress at seedling stage in hydroponic culture (Hoagland solution). The data on seedling length and dry weight were recorded at 14<sup>th</sup> days after transplanting and determine their stress tolerance index. Grater stress tolerance index more will be the stress tolerance and vice versa. The recorded data showed significant genetic variation among the genotypes. In all genotypes seedling length and dry matter decreases with increase in PEG induced osmotic stress. The genotype NI-5439, K-227, NIAW-1415, NIAW-34, DBW-14, NIAW-1994, NIAW-301, HI-977 and HD-2932 recorded maximum seedling length and dry matter with their stress index, while the minimum values were recorded in genotype MACS-6222, NIAW-2313, RAJ-3765 and HD-2285. It was concluded from the results that the genotype NI-5439 and K-227 was selected as most moisture stress tolerant genotype depending upon seedling length and dry matter stress tolerance index.

Keywords: Drought stress, Wheat genotypes, PEG, Stress tolerance index

### "An economic Analysis of Production and Marketing of French bean in Satara district"

#### Kiran S. Daundkar and Vinod Shelke

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Abstract: The investigation was carried in case of the resource use productivities in French bean cultivation for different size groups, it was observed that all six variables viz., Human labour  $(X_1)$ , Bullock labour  $(X_2)$ , Machinery Charges  $(X_3)$  Manures  $(X_4)$ , Nitrogen  $(X_5)$ , Phosphorus  $(X_6)$ , included in the production function analysis have jointly explained 40 per cent variation in the output of French bean. The marginal value product to factor cost ratio (MVP/PX) in case Bullock labour, Manure, Nitrogen and Phosphorus were more than unity and other marginal value product to factor cost ratio (MVP/PX) was less than unity (Human labour days, Machinery) indicates there by excess and under utilization, respectively. The major three marketing channels were found by the sample growers. However, Producer  $\rightarrow$  Commission Agent $\rightarrow$  Wholesaler $\rightarrow$  Cent) was available as marketable surplus for selling in market at overall level. The major problems faced by the French bean growers in production were high cost of seed (85.55 per cent) and in the case of marketing, the major problems were high transport charges (78.88 per cent).

Keywords: French Bean, Resource use Productivity, Resource use Efficiency Economics of Marketing.

## "Studies on wilt and Root rot Disease Management in Sugarcane Nursery"

#### N.J. Deshmukh, C.D. Deokar, R.B. Dhage and R.T. Shelke

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**Abstract:** Wilt and root rot disease is gaining economic importance as it is entailing the considerable losses in cane yield varying from 40-60%. Therefore the present investigations were carried out with main object to identify the wilt and root rot causing organism and its management in sugarcane nursery condition. A pure culture of Fusarium sp. and Pythium sp. was successfully isolated from sugarcane wilt and root rot diseases infected samples and proved the pathogencity. The pathogenic culture of Fusarium sp. and Pythium sp. The pathogenic culture of Fusarium sp. and Pythium sp. The infected plant showed brown to yellow areas as symptoms on leaves. The roots were shredded and unhealthy with white to pink, blakish mycelial growth on the setts 40-45 days after sowing. It was concluded that the just emerged and 45 days old seedlings were identified as the most susceptible. Assessment studies of biofertilizer and Trichoderma indicated that Fusarium sp. and Pythium sp. were found in carriers and the bioagent Trichoderma was proved to be the best antagonists in inhibiting the growth of the fungus. Among these, cocopeat was found most superior and recorded maximum germination percentage, plant height and minimum wilt and root rot disease incidence at 30 and 45 DAP in vivo conditions. Among the fungicides tested it was observed that Blitox and Bavistin inhibited mycelial growth of test fungus at 0.2 % concentration.

Assessment of Micronutrients and Their Relationship with Soil Properties in Sakri Tehsil of Dhule District (M.S.)

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**Abstract:** The present investigation was carried out to assess available micronutrient status of soils of Sakri Tehsil of Dhule District by GIS technique. About 225 soil samples (0-22.5 cm) were collected during 2014 from the 75 villages and analyzed for their fertility status and mapped by geographic information system (GIS) technique. The exact locations of soil samples were recorded with the help of GPS. It can be concluded that the samples were slightly acidic to moderately alkaline in soil reaction (5.70-8.37), non-saline (0.11 -0.97dS m<sup>-1</sup>), very low to high in organic carbon (2.10-9.30 g kg<sup>-1</sup>) and calcium carbonates ranged from (1.25-19.5 %). The available Fe, Mn, Zn, Cu, B and Mo in soils of Sakri Tehsil were ranged between 1.20-17.97, 2.04-6.60, 0.10-1.51, 0.29-3.93, 0.05-0.84 and 0.053-0.372 mg kg<sup>-1</sup>, respectively. Among the micronutrients, manganese, copper and molybdenum were fond sufficient in soil. The use of GPS-GIS based technique for soil sampling is new land mark, which will enable the further researchers and University Officials to monitor the changes in soil fertility status for years to come.

Keywords: Micronutrients, soil fertility maps, GPS-GIS technique.

## Screening of ACC (1-aminicyclopropane-1-carboxylic acid) deaminase producing plant growth promoting rhizobacteria from Onion (Allium cepa) rhizosphere

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**Abstract:** Biotic and abiotic stresses when imposed on plants leads to more ethylene production resulting in inhibition of plant growth leading to decrease in crop yield. Certain Plant Growth Promoting Rhizobacteria (PGPR) produces an enzyme 1 Amino Cyclopropane deaminase which metabolizes 1 amino cyclopropane carboxylate-precursor of ethylene to alpha ketobutyrate and ammonia ensuring the reduction in elevated plant ethylene levels. The ACC deaminase activity of PGPR is exploited to relive stress on crop plants so as to improve yields. In line with this, study was conducted to isolate 61 rhizobacteria from onion rhizosphere. Plant growth promoting traits like Phosphate solublization, Zinc and potash Mobilization, IAA production, Ammonia production, Siderophore production and HCN production were assessed in laboratory condition. Further, the 18 isolates showing Multiple functional traits were screened for ACC deaminase activity. Two isolates V3 and V15 exhibited ACC deaminase activity. The studies on gnotobiotic seeed germination and root shoot elongation assay showed significant difference as compare to control seeds of various crops. The isolates may exhibit potential as a bioinoculant for increasing various crop yields.

**Keywords:** Allium cepa, Plant Growth Promoting Rhizobacteria, ethylene production, ACC deaminase, seed germination, biofertilizer.

## Dry matter accumulation, its partioning and growth analysis studies in pigeonpea (cajanus cajan (L.) millsp.) Genotypes growing on rice bunds.

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**Abstract:** The field experiment was conducted at Agricultural research Botany farm and Agronomy farm, College of Agriculture, Dapoli, during Kharif 2013. Experiment consisted fifteen pigeonpea genotypes laid out in randomized block design with three replications. Among the genotypes, the genotype AKTE-11-1 recorded significant difference on dry matter accumulation, its partioning pattern and various growth parameters as compared to other genotypes. The genotype AKTE-11-1 recorded significantly highest dry matter of leaves, stem, root and total dry matter per plant (16.03, 109.96, 25.28 and 151.27 g) respectively as compared to other genotypes at harvest. The magnitude of various growth parameters viz., leaf area, LAI, SLW, SLA, AGR, RGR, NAR and LAR was also recorded significantly highest in genotype AKTE-11-1 at harvest of crop. **Keywords:** pigeonpea, dry matter accumulation and growth parameters

## Evaluation of Pigeonpea (Cajanus cajan (L) Millsp.) genotypes for Morpho-phenological traits by growing on Rice bunds.

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**Abstract:** A field experiment was conducted at Agricultural research Botany farm and Agronomy farm, College of Agriculture, Dapoli, during Kharif 2013. The experiment consisted fifteen genotypes comprising AKTE-11-1, BSMR-853, Vipula-1, T-Vishakha, BDN-711, Phule Rajeshwari, PKV-Tara, ICPL-87119, AKT-8811, UPAS-120, TAT-10, BDN-708, BSMR-736, Konkan Tur-1 and ICPL-87 laid out in randomized block design with three replications. The various morphological characters like plant height, mean number of leaves, number of secondary branches and mean leaf area per plant had the highest magnitude at the harvest in high yielding genotype AKTE-11-1 while low yielding genotype ICPL-87 was recorded lowest magnitude. High yielding genotype AKTE-11-1 required the highest number of days for 50% flowering (140.50) and physiological maturity (179.83) while reverse case was noticed in low yielding genotype ICPL-87. **Keywords**: Pigeonpea, growth, flowering, maturity.

## Effect of Foliar sprays of Growth Retardant tiba on Morpho-Physiological Traits and yield of Chickpea

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**Abstract:** The present investigation was undertaken during year rabi 2013-14 to study the effect of foliar sprays of TIBA on morpho-physiological traits and yield of chikpea(Cicerarientum). The field experiment was laid out in RBD with four replications comprising of different concentrations of TIBA. Spraying of growth retardant TIBA was done at 25 and 40 DAS. The different treatments tested were 25, 50, 75, 100, 125 and 150 ppm TIBA with control (water spray). Foliar sprays of 50 ppm TIBA followed by 25 ppm TIBA significantly enhanced number of secondary branches, length of branches, leaf area, total dry matter production plant<sup>-1</sup>, RGR, NAR and seed yield ha<sup>-1</sup>(q). Whereas, maximum plant height reduction was noticed in foliar sprays of 150 ppm TIBA over control and rest of the treatments.

Keywords: Growth retardant, TIBA, morpho-physiological traits and yield

## Youth and Gender Inclusive Extension Strategies

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**Abstract:** Farming has become knowledge intensive and there isneed for retaining Farm Graduates and Home Science Graduates in our villages in order to achieve the desired technological upgrading of farm enterprises. We need a national strategy for the knowledge and skill empowerment of farm families. At present, most of the Farm Graduates are seldom taking farming as a profession.There are several on-going technology transfer mechanisms such as ATMA, Krishi Vigyan Kendras, lab-to-land programmes and regular extension services. In spiteof these efforts the gap between scientific know-how and field level do-how is widening. There has to be a two-prolonged strategy for retaining educated youth in farming. Farm schools on the lines recommended by

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NCF in its First Report, could be established in the fields of Farm graduates who are operating agricultural enterprises efficiently. Secondly, Farm Graduates who do not own land can be assisted to provide demand driven services through Agri-clinics, Agri-business centres, Food Parks, etc. There should be Capacity Building and Mentoring Centres to assist Farm Graduates to set up Agri-Clinics and Agri-Business Centres. Groups of 3-4 Graduates can be formed for running these enterprises.Government should consider the following services to Farm graduates: Low interest loans, allotment of wasteland for setting up Agri-clinics and Agri-business Centres and facilities for establishingVillage Knowledge Centres. Groups of Farm Graduates can also be encouraged to form Producer Companies for undertaking the production of good quality seeds, agro processing, marketing, etc. They should be trained in Contract Farming methodology.The production of planting material and seeds necessary for the National Horticulture Mission could be undertaken by men and women Farm graduates. **Keywords:** Farming, farm graduates, scientific technology transfer mechanisms.

## Synergistic effect of plant product and inert material on Rice weevil, S. oryzae (L.)

#### P.V. Matti and J.S.Awaknavar

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**Abstract:** The indiscriminate use of chemical pesticides against storage pests by farmers in developing countries, pest control technology is required to evaluate its impact on net social welfare, the simultaneous determination of optimal storage operations, consumption and production for the optimal pest management. Laboratory experiments were carried out to study the synergistic effect of ash and sweet flag rhizome powder on rice weevil revealed that cent per cent adult mortality was noticed in 0.5 per cent sweet flag rhizome powder adone, 30, 20, 10, 5 and 2.5 per cent ash in combination with 0.5 per cent sweet flag rhizome powder and 30 with 0.25 per cent sweet flag rhizome powder, 99.25 per cent mortality was noticed in 10 per cent ash with 0.25 per cent sweet flag rhizome powder and which was on par with 20 per cent ash with 0.25 per cent sweet flag rhizome powder and 30 or powder. No seed damage was noticed in 0.5 per cent sweet flag rhizome powder alone, 30 and 20 per cent ash in combination with 0.25 per cent ash with 0.25 per cent sweet flag rhizome powder. No seed damage was noticed in 0.5 per cent sweet flag rhizome powder alone, 30 and 20 per cent ash in combination with 0.25 per cent sweet flag rhizome powder. No seed damage was noticed in 0.5 per cent sweet flag rhizome powder alone, 30 and 20 per cent ash in combination with 0.25 per cent sweet flag rhizome powder.

Keywords: Sweet flag, rhizome powder, Ash, Rice weevil, seed damage mortality

## Studies on Acetobacterdiazotrophicus Inoculation on growth, Nutrient uptake and yield of Sweet Sorghum (Sorghum bicolor L.) CV. PHULE AMRITA

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Abstract: The effect of inoculation of endophytic bacterium acetobacterdiazotrophicuson growth, nutrient uptake and yield of sweet sorghum (sorghum bicolor L.)cv. Phule Amrita. To achieve this, afield trial was conducted at Department of Plant Pathology and Agricultural Microbiology, Mahatma Phule Agricultural University, Rahuriduring kharif season of 2013-14. The investigation involved isolation, screening and characteristic growth on acidic LGIP semi solid medium. After incubation at 28+20C, it showed pellicle initialiy, which was later turned into orange thick pellicle at the top of semi solid medium in test tube. At the same time the medium colourless due to assimilation of bromothymol blue. The morphological studies showed ,that the organism was rod shape, gram negative with motility due to lateral or peritrichous flagella, non sporulating colonies were circular, smooth and yellowish orange in colour. The results of field experiment in general revealed that seed inoculation with Acetobacterdiazotrophicus (RSSV-1 strain) showed significant increase in growth parameters viz., seed germination, stem girth, seedling vigour index, number of leaves, height of plant, root length, dry matter weight of shoot and root, N, P and K uptake, fodder and grain yield and sugar quality parameters viz., brix percentage, reducing and non reducing and total sugar percentage. The fodder and grain yield obtained due to application of 75 kg N conjugated with Acetobacterdiazotrophicus + phosphate solubilizing bacteria + 75 % recommended dose of N(83.47 MT/ha) was on par with application of 100 kg N/ha without Acetobacterdiazotrophicus and PSB inoculation (82.35 MT/ha). These findings explicitly indicated the possibility of saving fertilizer nitrogen to an extent of 25 kg N/ha, in sweet sorghum. The results of microbial population of Acetobacterdiazotrophicus revealed that Acetobacter population in stem was decreased with increasing levels of fertilizer nitrogen application to sweet sorghum.

Keywords: Acetobacterdiazotrophicus, sweet sorghum, N, P, K.

## "Pseudomonas fluorescens and Trichoderma spp. mediated management of stem rot of groundnut incited by Sclerotium rolfsii"

#### R.B. Dhage and C.T. Kumbhar

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**Abstract:** The present investigation entitled 'Pseudomonas fluorescens and Trichoderma spp. mediated management of stem rot of groundnut incited by Sclerotium rolfsii' was conducted at College of Agriculture, Kolhapur, during the year 2014-15. In the laboratory study, total of five fluorescent bacterial isolates were isolated from soil samples and designated as Pf1, Pf2, Pf3, Pf4 and Pf5. Out of 5 isolates of Pseudomonas fluorescens, isolate Pf2 was found efficient in inhibiting the growth of Sclerotium rolfsii in vitro. This isolate was further evaluated in the field trial to study its efficacy along with Trichoderma spp. in combating stem rot disease of groundnut.

Results of the field investigation indicated that all the treatments of antagonists had profound effect in reducing incidence and intensity of stem rot disease in groundnut and promoting growth and dry pod yield of groundnut. However, significantly least per cent disease intensity (PDI) and per cent disease incidence were recorded in the treatments where integrated seed treatment with tebuconazole, P. fluorescens and Trichoderma spp. was followed in conjunction with application of P. fluorescens and Trichoderma spp. to soil at the time of sowing and, in the treatment wherein both the antagonists, P. fluorescens and Trichoderma spp. were all together inoculated to both, seed and soil. Per cent disease intensity with these two treatments was 18.33 and 19.17, respectively, whereas incidence was 28.86 and 28.98%. Incidence of the disease with these two treatments was reduced by 55.93 and 55.74%, respectively in comparison to uninoculated control. These two treatments significantly increased germination (92.89 and 92.59%), plant vigour index (1297.55 and 1148.24), shoot length (13.47 and 13.39 cm), branching (8.37 and 8.36 per plant-1), dry plant weight (6.87 and 6.82 g plant-1), number of pods (34.00 and 33.76 plant-1) and dry pod yield (22.43 and 21.83 q ha-1).

Keywords: Arachis hypogaea, Sclerotia, Pseudomonas fluorescens, Trichoderma spp.

#### In vitro studies in Phaseolus towards salinity stress

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**Abstract:** Salinity is a major abiotic stress affecting agricultural productivity worldwide. The present study was undertaken to evaluate the effect of salinity on morphological and biochemical parameters in Phaseolus under in vitro conditions. Seeds were germinated on Murashige and Skoog basal medium fortified with different concentrations of NaCl (50 and 100 mM). Non-saline medium served as control. The germination percentage, shoot/root length and fresh weight of seedlings decreased in presence of salinity. On 50 mM NaCl the germination percentage was 46.7% which reduced to 10.85% at 100 mM. The shoot length declined by 33% on 50 mM and 87% on 100 mM NaCl as compared to control. Free proline content almost doubled in the seedlings germinated in presence of stress. The importance of this study is in screening of commercial cultivars of Phaseolus for salinity stress and suggesting tolerant cultivars for plantation in salt affected field. **Keywords:** salt stress, Phaseolus , tissue culture, proline

### Seasonal Incidence of Sucking Pests of Okra

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**Abstract:** The field experiments on seasonal incidence of three major sucking pests of okra viz., leafhopper, aphid and whitefly and their natural enemies viz., Coccinellids and Chrysoperla were conducted during three seasons of 2014 i.e. summer, Kharif and rabi. The results revealed that the activity of leafhopper, aphid and Coccinellids were more in Kharif and rabi season whereas whitefly and Chrysoperla population were comparatively high in summer and end of rabi season. Leafhopper and aphid population attained peak in the month of February, July and October and the whitefly population reached peak in April, August and January in summer, Kharif and rabi season, respectively. Abundance of Coccinellids and Chrysoperla were less throughout the cropping period but relatively high in the month of October. As regards the correlation coefficient between different weather parameters with pest population, leafhopper and aphid were negatively correlated with maximum and minimum temperature, while whitefly population recorded a positive correlation with the same. Coccinellid and Chrysoperla were also negatively correlated with temperature during the whole year except rabi season. Morning and evening relative humidity and rainfall correlated positively with leafhopper, aphid and Coccinellid population and negatively with whitefly and Chrysoperla population. **Keywords**: Seasonal incidence, sucking pests, okra

## **Broken Rice – A Novel Substrate for the Production of Food Bio-Colour** through Solid State Fermentation

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**Abstract:** The toxicity due to synthetic colours has created a mounting interest towards natural colours and the bio-colours from microbial origin (Monascus spp.) are potentially safe alternative to synthetic colours. Broken rice was used through solid state fermentation by Monascus purpureus (MTCC 410) with variation in fermentation parameters. The peak yield value of red, orange, yellow and total bio-colour were 186.46 OD Units/g dms at 500 nm, 122.92 OD Units/g dms at 475 nm, 92.71 OD Units/g dms at 375 nm and 402.08 OD Units/g dms respectively achieved through SSF of broken rice at optimized process parameters including 70% (w/v) initial moisture content, 0.2-0.3 mm particle size, temperature of 30°C, inoculation with 2% spore suspension of 6 days old culture for incubation period of 7 days at pH 6 by supplementation of maltose (3% w/w) and MSG (1% w/w) as a carbon and nitrogen source respectively. Bio-colour extracts from broken rice were more stable in dark light and temperature at 20°C, 40°C and 60°C while the red, orange and yellow bio-colour extracts show good stability at pH of 6, 4 and 2 respectively. The yield of bio-colours obtained was more with broken rice as compared to other agricultural substrates. The use of broken rice as a substrate was cost effective and environmental friendly. The results indicated the suitability of broken rice for production of food bio-colours through solid state fermentation.

Keywords: Monascus, broken rice, bio-colours, solid state fermentation

## Efficacy of bio- agents on seed health of Sesamum (Sesamum indicum L.)

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Abstract: Sesamum (Sesamum indicum L.) is an important source of oil and protein. Sesame oil is known for its excellent nutritional, medicinal, cosmetic and cooking qualities for which it is considered as 'the Queen of Oils'. Sesamum oil is used for manufacturing perfume oils and for medicinal purposes. Sesamum is attacked by several disease causing fungi, bacteria and viruses leading to approximately 15-20 % or more losses in yield, several of these diseases are seed borne in nature. The seed borne mycoflora are carried over by infected seeds. They cause deterioration in seed in soil before germination causing seedling mortality. Seed borne fungal mycoflora are of considerable importance due to their influence on the overall health, germination and final crop stand in the field. Infected seeds play a key role in the dissemination of plant pathogens and disease establishment. Some of the seed borne fungi were found to be very destructive causing seed rot and obstructing seed germination leading to pre and post emergence seed rot. In view of the above, the present investigation was carried out using bio-agents on seed health of sesamum. The seeds of Sesamum var. JLT-408 were treated with Pseudomonas fluorescens @ 0.6 %, Trichoderma viride @ 0.6 %, Trichoderma harzianum @ 0.6 %, P. fluorescens + T.viride @ 0.6 % each, P. fluorescens + T. harzianum @ 0.6 % each, Thiram + Carbendazim @ 0.2% and untreated seeds were served as control. The results revealed that among the bioagents significant reduction in seed mycoflora by 84.21 per cent and increase in seed germination, seedling vigour index, field emergence and seed yield by 12.80, 18.93, 16.89 and 18.26 per cent, respectively was recorded over untreated control with the seed treatment of P. fluorescens + T. harzianum @ 0.6 % each. The seed borne fungi found associated with the seeds were Drechslera sorghicola, Macrophomina phaseolina, Fusarium oxysporum, Curvularia lunata and Alternaria alternata.

Keywords: Sesamum, bio-agents and Seed health.

### **Integrated Weed Management in Wheat (Triticumaestivum L.)**

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**Abstracts:** The field experiment was carried out, at post graduate research farm, college of Agriculture Kolhapur (MS) on "Integrated Weed Management in Wheat (Triticumaestivum L.)" in the clay loam soil during Rabi 2009-2010. The various monocots weeds observed in wheat field during rabi season were more rampart while the dicot weeds marked their presence in good numbers. The intensity of weed flora in wheat was up to 78.33 m<sup>-2</sup> when any weed control method was not followed. It reduced weed intensity up to 6.00 m<sup>-2</sup> by integrating pendimethalin (PE) 1.0 kg a.i. ha-1 + one hoeing at 30 DAS. Integrated weed management treatments viz., pendimethalin (PE) 1.0 kg a.i. ha-1 + one hoeing at 30 DAS gave effective weed control which resulted in higher production of grain and straw along with higher protein content. The higher net returns were obtained with weed free check (Rs. 24733 ha-1) followed by pendimethalin (PE) 1.0 kg a.i. ha-1 + one hoeing at 30 DAS (Rs. 23532 ha-1) and pendimethalin (PE) 1.0 kg a.i. ha-1 + 2,4–D 1 kg a.i. ha-1 (Na Salt) POE

at 30 DAS (Rs. 19666 ha 1). The benefit cost ratio was however, maximum (1.83) in the pendimethalin (PE) 1.0 kg a.i. ha-1 + one hoeing at 30 DAS followed by weed free check (1.74). **Keywords:** Benefit: cost ratio, Economics, Pendimethalin, Yield, Weed control, Wheat

## Effect of different concentrations of IBA in combination with constant BA on shoot proliferation of Bacopa monnieri (Brahmi)

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**Abstract:** A lab experiment was carried out during summer season of 2011-12 at Dept. of Plant Biotechnology, MGM College of Agricultural Biotechnology, Aurangabad to study effect of different concentrations of IBA in combination with BA on shoot proliferation of Bacopa monnieri (Brahmi) under in vitro condition. The experiment was laidout in completely randomized block design with five treatments of IBA (0.00, 0.25, 0.30, 0.35,0.40  $\mu$ M) with constant BA (1.1 $\mu$ M) MS basal medium on nodal segment of Brahmi. Among IBA 0.30 $\mu$ M with constant BA (1.1 $\mu$ M) showed significantly higher shoot proliferation. On an average within a period of 3 subcultures more than 39000 shoots can be produced from single nodal segment. Thus present protocol can be used to generate foundation stock of elite planting material for large scale cultivation. **Keywords:** Brahmi, IBA, BA, MS media, shoot proliferation

Efficacy of biopriming for management of Alternaria blight of Sunflower

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**Abstract:** The experiment on biopriming against management of Alternaria blight of sunflolwer was conducted with a view to increase the germination of seed by inhibiting the blight causing pathogen Alternaria helianthi through biopriming. The seed samples of sunflower were collected from Solapur and Ahmednagar, Pune and Nashik districts and the sample showing the highest incidence of Alternaria blight by blotter test was used for further study. The seeds of sunflower were soaked overnight (12 hrs) in 1% concentration of bioagents. The seeds were then bioprimed with Trichoderma viride @10 g/kg seed, Trichoderma harzianum @10 g/kg seed, Pseudomonas fluorescens @10 g/kg seed, Bacillus subtilis @10 g/kg seed, T. viride+ Pseudomonas fluorescens @ 5 g each /kg seed, T. harzianum+ Pseudomonas fluorescens @ 5 g each /kg seed, T. harzianum+ Bacillus subtilis@ 5 g each /kg seed along with untreated control. The results revealed that the biopriming of seed of sunflower with T. harzianum+ Pseudomonas fluorescens @ 5 g each /kg seed germination (17.91%), Seedling Vigour Index (16.31%), field emergence (15.87%), yield (14.66%) and reducing the blight incidence (51.31%) over untreated control. **Keywords**: Sunflower, Biopriming, Alternaria blight.

### Trap Nesting – A Strategy for Conserving Pollinator and Predator Diversity

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Abstract: Study was conducted at Bengaluru with the background that, several species of solitary bees and wasps that nest in pre-existing cavities in an ecosystem are important components of that ecosystem because they engage in several ecological interactions (e.g. pollinationandpredation) with other organisms. While recently, decrease in nesting habitats as a result of various anthropological activities is posing a severe threat to their richness and abundance. Hence, nesting instinct of bees and wasps was analysed in the present study by providing artificial cavity nests (trap nests) during kharif 2015. Trap nests made with hollow stem pieces (10 cm long) of Ipomea weed, Sal wooden blocks drilled with holes (10 cm deep) and hollow bamboo reeds (10 cm long) were placed in agricultural and forest ecosystems for nesting by the solitary bees and wasps. Of the total 603 trap nests placed 253 were occupied (42%) by the wasps. However, among occupied nests 12.77 per cent were bees (Megachilidae and Halictidae) and 28.86 per cent were wasps (Vespidae, Sphecidae and Crabronidae).Shannon-Weiner Diversity index [H'] was worked out for the occupants of different types of nests.Diversity of pollinators (Megachilidae and Halictidae)was higher in Sal wood block withH'=1.45 compared to Ipomea (H'=1.31) and bamboo reeds (H'=0.63). Diversity of apoid wasps of the family Sphecidae and Crabroanidae were higher in the Salwood (H'=1.15) compared to Ipomea stem reeds (H'=0.91). Ipomea reeds were also inhabited by the vespid wasps (Eumeninae, H'=1.03). However, there was no significant difference in vespid wasps' preference for the wooden blocks and the bamboo reeds. In addition, there was not

much difference between the diversity of fauna occupied in the Sal wood (H'=2.09) and Ipomea reeds (H'=2.00). In contrary, preference for bamboo reeds was very low (H'=1.10). **Key words:** trap nests, pollinators, bees, wasps, cavity nesting

## Effect of seed fortification with molybdenum and foliar application of Zn and Fe on growth traits, yield and quality of soybean under rainfed condition of Khandesh

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Abstract: Field experiment was conducted to asses the effect of different micronutrients on growth trait, yield and quality of soybean under rainfed condition of Khandesh at the farm of Agricultural Research Station, College of Agriculture, Dhule in 2012-2013. The experiment was laid out in randomized block design with nine treatments and three replication viz.  $T_1$ : Control(RDF 50:75:00),  $T_2$ :Water spray,  $T_3$ :FeSO<sub>4</sub> spray (0.5%),  $T_4$ :  $ZnSO_4$  spray (0.5%), T<sub>5</sub>: Seed fortification with Mo, T<sub>6</sub>:FeSO<sub>4</sub> spray (0.5%) +  $ZnSO_4$  spray (0.5%), T<sub>7</sub>: FeSO<sub>4</sub> spray (0.5%) + Mo, T<sub>8</sub>:ZnSO<sub>4</sub> spray (0.5%) + Mo, T<sub>9</sub>:FeSO<sub>4</sub> spray (0.5%) + ZnSO<sub>4</sub> spray (0.5%) + Mo. The result revealed that the highest number of branches (16.83 plant<sup>-1</sup>) observed in the treatment receiving combined application of zinc and iron with seed fortification of molybdenum. The significantly higher number of (44.66) nodules was recorded in treatment seed fortification of molybdenum. The higher values of chlorophyll content at 20 DAS (19.90 mg 100 g<sup>-1</sup>), 60 DAS (18.14 mg 100 g<sup>-1</sup>) and 80 DAS (10.14 mg 100 g<sup>-1</sup>) of soybean was recorded in treatment T<sub>9</sub> (foliar application of zinc and iron with seed fortification of molybdenum). However, the higher chlorophyll content at 40 DAS (28.06 mg 100 g<sup>-1</sup>) of soybean was observed under treatment  $T_6$  receiving foliar application of zinc and iron. The highest grain (22.65 q ha<sup>-1</sup>) and straw yield (19.66 q ha<sup>-1</sup>) were observed in  $T_6$  which receives foliar spray of zinc and iron. The lowest grain (16.62 q ha<sup>-1</sup>) and straw (11.18 q ha<sup>-1</sup>) yield were recorded in  $T_1$  (control). Application of zinc and iron with molybdenum ( $T_9$ ) significantly increased oil (21.20%) and protein (42.99%) content of soybean while, the lowest oil (18.20%) and protein (40.76%) content were recorded (18.20%) in treatment  $T_1$  (control).

Keywords: Zinc, Iron, Molybdenum, Foliar application, Seed fortification, Soybean.

### Effect of Irrigation, Nitrogen and Potassium levels on Yield and Oil Properties of Jatropha (Jatropha Curcas L.)

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Abstract: The field experiment was conducted for consecutive two years (2009-10 and 2010-2011) at Agro forestry Research Farm, M.P.K.V., Rahuri, Maharashtra, India in three years old Jatropha plantation raised at spacing of 3 m x 3 m in Entisol with low soil available nitrogen and high potassium status. The treatments were comprised of three levels of irrigations viz., No irrigation  $(I_0)$ , One irrigation  $(I_1)$  at sprouting and two irrigations  $(I_2)$  at sprouting and seed formation, three levels of nitrogen  $(N_0, N_1, N_2)$  0, 45 and 90 kg N ha<sup>-1</sup> and three levels of potassium (K<sub>0</sub>, K<sub>1</sub>, K<sub>2</sub>) 0, 30 and 60 kg K<sub>2</sub>O ha<sup>-1</sup>. The treatments were replicated four times in split -split plot design. The pooled results revealed that significantly higher seed and oil yield of Jatropha was recorded with  $(I_2)$ two irrigations at sprouting and seed formation over  $(I_1)$  irrigation at sprouting and no application  $(I_0)$ . Among nitrogen levels, significantly higher seed and oil yield of Jatropha was recorded with  $(N_2)$  90 kg N ha<sup>-1</sup> over 45 kg N ha<sup>-1</sup> and 0 kg N ha<sup>-1</sup>. Application of 60 kg  $K_2O$  ha<sup>-1</sup> recorded significantly higher seed and oil yield of Jatropha. The interaction effects of irrigation, nitrogen and potassium levels were recorded maximum yield of Jatropha. This is mainly because of the significant influence of combined application of nutrients on yield of Jatropha. Acid values, iodine values, saponification values of Jatropha oil have no significant difference due to different levels of irrigation, nitrogen and potassium. The Jatropha oil properties viz., acid values, iodine values, saponification values were compared with the ASTM and BIS standard. These properties were found within standard range.

Keywords: Jatropha, oil yield, oil properties etc.

#### Studies on biology of Holotrichia fissa Brenske

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**Abstract:** The biology of H. fissa was studied under laboratory conditions at Dharwad. The freshly emerged males and females collected from Hattarawata and Akkiwata (Belagavi district) were used to study the life cycle. Adult beetles emerged immediately after the onset of monsoon the soil from 7.30-8.pm. Females emerged

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first. Males emerge late attracted towards female for mating. Mating was observed for 4-5 minutes. Adult emergence was observed for 30-35 days. The peak emergence of beetles was noticed during  $24^{th}$  MSW (first fort night of June) and population decreased from  $26^{th}$  MSW and beyond  $29^{th}$  MSW (last fort night of July) no adult emergence was noticed. Eggs laid in soil at a depth of 8 to 10 cm. Fecundity per female varied from 2 (min) to 33 (max) eggs on an average of  $21.5 \pm 9.97$ . The incubation period was 7-9 days. The size of earthen cell varied from 1.25cm to 1.60cm. First instar took on an average of  $20.48\pm2.47$  days to complete. Second and third instar completed in  $26.82\pm1.36$  and  $33.00\pm11.90$  days respectively. The total larval period was 80.3 days. The pupal period lasted for 15 to 18days ( $15.57\pm8.08$ ). Field collected male beetles lived for 14-28 days ( $22.2\pm4.96$ ) and females lived for 7-23 days ( $16.4\pm4.64$ ) while the laboratory reared female lived for 8-10 days and males lived for 12-14 days. The total life of H. fissa was completed in 103 days.

Keywords: Biology, Holotrichia fissa

## Development of Bioinsecticidesagainst Spodoptera Frugiperda Using Chitnolytic Bacteria

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**Abstract:** The products chitinase are increasingly finding applications in various fields such as biomedicine, agriculture. Chitinase bring about hydrolysis of chitin which is widely distributed in cell wall of fungi, plants and insects. An attempt has been made to use chitinase producing bacteria for development of aBioinsecticides againstSpodoptera frugiperdawhich feeds on over 60 species of plants and is a periodic.But it is serious pest of maize, rice, sorghum, turf grasses, cotton, and peanuts, etc. In this attempt enrichment and isolation of chitinase producing bacteria from soil was carried out and isolates were examined for potential producing chitinase and killing the larvae of Spodoptera frugiperda.

Keywords: Bioinsecticides, Chitinase, Spodoptera frugiperda

## Vermicompost is an ideal agent to restore natural abilities and carrier of bio-fertilizer in comparison with lignite, talc, china clay, ash.

#### Suryakant Shinde, Dr. Manoj Aware, Dr.J.R.Khadse

**Abstract:** A study was conducted at BAIF Development Research Foundation, Central Research Station Urulikanchan. There are so many solid carriers are available to carry bio-fertilizer products. After inoculation of PSB microorganisms in to the vermicompost, PSB spore forming bacteria not only survive up to one year, but also enhance and restore natural abilities such as secretions of organic acids.PSB microorganisms survive in lignite and china clay and other carriers for six to seven months. In this invitro study PSB broth was prepared from culture preserved in refrigerator, then treated or applied in to vermicompost. PSB adapt, survive and compete with existing micro flora in vermicompost. after successful re-isolation of applied PSB bacteria from vermicompost used for further study in which PSB secret enzymes and organic acids in large quantity than original culture which was preserved culture in which bacterial populations inoculated in carriers were measured in ten days interval for times 0, 10, 20, 30, 40, 50, 60, days up to one year, by colony forming unit. PSB microbes produce more zone of solubilization and higher in count as compare to other carrier agent.

#### "Studies on Alternaria leaf spot of cabbage"

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Abstract: The leaf spot disease of cabbage (Brassica oleraceaL.) caused by Alternaria brassicae (Berk.) Sacc., was noticed in severe form in the field of Department of Agronomy, College of Agriculture, Dapoli during February, 2014. Considering importance of the crop and disease, present study on Alternaria leaf spot of cabbage was conducted. The pathogenic fungus was isolated on potato dextrose agar medium. The pathogenicity of the fungus was proved by inoculating healthy seedlings (45 days old) of cabbage variety Golden acre. The pathogenic fungus was identified as Alternaria brassicae. Among the different fungicides tested in vitro, it was revealed that, all the fungicides caused significant inhibition of pathogen but Difenconazole (0.1%) was the most effective fungicide as it recorded maximum inhibition (82.22%) of the mycelial growth of the pathogen Eleven varieties of cabbage were screened under natural conditions. None of the variety in screening trial was immune to the disease. Four varieties viz., Cabbage NS-25, Cabbage No-139, AnkurManas and Cabbage No-118were resistant and four varieties viz., Cabbage NS-25, Cabbage No-5624, Green Challenger and Veer-333 were moderately resistant. Golden Acre and Savitri were moderately

susceptible but Kranti was susceptible to the disease. Among the different fungicides tested in vivo, Mancozeb (0.25%) was the best fungicide followed by Azoxystrobin (0.1%). **Keywords:** Brassica oleraceaL, Alternaria brassicae, Mancozeb, Azoxystrobin, Difenconazole.

## Newer insectides as seed protectant against pulse beetle (Callosobruchus spp.) in stored mungbean seeds

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Abstract: Quality seed is the most essential basic input in crop protection. Pulse beetle, Callosobruchus spp. is the major pest of pulses in India. Pulses suffer enormous losses due to bruchid attack during storage. Some pre storage seed treatment is needed to take care of insect pests during storage with the aim of improving the shelf life of seed. Keeping the above facts in view, a laboratory experiment was conducted on "Newer insectides as seed protectant against pulse beetle (Callosobruchus spp.) in stored mungbean seeds "in completely randomized design with 8 treatments and 3 replications. Freshly harvested 1 Kg mungbean seed with very high germination (%) and low moisture content was taken for each treatment. Require quantity of insecticide was diluted in 5 ml. of water to treat 1 Kg of seed for proper coating. After drying in shade, seeds were packed in 2 Kg capacity gunny bag lets and kept in storage under ambient conditions. Samples of treated seed were drawn and observation of per cent germination, infestation and moisture content percentage were recorded at three months interval of storage period. The data on effect of insecticides on Mungbean (Vigna mungo) seed quality and insect damage during storage under ambient conditions revealed that, all the insecticidal seed treatments maintained the mungbean seed germination above seed certification standards (75%) up to 6 month of storage without any adverse effect on seed germination. The maximum seed germination at 9 month was recorded in deltamethrin 2.8 EC applied @ 1ppm (81%) and was at par with emamectin benzoate 5 SG @2ppm (79%) and spinosad 45 SC @ 2ppm (78%) per kg of seed. The remaining treatments recorded germination below seed certification standards. Similarly seed treatment with deltamethrin 2.8 EC @ 1ppm kept the seed free from insect infestation, whereas emamectin benzoate 5 SG @ 2ppm (0.33%) and spinosad 45 SC @ 2 ppm (0.33%) were found at par with deltamethrin seed treatment at 9 month of storage,. Thus, the result revealed that, deltamethrin 2.8 EC @ 1ppm, emamectin benzoate 5 SG @ 2ppm and spinosad 45 SC @ 2 ppm per kg of seed were found effective for the management of pulse beetle of mungbean and maintain the seed germination above MSCS up to 9 months.

Keyword: Mungbean, Pulse beetle, insecticides

## Effect of different fertilizer briquettes and organic manures on yield, nutrients uptake and quality parameters of chilli (Capsicum annuum L.) in lateritic soils of Konkan

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Abstract: A field study was carried out on a lateritic soils at Dr. B.S.K.K.V Dapoli in 2010-2011in Randomized block design with three replication and twelve treatments viz .  $T_1$  (control),  $T_2$  (RDF),  $T_3$  (Urea-DAP briquettes first two at transplanting and second one at 30 DAT),  $T_4$  (Urea-DAP briquettes First at transplanting, second at 30 DAT and third at 60 DAT),  $T_5$  (Urea-Godavari briquettes first two at transplanting and second one at 30 DAT),  $T_6$  (Urea-Godavari briquettes First at transplanting, second at 30 DAT,  $T_6$  (Urea-Godavari briquettes First at transplanting, second at 30 DAT,  $T_6$  (Urea-Godavari briquettes First at transplanting, second at 30 DAT,  $T_6$  (Urea-Godavari briquettes First at transplanting, second at 30 DAT,  $T_8$  (Urea-Suphala briquettes First at transplanting, second at 30 DAT,  $T_1$  (Vermicompost N based) and  $T_{12}$  (Poultry manure N based). It is observed that the application of Urea-Godavari briquettes first at transplanting, second at 30 DAT and third at 60 DAT was found significantly superior over rest of all the treatments in respect of yield. Application of Urea-Godavari briquettes first at transplanting, second at 30 DAT and third at 60 DAT recorded higher total N and P uptake while application of Urea-Suphala briquettes first at transplanting, second at 30 DAT and third at 60 DAT recorded higher total K uptake. It was also observed that the quality of the pods in terms of ascorbic acid and capsaicin content increased with application of organic manures alone

Keywords: Chilli, Fertilizer Briquettes, Yield, Available Nutrients and Uptake.

## Effect of Levels of Sulphur on Yield, Nutrient Uptake and Quality of Soybean in Inceptisol

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**Abstract:** The field experiment was conducted during Kharif 2012 at College of Agriculture, Kolhapur. It was carried out in Randomized Block Design with four replications comprising of five levels of sulphur (0, 20, 40, 60 and 80 kg S ha<sup>-1</sup>) application through elemental sulphur. The significantly highest grain yield (29.05 q ha<sup>-1</sup>) and straw yield (40.85 q ha<sup>-1</sup>) were recorded in 60 kg S ha<sup>-1</sup> (T<sub>4</sub>) but it was at par with treatment T<sub>5</sub> (80 kg ha<sup>-1</sup>). The protein yield (432.78 g kg<sup>-1</sup>) and oil yield (220.53 g kg<sup>-1</sup>) of soybean was found significantly superior in treatment T<sub>4</sub>. The nutrient uptake of soybean at critical growth stages increased significantly due to application of sulphur. However, the application of highest level of sulphur @ 80 kg ha<sup>-1</sup> recorded increase in the availability of nutrient. The results of present investigation indicated that application of sulphur @ 60 kg ha<sup>-1</sup> significantly increased yield, nutrient uptake and quality of soybean.

Keywords: sulphur, yield, nutrient uptake, quality, soybean and inceptisol.

## Effect of Organic sources of Nitrogen on economics of Green Chilli (Capsicum annuum L.)

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**Abstract:** Field experiment was conducted on effect of organic sources of nitrogen on economics of green chilli during summer season of 2014. The objectives of experiment to study the effect of organic sources of nitrogen on economics of green chilli and to find out the suitable combination of organic sources of nutrient in green chilli. The maximum and statistically higher net returns of Rs. 67334 ha<sup>-1</sup> was recorded with treatment of application of 100% N through poultry manure, which was significantly more than rest of the treatments. Treatment combination of application of 50% N through FYM + 50% N through poultry manure shown maximum result as compare to other combination. Similar trend was also noticed in case of benefit cost ratio (2.63) as that of net monetary returns.

**Keywords:** Chilli, FYM, poultry manure, vermicompost, neem cake, gross monetary returns, cost of cultivation, net returns, B:C ratio

## Anatomical basis of resistant and susceptible groundnut genotypes against late leaf spot

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Abstract: Late leaf spot (LLS) disease caused by Phaeoisariopsis personata (Berk. and Curt.) von Arx. is globally wide spread and is the most important foliar disease of groundnut and hamper yield upto 50-70%. One hundred fourteen groundnut genotypes from various Arachis spp. were screened in the field condition against LLS during Kharif 2013-14 at MPKV, Rahuri. The genotypes viz., RHRG 6083, GPBD 4, KDG 128, ICG 11426, ICG 12672, ICG 13919, ICG 14475, ICGV 94118, ICGV 13160 and ICGV 13165 were found resistance to LLS. Comparison was made between 10 resistant and 2 susceptible genotypes were examined for their static, structural and anatomical features. The anatomical features of both the surfaces of foliage were characteristically different in the resistant and susceptible genotypes. Anatomical investigations indicated that the stomatal frequency on the adaxial leaf surface was significantly higher in the susceptible genotypes than the resistant genotypes which had the low stomatal frequency on both adaxial as well as abaxial leaf surfaces, respectively. The foliage of resistant genotypes were characterized by small sized stomata (17.31  $\mu$  x 5.89  $\mu$  to 22.97  $\mu$  x 8.22  $\mu$ ), less number of stomata (114 to 153 per mm<sup>2</sup>) higher frequency of trichomes (4.67 to 7.41 per mm<sup>2</sup>), greater thickness of epidermis cum cuticle (21.54  $\mu$  to 28.98  $\mu$ ). The susceptible foliage was showed high frequency of large sized stomata, less thickness of epidermis-cum-cuticle layer, few trichomes on lower leaf surface. These differences were considered as partial contributing morphological and anatomical features of defence system of groundnut to LLS. Since, resistant genotypes did not show hypersensitivity but produced fewer spots on the foliage with delayed incubation period, it was inferred that the anatomical features of the resistant genotypes account for the defence to penetration, development of intercellular hyphae and consequent aggregation of mycelia for symptom development.

## Effects of constraints of various input resources on growth and yield of kharif rice under conditions of Konkan region

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**Abstract:** A field experiment was conducted during the Kharifseason of 2013 to study the effect of constraints of various input resources on growth and yield of rice at Agronomy Farm, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S.). The soil of the experimental field was sandy clay loam in texture and acidic in reaction, low in available nitrogen, medium in available phosphorus, available potassium and organic carbon. The experiment was laid out in randomized block design consisting eight treatments viz., T<sub>1</sub>: Full recommended package (FRP), T<sub>2</sub>: FRP – Fertilizer (Fert.), T<sub>3</sub>: FRP – Plant protection (PP), T<sub>4</sub>: FRP – Weed management (WM), T<sub>5</sub>: FRP – (Fert. + PP), T<sub>6</sub>: FRP – (Fert. + WM), T<sub>7</sub>: FRP – (PP + WM), T<sub>8</sub>: FRP – (Fert. + PP + WM) and replicated three times. Results revealed that the full recommended package (T<sub>1</sub>) was found to be better in terms of growth character, yield attributes and yield over all other treatments. Among various input resource constraints full recommended package (T<sub>1</sub>) recorded significantly highest grain (45.18 q ha<sup>-1</sup>) and straw (55.26 q ha<sup>-1</sup>) yield over all other treatments, except treatment T<sub>4</sub>.Among the three major inputs, skipping plant protection measures from full recommend package had caused maximum reduction in grain yield (26.56%), followed by excluding manures and fertilizer (17.55%) from full recommended package.

Keywords: Fertilizers, plant protection, weed management, growth characters, yield attributes and yield.

### Environment monitoring for disease forecasting of French bean crop

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Abstract: Environment monitoring over French bean crop field for studying correlation between the occurrence of airspora components specially some pathogenic fungal spores and meteorological factors at different growth stages of the crop was carried for the first time in Pune region. The study was carried out by employing a Tilak air sampler during two consecutive rainy seasons (2012 and 2013). A total of 86 and 85 types of airborne biocomponents were trapped during rainy season of 2012 and 2013 respectively. The group Deuteromycotina was found to be dominant with 60.36% and 59.70% contribution to the total airspora followed by Ascomycotina (19.01% and 19.59%), Basidiomycotina (9.79% and 10.36%), other types (6.45% and 6.29%), Phycomycotina (2.78% and 2.82%), Myxomycotina (1.60% and 1.24%) and Mycelia Sterilia (0.01% and nil) during both consecutive rainy seasons. Among Deuteromycotina pathogenic spore type Alternaria was recorded significantly (5.12% and 4.53%) and leaf spot disease incidence from these spores was observed during both rainy seasons which contribute to low yield. Relation between Alternaria and meteorological factors shows that there was significant negative correlation with minimum temperature (r = -0.297) and wind velocity (r = -0.355) during first rainy season whereas it is significantly positively correlated with relative humidity at morning (r =(0.219), average relative humidity (r = 0.225) and rainfall (r = 0.346) during second rainy season. The forecasting of airborne fungal diseases could be attempted if the information on the airspora over this crop is available. Such environment monitoring helps in understanding dissemination and spread of airborne biocomponents incuding pathogenic types and such data will be helpful in designing disease forecasting system. Keywords: Airspora, French bean, Alternaria, Meteorological factors, Pune

## Study of transient GUS expression in sugarcane using bacterial cells as microprojectiles

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Abstract: Gene delivery by particle bombardment has become a widely used technique with broad applications in plant transformation. However, transformation by particle bombardment often leads to integration at one locus of complex arrays of multiple copies of the introduced genes including plasmid vector, often fragmented and rearranged. Because of the multiple copies inserted during biolistic transformation are usually genetically linked and they cannot be segregated during subsequent generations. In the present study comparison was made between Biolistic transformation using plasmid DNA and bacterial cells containing plasmid coated on gold particles. Sugarcane embryogenic callus of Co 86032 and tobacco leaf were used as target tissue for transformation studies. E. coli (DH5 $\alpha$ ) harboring pCambia 2301 plasmid vector containing GUS as reporter gene was used. Transformation efficiency was calculated by using Transient GUS expression method. It was observed that transient GUS expression was high for sugarcane calli and tobacco leaf by bombardment with gold particles coated with plasmid DNA in comparison with bacterial cells coated gold particles. Further stable
transgenic plants will be developed, studied for expression and copy number of plants. This standardized protocol can be used to develop low copy number transgenic sugarcane and can be applied to other crops also. **Keywords:** Sugarcane, biolistic, microprojectile

## **Rural Youth in Farming**

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Abstract: Engaging youth in agriculture has been a prominent topic recently and has risen up the development agenda, as there is growing concern worldwide that young people have become disenchanted with agriculture.With most young people - around 85% - living in developing countries, where agriculture is likely to provide the main source of income it is vital that young people are connected with farming.Currently around the world we're living in an era where rapid urbanisation has led to a decline in rural populations and for the first time ever the majority of the world's population lives in a city. There is a lot of concern about engaging youth in agriculture, in many Ways to engage youth inagriculture:Demystifying the negative myths about agriculture, Presenting agriculture as a profitable venture, Availing special agriculture funding for youth, Providing incentives to young people engaged in agriculture, Preferential treatment for young farmers e.g. water levy, taxation laxity, Availing fair market opportunities for youth, Modernizing agriculture, Providing training opportunities in new technologies. ICTs could provide new opportunity for making agriculture more interesting for young people. The increased use of mobile phones in farming can also help deter young people away from stereotypes of traditional farming and help change their perceptions on agriculture, helping them to view it as an exciting and innovative industry. Farming offers the young generation a chance to make a difference by growing enough food to feed the world. There are many challenges ahead for the sector but if young people are offered education in agriculture, a voice at policy level, and in the media, and are engaged with innovations then the agriculture industry can attract youth again. As we look to find solutions to feeding a world of nine billion people by 2050, it is this new generation that – working together – can help to achieve global development. Keywords: ICT, youth, agriculture

# Effect of zinc solubilizing microorganisms in enhancing Zn availability and enzyme activity in Groundnut

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Abstract: Zinc is present in the enzyme system as co-factor and metal activator of many enzymes. The role of zinc in the nutrition and physiology of both eukaryotic and prokaryotic organisms, especially its importance for activity of many enzymes is widely studied. The experiment was conducted on zinc deficient soil at farmer's field in Kehal village, Taluka Jintoor, Dist. Parbhani during summer season of 2014 to assess the ability of zinc solubilizing microorganisms to enhance the zinc availability and enzyme activity in soil. Bioinoculants evaluated were Burkholderia cepacia, Burkholderia cenocepacia, Pseudomonas fluorescens, Pseudomonas striata, Trichoderma viride, Trichoderma harzianum and Bacillus megaterium. Tenth day after sowing 24 hrs old fresh culture of microbial isolates was inoculated at the rate 10 ml. Results revealed that Pseudomonas striata noticed significantly highest periodical Zn content in soil followed by Pseudomonas fluorescens and Trichoderma viride, respectively. Activity of alkaline and acid phosphatase was high in the rhizosphere at harvest stage. As seen among different microbial inoculants, Bacillus megaterium, Pseudomonas striata and Trichoderma viride noted significantly greater values of alkaline and acid phosphatase activity along with RDF at different sampling intervals and these were found at par with each other and superior over remaining treatments.

Keywords: Enzyme, Microorganism, Phosphatase, Soil, Zinc.

#### 2. Biotechnology

# Screening Of Plant Extracts for Their Potential Quorum Quenching Activity

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Abstract: Multidrug-resistance is a problem that we will continue to face unless we come up with alternate efficient drugs capable of counterattacking this problem hence medicinal plants could be one of those alternatives because most of them are readily available, non-toxic, and cheap and affect a wide range of antibiotic resistant microorganisms. Evaluation of plant for quorum quenching activity can be one of those counterattack solutions. Some of the naturally derived plant molecules such as furanones, furocoumarins, carotenoids, limonoids, pectin, coumarin and some enzymes have been reported for their potential of blocking quorum sensing signal molecules, potentially which are very effective in being less toxic compared to bacterial or synthetic molecules. Two mechanisms prominently observed in bacterial quorum sensing are represented by acylhomoserine lactone (AHL)-dependent quorum-sensing systems and autoinducing peptide (AIP)dependent quorum-sensing systems. Quorum sensing (QS) is a key regulator of virulence, biofilm formation and pigment production in many medically relevant bacteria. Hot and cold extracts of sixteen different medicinal plants using four different solvents were examined in this study for their effects on QS system. Violaceinproduction inhibition assay (using ChromobacteriumviolaceumMCC2216) and Biofilm Inhibition assay (using Vibrio parahaemolyticus MTCC\*451) were used to inspect the activity of the plant extracts on the quorum sensing systems. Among these Amla(Embilicaofficinalis), Behda (Terminaliabellerica), Hirda(Terminaliachebula), Indian gum tree(Accaciaarabia), Kusal(Alternantheratenella) and Dudhi(Euphorbia geniculate) caused significant inhibition of biofilm formation and inhibition of violacein pigment production in the test organisms used. Additionally Thin layer Chromatography (TLC) was performed for both Dudhi and Kusal extracts to check individual quorum quenching activity of the components of each extract but no positive results were obtained suggesting that the effective mechanism of Quorum Quenching (QQ) depends on the synergistic action of two or more components of the extract.

Keywords: Quorum Sensing, Quorum Quenching, Acylhomoserine lactone (AHL), Medicinal plants.

# Hygienization and shelf life extension of leafy Vegetables Vegetables by Combination treatment including Radiation Processing.

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Abstract: Spinach (semi-Savoy spinach), coriander (Co-2) and mint (Japanese mint /Menthol mint) were cleaned, washed thoroughly using chlorination, air dried and packed in styrofoam based tray with cling film. The packed samples were radiation processed at gamma dose of 2 kGy and stored at 4°C. Microbial analyses were carried out for the fresh as well as radiation processed vegetables. Sensory analysis was also performed with cooked produce at 9 point hedonic scale. Effect of processing on the content of chlorophyll, total phenolic and antioxidant capacity were investigated by Arnon's, folin ciocalteu and DDPH antioxidant assay methods, respectively. Total aerobic plate counts in fresh spinach, coriander and mint samples collected from different location of Mumbai and nearby cities were found to be in the order of ~  $10^7$  to ~  $10^8$  CFU/g. In these samples yeast and mould count was in the order of ~ $10^5$  CFU/g and presumptive coliform in the order of ~  $10^4$  to ~  $10^5$ CFU/g. In the above said combination processed samples the total plate count was below ~  $10^3$  CFU/g and presumptive coliform count was below detectable level. Yeast and mould count in these samples also reduced below ~  $10^3$  CFU/g. Overall acceptability of processed samples was rated 7.5 ±1 on a 9-point hedonic scale. In these samples total phenolic content ranged between 12 to 24 mg CE/g (dry wet), DPPH radical scavenging activity in fresh non treated spinach coriander and mint was 45, 60 and 70% respectively which remain unchanged in the processed samples. Total chlorophyll content in these vegetables ranged between 70 to 100 mg/g fresh wet. After 10 day's storage total chlorophyll content gradually reduced to 50 mg/g. Marginal enhancement in total phenolic content and antioxidant activity observed in the processed samples. The findings thus indicate that the above combination process can ensure safety and extend the shelf life of leafy vegetables. Keywords: Radiation, Leafy vegetables, Coriander, Spinach, Mint

# Bubalus bubalis (water buffalo) mammary gene expression profiling during the onset of differ in milk production trait in same lactation period.

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**Abstract:** Gene expression analysis is increasingly important in biological research, while real-time PCR is becoming the method of choice for high-throughput and accurate expression profiling of selected genes. Understanding the mechanism of milk synthesis and secretion is important for dairy industry. Thus present study reports the expression of genes involved in metabolism and milk synthesis in buffalo mammary tissue. The genes studied were Prolactin Receptor (PRLR), STAT5, Fatty Acid Synthase (FASN), P63, CD49 and Ribosomal Protein S9 (RPS9). The expression of these genes was studied in two sets of mammary tissue of water buffalo differed in their total milk yield. Real-time expression analysis of these genes across buffalo tissues revealed PRLR, STAT5, FASN and P63 showed higher expression in high milk yielding than low milk yielding animals whereas no significant difference was found in the expression of CD49 between both the sets. **Keywords:** Water buffalo, milk synthesis, Expression analysis.

# Isolation and screening of Lactic acid bacteria for bioactive potential

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Abstract: Plant probiotics are plant associated elite bacteria which have multiple abilities like protecting plants from diseases and improving the nutritional quality of the plant. Spraying of a chemical pesticide on the vegetable plant leads to hazardous effect on the consumer. The aim of this study was to isolate Lactic acid bacteria (LAB) from fresh vegetables and screen them for antimicrobial potential. Junnar, Ambegaon and Khed talukas were the target locations based on productivity from Pune district. Total 230 presumptive LAB isolates were obtained from twelve different vegetable samples from fields by cluster sampling using the randomized block design. The vegetable samples were Cabbage, Cauliflower, Gherkins, Cluster Beans, Cow Pea, French Beans, Tomato, and Cucumber. The common infestations on vegetables are Xanthomonas campestris, Pseudomonas syringae, Erwinia spp etc controlled using large amount of chemical pesticides. These vegetable samples provide suitable microenvironment for colonization of LAB. Identification of bacteria was done using Matrix Assisted Laser Desorption Ionization Time-Of-Flight (MALDI-TOF) and Microlog GEN III microbial identification system. The isolates were identified as Staphylococcus epidermidis, Enterococcus mundtii, Lactobcillus plantarum isolated from Tomato, Enterococcus mundti from Gherkins, Lactobcillus plantarum from Cauliflower, Enterococcus faecium from Cluster Bean. The LAB isolates exhibited milk curdling ability. The antibacterial potential displayed by Lactobcillus plantarum with zone of inhibition 4 mm and Enterococcus faecium with 2 mm of inhibition zone was comparable with standard Lactobcillus plantarum MCC2156 with inhibition zone 4 mm towards Xanthomonas spp. as test pathogen. Such isolates antibacterial potential can be used to prevent the decay of vegetables due to infection.

Keywords: Lactic acid bacteria, bioactive potential, antibacterial activity.

# Studies on the prevalence of multidrug resistant bacteria, correlation among the physico-chemical parameters, occurrence of heavy metals in Mula River, Pune

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**Abstract:** The emerging diseases and their curative therapies are most challenging problems worldwide due to emergence of antibiotic resistant pathogens. The medium of exposure of these pathogens to the living organisms is mainly by ingestion of contaminated food, water or air. The current study aimed at the evaluation of antibiotic resistant bacteria isolated from Mula river water samples in the vicinity of pharmaceutical companies (P4), hospitals (H5) and waste water treatment plants (W7) of the Pune city. It also emphasized on the correlation between heavy metals, biological oxygen demand, temperature, pH to the antibiotic resistance and multidrug resistance (MDR). Among the three antibiotics, Ceftriaxone resistance was highest (CTA:  $3.1 \times 10^4$  colonies) followed by Cefpirome (CP:  $3.0 \times 10^4$  colonies) and then Ertapenem (EP:  $0.4 \times 10^4$  colonies). The results also

indicated the presence of multi drug resistant coliforms. Higher resistance  $(1.2 \times 10^4 \text{ colonies})$  was observed to the combination of EP and CTA. The coliforms (MDR) were also isolated ( $0.06 \times 10^4$  colonies) against the combination of all three antibiotics. The BOD (10-14 mg/L) was highest in case of water samples collected from nearby of pharmaceutical companies. The screening of heavy metals revealed that, the concentration of Hg (0.8  $\mu$ g/L), Pb (17.24  $\mu$ g/L) and Cd (100  $\mu$ g/L) were exceeding the maximum permissible limits governed by most of the regulatory authorities. The highest concentration of Cu (23.57  $\mu$ g/L), Co (5.25  $\mu$ g/L) and Cd (100  $\mu$ g/L) were found in the P4 samples. While the concentration of Pb (17.24  $\mu$ g/L) and Zn (1.15  $\mu$ g/L) were highest in the samples of W7 and H5. The contour map results concluded a positive correlation of BOD with MDR and presence of exceeding concentration of heavy metals. Higher BOD is also the indicator of heavy presence of micro-organisms. Presence of heavy metals positively correlated with MDR (except EP+CP). The results are the alarming indicator for emergence of MDR bacteria in the environment and the emerging threat to the health of community. It is necessary to look forward critically towards the study of mechanisms to control the spread of MDR bacteria as well as management and disposal of waste and pollution.

Keywords: Antibiotic resistance, multi drug resistance (MDR), heavy metals, Coliforms.

### Effect of different concentrations of IBA in combination with constant BA on shoot proliferation of Bacopa monnieri (Brahmi).

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Abstract: A lab experiment was carried out during summer season of 2011-12 at Dept. of Plant Biotechnology, MGM College of Agricultural Biotechnology, Aurangabad to study effect of different concentrations of IBA in combination with BA on shoot proliferation of Bacopa monnieri (Brahmi) under in vitro condition. The experiment was laidout in completely randomized block design with five treatments of IBA (0.00, 0.25, 0.30, 0.35,0.40 µM) with constant BA (1.1µM) MS basal medium on nodal segment of Brahmi. Among IBA 0.30µM with constant BA (1.1µM) showed significantly higher shoot proliferation. On an average within a period of 3 subcultures more than 39000 shoots can be produced from single nodal segment. Thus present protocol can be used to generate foundation stock of elite planting material for large scale cultivation.

Keywords Brahmi, IBA, BA, MS media, shoot proliferation

# "Evaluation of curcumin capped copper nanoparticles as possible inhibitors of human breast cancer cells and angiogenesis: a comparative study with native curcumin"

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Abstract: Synthesis of metal nanoparticles for improving therapeutic index and drug delivery is coming up as an attractive strategy in the mainstream of cancer therapeutic research. In the present study curcumin capped copper nanoparticles (CU-NPs) were evaluated as possible inhibitors of in vivo angiogenesis, pro-angiogenic cytokines involved in promoting tumor angiogenesis along with inhibition of cell proliferation and migration of breast cancer cell line MDA-MB-231. The anti-angiogenic potential was assessed using in vivo CAM model (chorioallantoic membrane model). MTT- based cytotoxicity assay was used to assess the effect of CU-NPs against proliferation of breast cancer cell line. The wound healing migration assay was used to evaluate the effects of CU-NPs on the migration ability of breast cancer cell line. Native curcumin (CU) was used as a reference compound for comparison purpose. The result of the present investigation indicates that, CU-NPs could not demonstrate impressive anti-angiogenic or anticancer activities significantly as compared to native CU. The possible mechanisms of experimental outcomes are discussed in the light of the methods of nanoparticle synthesis in concert with the current state of the art literature.

Keywords: Curcumin, Breast cancer, Angiogenesis, Nanoparticles, Chorioallantoic membrane.

### Comparative studies on indoor air quality and its toxic effects due to use of cook-stoves in rural Pune

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Abstract: The conventional use of biomass fuel cook-stoves (Chulhas) lead to indoor air pollution (IAP). Burning of solid biomass fuels like wood, cowdung and crop residues account for emissions of many obnoxious gases, taking a toll on environment and public health and kills almost a quarter of a million people annually. Current research was aimed to survey 215 households of 5 villages around Pune district and compares the indoor air quality and its toxic effects caused due to harmful gases released from cook-stoves at a distance of 25 cm. The spot observations were done based on demographic characteristics of each village such as type of cookstove used, type of biomass, cooking hours etc. Our preliminary studies on a real time flue gas analysis from wood (sawdust, twig), cowdung and passive cigarette smoke at a distance of 10 cm indicated higher levels of carbon monoxide (CO) in the range of 854.0-3115.0 ppm, 0.0-30.3 ppm of sulphur dioxide (SO<sub>2</sub>), 0.0-90.0 ppm of nitrogen oxide (NO) and 0.0-14.6 ppm of nitrogen dioxide (NO<sub>2</sub>), compared to Liquefied Petroleum Gas (2.0, 1.0, 3.0 and 0.1 ppm for CO,  $SO_2$ , NO,  $NO_2$  respectively). The genotoxicity of biomass smoke extracts (BSE) (sawdust, twig, cowdung) and cigarette smoke extract (CSE) by comet assay in peripheral blood mononuclear cells (PBMC) demonstrates the extent of DNA damage expressed in percent DNA in tail was in the order of CSE > cowdung smoke extract where as no significant damage was observed due to sawdust and twig smoke extracts in short term exposure (1h). The cytotoxicity of BSE and CSE was evaluated by trypan blue dye exclusion assay, where viable cells were least for CSE followed by twig and sawdust smoke and maximum for cowdung smoke indicating that eventhough sawdust and twig smoke extracts were cytotoxic to PBMC, they did not show any genotoxic effect. Glutathione-S-transferase, as oxidative stress marker, was found to be 7.7 times higher in PBMCs exposed to cowdung smoke extract than CSE, which further supports that cowdung smoke is posing less oxidative stress on PBMCs than cigarette smoke. These results revealed that the use of cowdung can be discouraged as a biomass fuel in rural and underdeveloped parts of several countries. Keywords: indoor air pollution, comet assay, cytotoxicity, glutathione-S-transferase

# Antioxidant studies of lactic acid bacteria isolated from plant sources

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Abstract: The resistance to oxidative stress (OS) is crucial to stay healthy and it is essential to reduce the adverse effects of OS related diseases and aging. Various researchers have documented the isolation of lactic acid bacteria (LAB) from vegetables, however the studies on LAB-induced oxidative stress protection from vegetable source is scarce. Thus, the aim of this study was to isolate and identify LAB from fresh vegetables and evaluate their antioxidant capacity. Fresh vegetable samples were collected from various locations of Junnar, Ambegaon and Khed talukas of Pune district. LAB from fresh vegetables namely Ridge Gourd, Fenugreek, Bitter Gourd, Bottle Gourd and Cabbage were enriched in MRS (de Man Rogosa Sharpe) broth and isolated by plating on MRS agar. Majority of presumptive fifty seven isolates were found to be gram positive rods (> 50%). while others were cocci and fewer coccobacilli. Further identification of few isolates was done by MALDI-TOF and metabolic fingerprint determination by MicroLog M technique. The isolates were identified as Lactobacillus plantarum, Enterococcus faecium, Enterococcus hirae, Enterococcus mundtii and Staphylococcus epidermidis. The antioxidant activity of cell free supernatant and intra cellular extract of H<sub>2</sub>O<sub>2</sub> treated LAB was tested by traditional 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay. The antioxidant activity in decreasing order was Lactobacillus plantarum> Enterococcus faecium> Enterococcus hirae which were at par to quercetin, a well known antioxidant. Lipid peroxidation ability was determined with the thiobarbituric acidreactive substances (TBARS) assay where no level of TBARS was detected. Few potent isolates were analyzed for their milk curdling ability to develop starter cultures with health benefits.

Keywords: lactic acid bacteria, antioxidant, fresh vegetables, starter cultures

# Identification of strains and determination of multi-drug resistance in isolates obtained from Mula river, Pune

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**Abstract:** Over the years, increase in the pollution levels in Pune city has led to deterioration of the water quality to a great extent, resulting in phenomenon such as Multi-drug resistance (MDR) of bacteria in the river waters. In this study, four of the isolates, viz., P4CP14a, H5CP2a, W7CP1a and P4CTA17a, obtained from the Mula river, Pune were first identified using MALDI-TOF MS analysis and were then tested for their tolerance

towards multiple antibiotics and the determination of their Minimum Inhibitory Concentrations (MIC) were done using macro-dilution testing and Etest, which showed that all the 4 strains were resistant towards Nalidixic acid, Cefpirome, Ceftriaxone, Ciprofloxacin and Tetracycline for the Etest and MIC values such as, P4CTA17a(140  $\mu$ g/ml), H5CP2a( 540  $\mu$ g/ml), P4CP14a( 710  $\mu$ g/ml) and W7CP1a( 870  $\mu$ g/ml) for macro-dilution MIC. Further analysis on the antibiotic susceptibility by disc-diffusion testing revealed that P4CP14a and H5CP2a were ESBL – producing strains, whereas, W7CP1a and P4CTA17a were ESBL + AmpC hyper-producing strains. Also, the presence of 2 virulence genes viz., iutA and afa was confirmed by PCR analysis for detection of virulence factors. This suggests that there is presence of MDR in the bacteria in the river waters which possess a very high degree of resistance and virulence genes that are responsible for the spread of this resistance and pathogenicity, thus posing a great threat to human health and environment.

Keywords: Mula river, Multi-drug resistance, Extended-spectrum beta lactamase, Minimum inhibitory concentration

# Challenges associated with the isolation of non-streptomycete actinomycetes

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Abstract: Actinomycetes are known to have applications in medicine and biotechnology industries. The most common of actinomycetes is the genus Streptomyces and it is perhaps the most easily cultivable genus. As a result, when samples are plated for the isolation of actinomycetes, Streptomyces grows abundant and faster than the rest of the genera, leading to exclusion of most of the other non-streptomycete genera. Although several pretreatment methods are recommended for isolation of rare actinomycetes (or non-strepomycete genera), we report the inadequacies associated with the methods eventually proving that these methods are not fool-proof for exclusion of the genus Streptomyces. In this regard, we chose soil samples from Rajasthan (salt lake-Sambhar, sand dunes-Sam and stone quarries-Balesar) and Maharashtra (caves-Karla). The purpose was to choose uncommon sites that could naturally harbor actinomycetes in better proportions as compared to other bacteria. The chemical pre-treatment [Sodium dodecyl sulphate and yeast extract (SDS-YE) and 1%chloramine-T (CT)] and enrichment technique [rehydration and centrifugation (RC)] earlier reported to be better for isolation of nonstreptomycetes were used for isolation of actinomycetes. 2 soil samples each from Sambhar Lake, Sam, Balesar and Karla were subjected to SDS-YE, RC and CT treatments which gave 15 isolates. It was expected that these would not be from genus Streptomyces, however, morphological studies using cover slip culture technique suggests that the strains indeed belong to the genus Streptomyces. Challenges associated in isolating nonstreptomycete genera are discussed.

Keywords: rare actinomycetes, Streptomyces, caves, desert, salt lake

### Studies on production of secondary metabolites from actinomycetes

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**Abstract:** Secondary metabolites have a great industrial as well as medicinal significance as solvents, antifreeze, dyes, drug carriers etc. These secondary metabolites are commonly produced by chemical pathways. Such chemical reactions can result in undesirable by-products. This gives a great importance to the volatile metabolites produced by microbial pathways. This study is based on actinomycetes strains isolated from Rajasthan which were screened for secondary metabolite production capacity. The targeted metabolites were alkenes, silver halides and carboxylic acids. Of the isolates screened, 8 isolates produced alkenes, 6 isolates produced silver halides and 8 isolates produced carboxylic acids in nutrient medium with starch as the carbon source. The metabolites were first detected qualitatively by performing chemical detection tests like bromine test and potassium permanganate test for alkenes and unsaturated compounds respectively and silver nitrate test for alkyl halides and carboxylic acids. The gas chromatography analysis revealed the production of 2-propanol and propionic acid. The microbial production of these compounds gives an ecofriendly alternative to the harsh chemical processes used otherwise.

Keywords: Actinomycetes, alkenes, alkyl halides, carboxylic acids, 2-propanol, propionic acid

# Characterization of Clinical isolates of P. aeruginosa and E. coli as MDR/XDR and PDR based on their resistance pattern.

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**Abstract:** The resistance towards the commonly used antibiotics is on rise in clinical as well as environmental settings. This resistance has been reported in most of the common microbes like E. coli, P. aeruginosa, A. spp, S. aureus etc. This resistance problem has reached the alarming levels because the resistance to common antibiotics like aminoglycosides and cephalosporins has become the known fact, but the resistance to 3<sup>rd</sup> and 4<sup>th</sup> line of antibiotics is also on rise, leaving with no treatment options available. The characterization of these strains as multi/extensively and pan-drug resistance makes it easy to understand the level of resistance in microbes. To check the extent of resistance we collected 4 P. aeruginosa isolates and 5 E. coli isolates from B. J. Government Medical College and screened them against range of antibiotics based on the guidelines. All four strains of P. aeruginosa were found to be extensively resistant leaving Polymixin B as only available treatment option. The all 5 strains of E. coli, P. aeruginosa

# Evaluation of in vitro cytotoxicity, anti oxidant and anticancer activity of Glycyrrhiza glabra against human breast cancer cells

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**Abstract:** Glycyrrhiza glabra has been used as traditional medicine in India and many other countries since many years for the treatment of different diseases. The major problem of use of herbal medicines in clinical practice lies with the fact, that there is sparse scientific and clinical data, as well as few efforts of efficacy and safety testing of the herbal products. There is a need in the present scenario to establish the pharmacological activities for identifying and comparing various preparations for potency. The present work was designed to evaluate in vitro anticancer activity of Glycyrrhiza glabra against human breast cancer cells. Methanolic extract of Glycyrrhiza glabra was evaluated for inhibition of cell proliferation and migration of human breast cancer cell line MDA-MB-231. MTT- based cytotoxicity assay was used to assess the effect of methanolic extract of Glycyrrhiza glabra against proliferation of human breast cancer cells. Methanolic extract of Glycyrrhiza glabra against proliferation ability of human breast cancer cells. Methanolic extract of Glycyrrhiza glabra against proliferation ability of human breast cancer cells. Methanolic extract of Glycyrrhiza glabra showed significant anticancer activity against MDA-MB-231 human breast cancer cell line.

# **Biocontrol of Citrus Canker On Citrus**

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**Abstract:** One of the most pernicious disease citrus canker is provocated by Xanthomonas species. Citrus canker causes continuously decline in fruit production until the tree produces no fruit at all. There is need to prevent the economic loss. The pathogenic bacteria was isolated on Nutrient Agar and enriched in Luria Bertani broth. Then soil sample from citrus plant field were added to the enriched cultural broth. Qualitative plaque assay were performed. Plaques were detected. Bacteriophages showed ability to infect Xanthomonas species. Hence, use of bacteriophages can succeed over chemical methods to control citrus canker. Key words – Bacteriophage, Citrus Canker, Biocontrol, Pathogenic bacteria.

# Agricultural application of fluorescent carbon Nano particles

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**Abstract**: Carbon based Nano materials have recently emerged as the most attractive tools to produce photo luminescent material. These do not contain toxic components such as heavy metal or semiconducting quantum dots. These carbon based nanomaterial such as carbon nanotubes fullerenes and carbon nanodots are widely used in biomedical devices. Bioimaging nanotubes enable size dependant photoluminescence and chemical stability. The study is carried out to developed simple approach for the synthesis of water soluble Carbon Nano Particle (CNPs) from various food waste. About 50 g of (CNPs) from 3 Kg of food waste were synthesized. Synthesis of CNPs involves simple and eco-friendly method where burnt food waste was added to the water. The CNPs exhibited a high degree of solubility in water because of abundant oxygen containing functional group around their surface. The narrow particle of photoluminescence emission (362-370 nm) confirmed that

the size of CNPs (4 nm) is because of similar quantum effect and emission traps on the surface. We carried out the field experiment to determine the germination efficiency of Wheat, Jawar and Maize seeds with CNPs dissolved water. The Vigour index was found to be increased as compare to control hence fluorescent Carbon Nano Particles can be applied for agricultural use.

Keywords: CNPs, Seed germination, Vigour index.

#### **Bioleaching of E-waste.**

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**Abstract**: E-waste generation rate is increase due to increase in innovation, modification and usefulness of electronic devices. Recycling of these toxic E-wastes is one of the major concerns in this century. Bioleaching of this E-waste will prove to be efficient and eco-friendly approach for recovery of rare and Nobel metals. The current study was aimed on bioleaching of precious metals from Printed Circuit Board (PCBs), Random access memory boards (RAM) and Subscribe Identity Module cards (SIM). Mix cultures of micro-organisms were applied for bioleaching of pulverised RAM. IC-PMS and AAS analysis of fermented broths of RAM shows efficient bioleaching of Iron(15.995 ppm), Copper(15.23 ppm), Magnesium(20.75 ppm), Manganese(29.40 ppm), Aluminium(21.75 ppm), For SIM cards Gold(0.810 ppm), Copper(20.58 ppm), Magnesium(144.2 ppm) and Chromium(0.0479 ppm), For PCB Iron(6.432 ppm), Copper(6.739 ppm),Manganese(5.170 ppm),Gold(0.022 ppm),Cadmium (0.0009 ppm) and Chromium(0.0951 ppm).Bioleaching of precious metals from E-waste was successfully carried out by micro-organisms. **Keywords**: E-waste, IC-PMS, AAS.

#### 3. Chemistry

# Eco-friendly Polyethylene glycol-400: synthesis and antibacterial evaluation of some new 2-[1-(2-(4-substituted phenylthiazol-2-yl) hydrazono) ethyl] phenol

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**Abstract**: An efficient one-pot three component procedure for the synthesis of 2-[1-(2-(4-substituted phenylthiazol-2-yl) hydrazono) ethyl] phenol derivatives from  $\alpha$ -haloketone, thiosemicarbazide and substituted acetophenones using polyethylene glycol-400 as a green solvent is mentioned. The newly synthesized compounds were evaluated for their antibacterial activity.

Keywords: PEG-400, thiazole derivative, α-haloketones, thiosemicarbazide, substituted acetophenones.

# Target Synthesis of Metallo-multilayers and metal Clusters of tme of iron Family

#### Jairaj K. Dawle, Bondge A.S, Makane T.P

**Abstract**: The mulsilayers of transition metal element (TME) of iron family and their metal clusters are targeted so synthesis owing to their anomalous behavior at the probable multilayer or cluster level. **Keywords**: Multilayers, clusters, antiferromagnetic (AFM), gaint magneto resistance (GMR).

# Synthesis of Triazoles and Flavoens

#### Jairaj K.Dawle and Bondge A.S

**Abstract**: synthesis of some triazole from substituteed anilines and that of flavoens from aromatic ketones and aldehydes have been carried out in the present work. Keeoing in view the importance of nitrogen heterocycles as a the antimicrobial agent and many other applications, the synthesis of triazole is undertaken. similarly the wild antibiotic applications of chlcones and flavones has made us to undertake to synthesis of new flavones. **Keywords:** Trizoles, Flavones, antimicrobial activity, antibiotic activity, substituted anilines, aromatic aldehydes and ketones.

# Application of biosynthesized gold nanoparticles as colorimetric detection of Cu<sup>2+</sup> ions in aqueous samples

#### MrunaliGharge andBalaprasadAnkamwar

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Abstract: Heavy metal ion contamination has been an important concern in the world for increasing pollution level and has to be monitored to control its impact on the environment and the ecosystem. This paper describes the sensing application of biosynthesized and unmodified gold nanoparticles as sensors for the colorimetric detection of  $Cu^{2+}$  ions in water samples. The colour of Au NPs was changed from purple to colourless by the addition of 100µl of  $Cu^{2+}$  ions along with change in absorbance due to the complex formation. Selectivity and linearity of the method at various concentrations of  $Cu^{2+}$  was also tested. A new peak at around 801nm was observed in addition to the peak at 549nm. More precisely with increase in concentration of  $Cu^{2+}$  ion solution the peak at 549nm decreased and that of 801nm increased. The method was linear in the range of with correlation coefficient (R<sup>2</sup>) 0.993 with a limit of detection 0.017 x10<sup>-6</sup> M which falls below maximum acceptable level of 20  $\mu$ Mas set by the US environmental protection agency.

Key Words- heavy metal ions, colorimetric sensors, gold nanoparticles

# **Ring Isomerism in Isomeric Metal Juglonates and its Effect on their Structural and Biological Properties**

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Abstract: Among the different types of isomerism which are well recognized in coordination chemistry, an additional and interesting type of isomerism has been explored through our investigations of an extensive series

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of isomeric chelates of hydroxy 1, 4-naphthoquinone derivatives. These hydroxy 1, 4-naphthoquinones in which the hydroxy group is situated adjacent to carbonyl group are typical ligands which can interact with most of the metal ions belonging to s, p, d and f blocks of the periodic table and provide isomeric chelates involving five membered and six membered rings. These are recognized as isomeric juglonates. Isomerism in these metal juglonates is solely due to the difference in ring size and therefore may be classified as **ring isomerism**. Such a type of ring isomerism is not yet well established in coordination chemistry, therefore it is explored in detail from structural and biological point of view. This communication is a part of this work in which synthesis, characterization of isomeric Erbium (III) and Prasodymium (III) chelates with Phthiocol and Plumbagin will be reported along with their antimicrobial studies. These chelates are synthesized by using methods well established in our laboratory. Their chemical characterization is done through elemental analysis and thermogravimetry while the structural characterization is done with the help of XRD, SEM, IR and Solid State UV spectroscopy. The antimicrobial activities are screened against some selected Gram positive, Gram negative and Fungal microorganisms using standard procedure.

Keywords: Isomeric Juglonates, Ring Isomerism, Effect on Different Properties.

# Synthesis And Characterization of Transition Metal Ion (CO<sup>II</sup>, NI<sup>II</sup>, CU<sup>II</sup>andZN<sup>II</sup>) Complexes of Schiff Bases Derived from Aminothiazole And Their Biological Activity.

**B.N. Muthal<sup>1</sup>, B.N.Raut<sup>1</sup> and A.S.Tekale<sup>2</sup>** <sup>1</sup>Shri Shivaji College, Kandhar Dist. Nanded(MS). <sup>2</sup>Shri Shivaji College, Udgir Dist. Latur(MS).

Abstract: A series of Schiff bases have been synthesized by reacting 4(4-fluro phenyl) aminothiazole and R-substituted Salicylaldehyde (R-H, 5-Me, 5-cl and 5-ome and 2-hydroxy-1-naphthalene. The bases and their metal complexes were characterized by elemental analysis, UV-visible and Infra-red spectra, magnetic susceptibility and conductivity measurement. The Schiff base complexes act as monomeric and have octahedral in geometry. The ligand coordinated through oxygen atom of phenolic –OH group and the nitrogen atom of azomethine group. The complexes are non-electroliticin nature. The stability constants and thermodynamic parameters ( $\Delta$  H, $\Delta$  Gand $\Delta$ S) were recorded. The –ve $\Delta$ G in each cases indicates the complexation is spontaneous. The enthalpy change is exothermic. The positive value of  $\Delta$ S indicates the reactions are entropicallyfavoured.

The Schiff bases and their metal complexes were screened for antibacterial, antifugal and pesticidal activity.

# Synthesis and Biological Study of Sulfonyl and Amide Derivatives of [1-(4methoxyphenyl) cyclopropyl] (piperazine-yl) methanone

Namdeo Bhujbal<sup>1</sup>, Dattatrya Gaikwad, Neha Patil and Meghmala Waghmode Annasaheb Magar College, Hadapsar, Pune-411028, INDIA

**Abstract:** Piperazine is an interesting heterocyclic moiety as a constituent of several biologically active molecules. The polar nitrogen atoms in piperazine confer bioactivity to molecules and enhance favorable interaction with micro molecules. Disubstituted piperazine exhibits wide range of biological properties, a number of piperazine derivatives have been synthesized and evaluated for their cytotoxic activity. Some piperazines have been found to anti-tuberculosis activity. The clinical drug development studies of piperazine compounds in small animal models by US National Cancer Institute (NCI) demonstrate that these targets had the ability to suppress experimental tumours. The study of [1-(4-chlorophenyl)cyclopropyl] (piperazine-yl) methanone derivatives refers that these compounds posses anticancer and anti-tuberculosis activities. Considering the biological importance of piperazine we designed the methodologies for the synthesis of [1-(4-methoxyphenyl)cyclopropyl] (piperazine-yl) methanone amide **2** derivatives. The derivatives **1** and **2** were evaluated for antibacterial and antifungal activities. This paper represents synthetic and biological study of compounds **1** and **2**. **Keywords:** Piperazine, Sulfonyl derivative, Amide derivative

### A Nephelometric study of Precipitation of Inorganic Compound

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**Abstract:** Chemical Kinetic is most growing field of research in chemistry. The present study includes measurements of precipitation reactions of sodiumthio sulphat, and Hydrochloric acid. For this study nephelometer is used for studying precipitation reactions. It has been observed that there is change in precipitate

formation with time. The reaction is studied to observe effect of concentration on the rate of reaction, it is also observed that reaction follows first order kinetics. Precipitate formation of Sodium thiosulphate and hydrochloric acid is carried out at different temperatures, experiment were also performed to study effect of salt on precipitation. The thermodynamic parameters  $\Delta H$ ,  $\Delta S$ ,  $\Delta G$ , Ea were calculated using Arrhenius equation. **Keywords:** Sodium thiosulphate, Hydrochloric Acid, Precipitation reaction, nephelometer, Kinetics.

### Chemical, Physical and Biological Study of some Lanthanium Nanochelates

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Abstract: Lanthanide chelates constitute an important group of metal complexes which possess several attractive features in the various branches of Science and Technology. Among these, detail study of the nanometric chelates with naphthoquinone oxime based Ligands is the most interesting aspect of our present interest. The naphthoquinone oximes under our current interest are isomeric 1, 2-naphthoquinone 1-oxime, and 1, 2-naphthoquinone-2-oxime. The possibility of the formation of Lanthanide nanochelates was realized during our synthesis and characterization of 1, 4 as well as 1, 2-naphthoquinone oximates with Lanthanide metals. During their syntheses, there was a significant and striking observation that the precipitates of these chelates were passing through whatman filter paper No.42. This was a clear indication of extremely tiny particle size tending to nano level. To confirm this XRD patterns as well as SEM photographs of these chelates were recorded which provided supporting evidence in favour of the formation of **nanochelates**. Therefore, we are carrying out detail investigations of the synthesis and characterization of lanthanide oximates of isomeric 1, 2naphthoquinone oximes with special reference to their Chemical, Physical and Biological properties. Through this communication, we would like to present the significant findings of our recent work on synthesis and characterization of some selected lanthanide 1, 2-naphthoquinone oximates by using modern analytical and instrumental techniques. The antimicrobial activities of the synthesized chelates against some Gram positive, Gram Negative and Fungal microorganisms were examined by following the standard procedure.

# Effect of Position Isomerism on Structural and Antimicrobial Properties of Isomeric 1, 2-Naphthoquinone Monoximates

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**Abstract:** Coordination chemistry of 1, 2-naphthoquinone 1-oxime and 1, 2-naphthoquinone 2.oxime is of special interest due to (i) their powerful chelating ability (ii) relative dominance of oxmic or naphtholic form depending on the nature of media and (iii) exhibition of position isomerism by these ligands as well as their metal-chelates. Among the large number of isomeric metal 1, 2-naphthoquinone oximates, those with transitional and lanthanide metals are more interesting due to (a) their microfined nature tending to nanolevel (b) structural peculiarities involving different isomeric forms and (c) strong antimicrobial activity and possibility of medicinal applications. In the present work isomeric 1, 2-naphthoquinone monoximates of Nickel (II), Copper (II) and Mercury (II) have been synthesized and characterized through elemental analysis and thermogravimetry. Their structural investigations are done with the help of TG/ DTG, IR and UV spectroscopy, XRD and SEM as well as magnetic susceptibility measurements. The XRD patterns and SEM photographs are indicative of their nanometric nature. The results of DTG, IR, UV and magnetic studies are employed to examine the effect of isomerism on molecular structure. The antimicrobial activities of these isomeric chelates were measured against some Gram positive, Gram negative and fungal microorganism using well diffusion technique and following standard procedure. The results of antimicrobial study are employed to assess the effect of position isomerism an antimicrobial activities.

Keywords: Position Isomerism, Effect on Structural and Biological Properties.

# **Enroute to Linear Azo-acene Transition Metal Complexes**

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**Abstract:** There are several reports available on aromatic diamine-transition metal complexes. Azo-acenes can complex a large range of metal cations (including  $Au^{3+}$ ,  $Ag^+$ ,  $Cu^+$ ,  $Cu^{2+}$ ,  $Ru^{2+}$ ,  $Re^+$ ,  $Ir^{3+}$ ,  $Pt^{2+}$ ,  $Os^{2+}$ ,  $Os^{3+}$ ,  $Fe^{2+}$ ,  $Co^{2+}$ ,  $Li^+$ ). Such complexes have found applications in fields such as, antimicrobial, sensing, catalysis, luminescent probes, photovoltaics, light emitting diodes, molecular switching, supramolecular chemistry, non-linear optics, among others. We are involved in the development of new methods to synthesise aza-acenes. Our latest results on the synthesis of linear di-aza-acenes are reported here and their complexation with variety of transition metals is under progress.

Keywords: Azo-acenes, Transition metals, Antimicrobial activity, luminescent probes, catalysis.

4. Botany

# Ecology of Chivari (O) Dam, Osmanabad (M.S.) India

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**Abstract:** The present paper deals with the ecological study of Chivari(O) Dam, Osmanabad (M.S.) India. The work was carried-out during the year 2015 (January to December). The Dam waters is mainly used for agricultural, drinking and fishery purposes. The seasonal variations of parameters such as water temperature water transparency total solids, TDS, total suspended solids, dissolved oxygen BOD, COD, pH, hardness, calcium were studied.

Keywords: Ecology-Chivari (O) Dam - Osmanabad.

# Correlation between seed, seedling, growth and yield characters on yield of sunflower hybrids (Helianthus annuus L.)

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Abstract: The present investigation entitled "Correlation between seed, seedling, growth and yield characters on yield of sunflower hybrids (Helianthus annuus L.)" was conducted with view to determine character association within and between seed, seedling, growth and yield attributing characters. The experiment was conducted during kharif 2012 on experimental farm of Oilseeds Research Unit, Dr. PDKV, Akola, using Randomized Block Design with three replications. The experimental material comprised of eight (8) sunflower hybrids i.e. PKVSH-27, DRSH-1, SH-3322, LSFH-171, PKVSH-952, PKVSH-953, PKVSH-954 and PKVSH-955. The observations were recorded on ten randomly selected competitive plants in each replication for each hybrid. The data were recorded on 31 different seed, seedling, growth and yield attributing characters. The character association revealed that the seed characters, kernel to hull ratio (0.986), seed kernel percentage (0.984), volume weight (0.783) and hundred seed weight (0.741) showed highly significant positive correlation with yield per plant, indicating that seed yield could be increase by increase in these seed characters. All the seedling characters studied, viz., germination percentage (0.976), root length (0.986), shoot length (0.729), seedling vigour index (0.966) and seedling dry weight (0.841) shown highly significant positive correlation with seed yield per plant indicating the vital role of these characters towards corresponding gain in yield of sunflower hybrids. The growth characters, number of green leaves at 60 DAS (0.780) and at 90 DAS (0.947) has shown highly significant positive correlation with seed yield, whereas, plant height at 30 DAS (0.492), plant height at 60 DAS (0.454), number of green leaves at 30 DAS (0.599) and days to maturity (0.494) has shown significant positive correlation with seed yield. The yield attributing characters, number of filled seed per head (0.985), total number of seeds per head (0.985), hundred seed weight of produce (0.923) and head diameter (0.719) has shown highly significant positive correlation with yield per plant. The significant positive correlation with seed yield has also been shown by the characters volume weight of produce (0.491) and seed filling percentage (0.443). In the present investigation, the hybrid PKVSH-952 recorded highest yield per plant (72.67 g). High yield per plant of PKVSH-952 was attributed mainly due to maximum values of desirable seed, seedling and yield attributing characters and significant positive correlation of these characters with yield per plant. Hence, it is suggested that seed and seedling characters must necessarily be given proper weightage in sunflower improvement programme.

# Impact of Environmental Factors on Stigmasterol Content of Clerodendrum Serratum growing in Western Ghat

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Abstract: Natural remedies from medicinal plants are found to be safe and effective. Many plants species have been used in folkloric medicine to treat various ailments. Even today compounds from plants continue to play a major role in primary health care as therapeutic remedies in many developing countries. Different medicinal plant species show a marked variation in active ingredients during different seasons, these have been widely attributed to variations in environmental variables such as temperature and rainfall. Hence present study was investigated to the environmental response of Clerodendrum serratum, which are abundant at Amboli (Sindhudurg) and Patgaon (Kolhapur) in Western Ghats. The results revealed that maximum content of

stigmasterol was reported in root sample (0.40%) collected from Amboli, followed by Patgaon region (0.36%) during summer season. The lowest content of stigmasterol was recorded in leaves (0.019%) in Patgaon region as compared to stem and root samples. The stem samples collected from Amboli region also showed highest content of stigmasterol in summer (0.24%) season which was followed by winter (0.21%) and rainy (0.19%) season. It is indicated that accumulation of stigmasterol in Clerodendrum serratum is greatly influenced by geographical and climatic conditions.

Keywords: Clerodendrum serratum, stigmasterol, HPTLC, seasonal, regional variation.

# "Floristic element of Nawegaon National Park and Nagzira WildLife Sanctuary (Dist.-Gondia) Maharashtra, India"

#### D.N.Patil

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**Abstract:** The Studies on 'The Flora of Nawegaon National Park and Nagzira Wildlife Sanctuary' was carried out during 2001-2009. Nawegaon National Park andNagzira Wildlife Sanctuary lies in Tirora range of Bhadara forest division in Gondia district (M.S.). These forest are with great diversity of plants and animals. Thousands of visitors visit this area every year. So far no detailed account of the vegetation of the area was known. Based on extensive plant exploration in the areas and literature, the study resulted enumeration of**715** species among **440** genera, and **122** families of Angiosperms in thesis form. The detailed flora includes methodology, rare, endemic and threatened plants, key to the families, genera and species etc. Each species include latest nomenclature, morphological description, phenology, distribution and important uses. The critical study has also revealed that there are number of plants (c 300) used economically for food, shelter for wild animals and birds, fodder, fuel, fibre, timber, agriculture impliments, dyes, beverages, paper industries, tannin, gums, resins, biofuel and medicines. The present paper deals with importance of **34** medicinal plants used by tribals of this areas. Environmental impact of the vegetation of the protected areas and conservation aspects are discussed. **Keywords** : Plant diversity, Utility, factors, conservation.

# Effect of Plant (Leaf) Extracts on Macrophomina Phaseolina a caused agent of fruit rot Diseases of IVY Gourd

#### V. S. Chatage

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**Abstract:** Ivy gourd fruits are attacked by Macrophomina phaseolina which was severe in Marathwada region of Maharashtra after harvesting. Pathogencity test of the organisms were confirmed as Koch's postulates and fully satisfied. Therefore the present study based on botanical pesticides for controlling these diseases. Leaf extracts, Azadirachta indica leaf extract showed reduction of radial growth of Macrophomina phaseolinas sensitive (87.77%) and Resistant (85.55%) at 100% conc. respectively. Asparagus officinalis also showed significantly results at 100% conc.

Keywords: Coccinia indica, botanical pesticides of plant (Leaf) extracts

### **Biochemical Changes in Colocasia Infected with Phytophthora Colocasiae**

#### V.S. Chatage and M.B. Patil

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Abstract: Biochemical changes were observed from healthy and artificially inoculated Cooper oxychloride resistant ( $Pc_5$ ) and sensitive ( $Pc_8$ ) isolates of Colocasia (Colocasia esculanta L.) leafs caused by Phytophthora colocasiae. There was a significant variation between healthy and infected leafs which showed significant changes with respect to estimation of moisture, starch, polyphenols, DNA, RNA, fat crude protein, crude fiber, total sugar, reducing sugar, non reducing sugar, total ash, ascorbic acid, phosphorus, iron, calcium. Among them, total sugar (7.00 mg/g) was decreased in healthy leafs. But in ascorbic acid (17%) increased it was n healthy leaf as compared with infected leafs followed by phosphorus (10.24 %) and others. Infected leafs of C. esculanta by both resistant and sensitive isolates reduced the contents of all parameters. This was more pronounced due to utilization of nutritious compounds of the leafs spot by fungal pathogen for their growth and metabolism which causes deterioration of the nutritious compounds of the leaf.

Keywords: Phytophthora colocasiae, biochemical changes, Colocasia esculanta, Cooper oxychloride

# Enlisting algal Diversity from places, Possible sources for aero-algal flora of Fergusson College campus, Pune

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**Abstract:** While studying algal diversity of any locality, a new trend of studying aero-algal flora as one of the important criteria is considered, now a days. It has been observed that number of terrestrial and sub-aerial sources play a very key role in the distribution of aero-algal flora of that locality. Hence emphasis was given on various terrestrial and sub-aerial sources for enlisting the algal diversity of fergusson college campus. Total 11 samples were collected from various places such as building wall, brick algae, soil algae, puddles, bark algae etc. from fergusson college campus. The samples were cultured using B.G- 11 medium. Total 44 algal forms were identified, dominant being cyanophyta (38) followed by bacillariophyta (4) and chlorophyta (2) respectively. Out of 44 algal forms, 26 forms were identified upto species level while 18 forms were identified upto generic level only. Forms such as Lyngbya(14), Phormidium(9), Microcoleus(3), Chroococcus(2) Scytonema(2) , Pinnularia(2), Navicula(2) ,and Aphanocapsa, Aphanotheca, Microchaete, Gleocapsa, Hydrocoleum, Chlorogloea, Oscillatoria, Microcystis, Oedocladium,Cosmarium has been recorded. Aero-algal flora, act as the guideline for identification of useful and harmful forms. Cyanophyta was recorded as dominant group in this study. Members from cyanophyta shows utility as biofertilizers with respect to paddy cultivation. Identification of such naturally occurring cyanophyta members can open up a new branch of releasing it as natural biofertilliser, which can be considered as cost effective agricultural practices.

## Management of Carbendazim resiatant Alternaria alternata causing fruit rot disease of pomegranate

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**Abstract:** In present research work the diseased fruit rot sample of pomegranate collected from different localities of Aurangabad district. The sensitivity of isolated Aleternaria alternata to carbendazim was tested and result shows it is resistant to carbendazim. The different control method were used to manage the carbendazim resistant Alternaria alternata by using Synergistic effect of Agrochemicals like Captam, Thiram, Captofol, Mancozeb, and Benomyl, biopesticides. The result showed that synergistic effect of different fungicides and use of biopesticides were effective for management of Carbendazim resistant Alternaria alternata causing fruit rot of pomegranate.

Keywords- Alternaria alternate, management, Synergistic fungicides and biopesticides

#### Biodiversity of fungi associated with biodeterioration of Raisins

#### Suvarna T. Kadam, Bhagwan M. Waghmare and Rahul K. Dhabale

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**Abstract:** Raisins are the dried grapes which are one of the most nutritious dried fruits in the world. The knowledge of microbial flora as well as some biochemical factors is very important for ensuring the consumers health. The deterioration in raisins is the results from the contamination and growth of fungi during drying and storage. Considering this fact, experiments were undertaken to isolate the mycoflora and their effects on the nutritional changes in protein, fat, carbohydrates and calorific value. Fifteen fungal species belonging to eight genera were isolated from 50 samples of raisins which were collected from different parts of Marathwada region. It was found that the species of Aspergillus were predominant contaminants followed by the species of Rhizopus, Fusarium, Penicillium and Alternaria respectively. It was observed the percent incidences from different cultivating media. Ten species from five genera were employed for the study of biodeterioration of raisins. The results were remarkable in which Fusarium avenaceum caused the 50% of degradation in protein while, Fusarium oxysporum was responsible for poor degradation of carbohydrates and calorific value about 10%. Fusarium avenaceum and Fusarium oxysporum was observed in case of maximum degradation in fat. **Keywords:** Biodiversity, biodeterioration, raisins.

# Diversity of arbascular mycorrhizal fungi in the nannaj forest, n. Solapur, solapur.

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**Abstract:** German Botanist Frank in 1885 coined the term "Mycorrhiza" for first time to designate the symbiotic relationship between fungi and plant roots i. e. the plant providing sugars for fungi and in turn fungi provides nutrients to the plants. There are two groups of mycorrhiza i. e. Ectomycorrhiza and Endomycorrhiza, both play an important role in improving soil fertility (Bagyaraj and Varma 1995) soil deterioration, drought resistant and for supply of water. AMF colonize root tissues bio-tropically and form a network of mycelia,

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providing a direct link between soil and plant roots (Smith and Read 1997). Different species of AMF are an essential component of the ecosystem and have been reported to induce different growth patterns and biomass production in plants. Although they prefer certain hosts, they are not usually host specific and have a wide host range (Abbott and Robson 1982). Mycorrhizal diversity is greatly affected by changes in the rainfall, temperature, etc.The selected site is a 'Great Indian Bustard Sanctuary', Nannaj, Solapur have an area of 8496.44sq.kms. The aim of the present work was to assess the species diversity of AM fungal species, to find out the spore diversity and the seasonal variation in arbascular mycorrhizal population with their physic-chemical properties of rhizospheric soil in a Nannaj forest, N. Solapur, Solapur.

### In Vitro studies and secondary metabolite production in medicinal plants from family Apocynaceae

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Abstract: Family Apocynaceae includes many medicinally important plants like Catharanthusroseus, Rauvolfiaserpentina, Holarrhenaantidysenterica, Alstoniascholaris, Wrightiatinctoria, Tabernaemontanadivaricata, Chonemorphafragrans, Aspidospermaramiflorum and Mandevillavelutina. They are used in Indian medicinal systems like Ayurveda and Siddha systems . They are used by tribal people in India for treatment of many diseases. Chonemorphagrandiflora, Vallarisheynei and Beaumontiagrandiflorawere studied for their in vitro responses. In vitro plantlets were obtained were obtained by using BAP and Kinetin whereas root induction was obtained by using IBA. Studies on secondary metabolite production revealed presence of an important anticancer compound camptothecin in C. grandiflora. Locality dependant variation in camptothecin production in C. grandiflorawas recorded.Steroidal alkaloids were detected in Vallarisheynei and Beaumontiagrandiflora.Methanolic extracts of C. grandiflora exhibited promising antibacterial activity. Thus further studies in secondary metabolite production and antibacterial activity are needed. Key words-Apocynaceae, in vitro studies, medicinal, Chonemorphagrandiflora

### Role of Various Factors in Development of White-Rust Disease of Mustard.

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**Abstract:** Development of white rust on mustard, caused by Albugo candida(Lev)kuntze, has become important factor in decreasing the production of this crop during the past few years. Therefore, detailed studies were undertaken showing epidemiological factors affecting disease development. Older leaves were more susceptible than younger leaves. Older leaves showed symptoms 4 days after inoculation with disease intensity of older leaves compared with younger leaves. Which showed symptoms 6 days after inoculation with disease intensity of 6.8%. On lower surface, the symptom appeared 3 day after inoculation while on upper surface appeared 5 days after inoculation. Oosporic material 19g/pot was found optimum for white-rust development. White-rust appeared in 23 days when inoculum was placed at a depth of 7.5 cm in soil. Where as it took 56 days when the inoculums was placed at depth of 10 cm. Late sown crop suffered maximum white-rust inoculums. **Keywords:** Albugo candida, White rust, Epidemological factor.

# Effect of seed hardening on growth, seed yield and seed quality of wheat under rainfed condition

#### R.A. Pejgude, R.G. Chawhan, R. K. Kamshette and S.N. Pawal

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**Abstract:** The present investigation entitled, "Effect of seed hardening on growth, seed yield and seed quality of wheat under raifed condition" was conducted during Rabi season 2013 at Agricultural Botany Farm, PGI, MPKV, Rahuri. The experiment was laid out in Factorial Randomized Block design with two replications. The seeds of four varieties for experiment were collected from Wheat Specialist, Agricultural Research Station, Niphad. In this experiment the seeds were treated with the eight chemicals before sowing and treatments were water, CaCl<sub>2</sub> 2%, KH<sub>2</sub>PO<sub>4</sub> 2%, KNO<sub>3</sub> 1%, KCl 1%, KCl 2%, Cycocel 20 ppm, IAA 20 ppm and untreated control. The observations on different plant characters such as days to field emergence, field emergence percentage, days to 50 per cent flowering, productive tillers/m<sup>2</sup>, plant height (cm), panicle length (cm), days to maturity, grain yield per plot (kg), grain yield per hectare (kg) were taken in field condition. The seed quality observations viz., thousand gains weight (g), germination percentage, shoot length (cm), root length (cm),

seedling vigour index, seedling dry weight (g) and electrical conductivity ( $\mu$ S/cm) were taken in laboratory. The studies revealed that, the least days required for field emergence was recorded for seed hardened with KCl 1%. The highest field emergence per cent was recorded for seed hardened with 2% CaCl<sub>2</sub>. Treatment CCC 20 ppm recorded lowest field emergence per cent. The treatment KCl 1% recorded minimum days for the 50% flowering. Seed hardened with 2% CaCl<sub>2</sub> recorded highest plant height while, the lowest plant height was recorded for seed treated with CCC 20 ppm.The seed hardened with 20 ppm CCC was showed maximum number of productive tillers/m<sup>2</sup> and highest panicle length. The late maturity was showed by the seed treated with 20 ppm CCC while, early maturity was showed in control. The highest grain yield per plot, grain yield per hectare and thousand grain weight was recorded for seed hardened with CCC 20 ppm. The highest germination percentage, shoot length, root length, seed vigour index as well as the seedling dry weight was recorded for the seed treated with CaCl<sub>2</sub> 2%. The lowest electrical conductivity was recorded for the seed hardened with IAA 20 ppm. Based on the above results, it is concluded that the seed hardening with CCC 20 ppm is more effective in increasing the yield in rainfed wheat while, the seeds hardened with CaCl<sub>2</sub> 2 % showed better field emergence, plant growth as well as seed quality parameters.

### Studies on Acetobacterdiazotrophicus Inoculation on growth, Nutrient uptake and yield of sweet sorghum (Sorghum bicolor L.) CV. phule Amrita

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Abstract: The effect of inoculation of endophytic bacterium acetobacterdiazotrophicuson growth, nutrient uptake and yield of sweet sorghum (sorghum bicolor L.)cv. Phule Amrita. To achieve this, afield trial was conducted at Department of Plant Pathology and Agricultural Microbiology, Mahatma Phule Agricultural University, Rahuriduring kharif season of 2013-14. The investigation involved isolation, screening and characteristic growth on acidic LGIP semi solid medium. After incubation at 28+20C, it showed pellicle initialiy, which was later turned into orange thick pellicle at the top of semi solid medium in test tube. At the same time the medium colourless due to assimilation of bromothymol blue. The morphological studies showed ,that the organism was rod shape, gram negative with motility due to lateral or peritrichous flagella, non sporulating colonies were circular, smooth and yellowish orange in colour. The results of field experiment in general revealed that seed inoculation with Acetobacterdiazotrophicus (RSSV-1 strain) showed significant increase in growth parameters viz., seed germination, stem girth, seedling vigour index, number of leaves, height of plant, root length, dry matter weight of shoot and root, N, P and K uptake, fodder and grain yield and sugar quality parameters viz., brix percentage, reducing and non reducing and total sugar percentage. The fodder and grain yield obtained due to application of 75 kg N conjugated with Acetobacterdiazotrophicus + phosphate solubilizing bacteria + 75 % recommended dose of N(83.47 MT/ha) was on par with application of 100 kg N/ha without Acetobacterdiazotrophicus and PSB inoculation (82.35 MT/ha). These findings explicitly indicated the possibility of saving fertilizer nitrogen to an extent of 25 kg N/ha, in sweet sorghum. The results of microbial population of Acetobacterdiazotrophicus revealed that Acetobacter population in stem was decreased with increasing levels of fertilizer nitrogen application to sweet sorghum.

Keywords : Acetobacterdiazotrophicus, sweet sorghum, N, P, K.

# Cultural, morphological and enzyme activity of endophytic fungi isolated from Buchnania lanzan

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Abstract: Buchnania lanzan is one of the best, versatile and most commonly used as a household remedy. It is used for the management of wounds and also as a digestive, expectorant and purgative. Buchnania lanzan is used as a cardiotonic, astringent and also for the treatment of skin diseases and glandular swelling. Endophytic fungi are a group of fungi that colonise living, internal tissues of plants without causing no apparent injury. The endophytes may produce a plethora of substances of potential use of modern medicine, agricultural and industry. Such as novel antibiotics, antimycoticss, immune suppressants and anticancer compounds. Endophytic fungi are found virtually every vascular plants species. Endophytic fungi were isolated from plants parts such as stem and leaves of Buchnania lanzan which was collected from Kinwat forest of Marathwada region. The use of simpler solid media such as MRBA and PDA permits isolation of endophytic fungi. The specific media is used for the rapid screening of fungi for presence or absence of specific enzymes. Thirty two isolates of fungal species were recorded belongs to genera Fusarium, Apsergillus, Trichoderma, Alternaria, Curvularia, Trichoderma. Among the isolated fungi, the dominant are screened for their ability to produce extracellular enzymes such as Cellulase, Amylase, Lipase and Protease. Thus results were remarkable to note that, the tested fungi which showed 68% Amylase, 62% Lipase, 48% Cellulase and 24% Protease enzyme activity.

Keywords: Buchnania lanzan, endophytic fungi, , extracellular enzymes.

# Augmentation of herbage yield and essential oil biosynthesis in Ajowan (Trachyspermum ammi. Linn) by foliar micronutrient fertilization

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Abstract: Medicinal plants have been used since long time by mankind, against various diseases as they contain natural bioactive components of therapeutic value. According to WHO, 80% of world population have been shifted to ayurveda as the herbal drugs do not have any side effects and they are non-allergic. Looking into the export potential of commercially important medicinal plants, there is urgent need to increase the active principle content of these plants. It will ensure guaranteed, uninterrupted and non-adulterated supply to the pharmaceutical industries. Micronutrients play an important role on growth, yield and essential oil biosynthesis in aromatic plants. Foliar application of fertilizers gives a due guarantee of maximum availability of nutrients for plants resulting into higher yield. Present study was attempted to assess the growth, yield and thymol content in Ajowan by foliar application of micronutrients like Fe, Zn and Mn in different concentrations to field grown Ajowan plants. The results revealed that all the treatments of micronutrients had significantly influenced plant growth attributes like height, no. of branches/plant and dry matter. The uptake of N, P and K was also increased. Foliar applications had positively contributed to increase the yield attributes such as no. of umbels/plant, seed yield/plant and essential oil content. Similarly, thymol the therapeutic component of oil was also enhanced.

# "Regulation of soil fertility and Fungal Diversity in Organic Farming System"

#### Shaikh N.F. and B.D.Gachande

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**Abstract:** The present research work determines the influence of organic inputs like farm yard manure (FYM), Jeevamruth, beejamruth and inorganic inputs on soil physico-chemical properties and fungal population of Wheat during the period 2010-2013. The results indicate that, organic farming of Triticum aestivum (wheat), increases minimum and maximum organic carbon (0.10-0.26%), phosphorus (9.18-18.12 kg/h), water holding capacity (2.66-4.46%) and lowers the pH (0.9-1.8) and electrical conductivity (0.44-0.45 ms/cm) over inorganic farming. The organic inputs also enhance the soil rhizosphere and non-rhizosphere mycoflora over inorganic farming. The overall results indicated that, the soil physico-chemical properties and fungal population of soil in organic farming were significantly higher than inorganic farming for sustainable agricultural development. **Keywords:** Organic, inorganic inputs, soil fertility, microbial diversity and Triticum aestivum.

### Effect of clove oil on aflatoxin production in stored maize grains

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**Abstract:** Incidence of seed borne fungi is a serious problem during storage which reduces nutritive value of seeds. Maize is one of the important cereal crop widely consumed in world. Frequency occurrence of aflatoxigenic fungi A. flavus wasvery high in selected maize verities during storage. Occurrence of aflatoxin in seeds adversely affects on seed health and its consumption is unsafe to human and animals health. Crude toxin was recovered from stored maize grains and identified by TLC as aflatoxin. Quantitative analysis of aflatoxin was carried out by HPLC before and after seed treatment. Clove oil is non-hazardous to human and animals health. It showed significant antifungal activity against A. flavus.Application of clove oil during storage remarkably reduces aflatoxin production in maize.

Keywords: Maize grains, A. flavus, seed borne fungi, aflatoxin, clove oil, HPLC.

# **Agricultural Practices and Climatic Dynamics.**

#### Smita Basole and Sunita Bhosle

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Abstract: Recent years have seen many efforts to increase the agricultural production. Those improvements were achieved through sustainable techniques and practices. While using the modern techniques, they causes degradation of natural resources. India is the one of the country having agroclimatic zones with diversified

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seasons, crops and farming systems. At the same time it is also vulnerable section of climatic changes. It was reported that 2/3 of sown area is drought prone and about 40 million hectors is flood prone. The nation faces many prominent effects of climatic changes. To minimize these effect we must adapt integrated systems. The sustainable agriculture hold great potential to replenish ecological damage, to improve agricultural productivity, to meet global and national food securities and improvement in farmer's live hood. Modern sustainable methodology help to reduce vulnerability with uncertain climatic conditions. But sustainable agriculture alone will not sufficient to reduce agro- eco- socio. problems.

Keywords: sustainable agriculture , food security, climatic changes, ecological degradation

#### "Effect of Morinda citrifolia silver nanoparticles on cervical cancer cell line"

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**Abstract:** Cervical cancer is one of the most common cancers in humans. Infection by the sexually transmitted human papillomavirus increases the risk of developing invasive cervical cancer. In India, about 365 million women above 15 years of age are at risk of developing cervical cancer. Consequently, synthesizing nanoparticles for improving therapeutic index and drug delivery is coming up as an attractive strategy in the mainstream of therapeutic research. Synthesis of nanoparticles using the extract of the medicinal plants also gained an immense attention. Morinda citrifolia is an herbaceous plant belongs to the family Rubiaceae and is commonly known as 'Noni'. It is extensively used as home remedy for various diseases in Indian traditional system as well as in tribal system in India for multiple clinical applications. In the present investigation, Morinda citrifolia silver nanoparticles were synthesized. The nanoparticles were evaluated for their anti cervical cancer cell line ME-180 at different concentrations was demonstrated by SRB (Sulforhodamine B) colorimetric assay. The Morinda citrifolia silver nanoparticles showed significant anticancer activity against cervix cancer cell line ME-180. Furthermore the nanoparticles were evaluated for their antioxidant activity using 2,2-diphenyl-1-picryl hydrazine (DPPH), OH, and superoxide anion radicals. Nanoparticles demonstrated considerable reducing power.

Keywords: Nanoparticles, Sulforhodamine B, cervical cancer, superoxide anion radicals.

#### Planktonic Biodiversity of Yeldari dam in Parbhani District Maharashtra

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**Abstract:** Planktonic biodiversity is the occurance of all microalgal forms mainly the diatoms and other forms belonging to measure groups like cyanophyceae, chlorophyceae etc. This important algal community play very important role in aquatic life both autotrophic as main photosynthetic component as well as it act as food for unicellular zooplanktonic group and other aquatic animal EX. Pisces. The present study deals with the taxonomic identification of the phytoplanktonic species recorded at up to generic level from Yeldari dam in Parbhani district of Maharashtra India during the 2012 to 2014. In all twenty three algal genera were recoded belonging to class Chlorophyceae, Cyanophyceae and Bacillariophyceae. Members of Cyanophyceae class taxa were most dominant as compare to other classes. The results of this study shows that there is rich fish growth were found because of the rich algal growth in Yeldari dam.

Keywords: Yeldari dam, Phytoplanktons, Chlorophyceae, Cyanophyceae and Bacillariophyceae.

#### Algae Based Biofuel: A Renewable Source of Bioenergy

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Abstract: The demand for energy is growing worldwide especially in many of the rapidly developing countries such as in China and India. Furthermore, the continued combustion of fossil fuels has created serious environmental concerns over global warming due to the increased release of greenhouse gases. The fast growth of the world population and rapid development of a number of emerging economics have both led to sharp increase in global energy consumption. Biomass is an attractive feedstock as it is a renewable resource that could be sustainably developed in the future. Biofuel production is expected to offer new opportunities to diversify income and fuel supply sources and can help to reduce the adverse effects of the frequent oil supply crisis, as well as developing long-term replacement of fossil fuels, helping non-fossil–fuel-producing countries to reduce energy dependence. Algae are the main raw materials from which such biofuels can be produced at

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high efficiency levels and at low investment. Algae are a material that is cost-effective and provides a relatively high yield of biofuel. An algal-based biorefinery could potentially integrate several different conversion technologies to produce biofuels including biodiesel, green diesel and green gasoline. **Keywords:** Energy, biofuel, algae, fuel

#### 5. Zoology

# Butterfly as an Ecotourism and Employment Resource for Indigenous People in Maval Tahsil, Pune District, Maharashtra, India

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**Abstract:** Tahsil Maval is located 43kms from Pune at north-west direction .This is hilly area with highest rainfall in Pune District. Most of the area is covered with forest. The survey was carried out during August 2007 to August 2009 to study butterfly diversity, their seasonal abundance, their biotopes and nectar food plants. This survey further revealed that indigenous people can become more involved in the tourism industry, and particularly with ecotourism. Butterfly related industry is relatively a very young industry especially in India as compared to other very established ones such as Apiculture, Sericulture, Vermiculture, Bird aviaries and Aquaria. The objective of study is to bring awareness among indigenous people to exploit butterflies as ecotourism product to conserve environment and to make them aware about employment resources on their traditional lands.

Keywords: Butterfly, Maval tahsil, ecotourism, conservation, employment resources.

# Efficacy of Chlorfenapyr insecticide against adult Tribolium castaneum exposed to various surfaces

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**Abstract:** Chlorfenapyr is an insecticide of pyrrole group that inhibits adenosine triphosphate (ATP) production in the cellular structure of insects .It was first registered in the USA for control of termites, cockroaches and nuisance in ants under the trade name Phantom<sup>®</sup>. Now it is widely used to control different pests. Tribolium castaneum is a worldwide pest commonly found in raw stored grains, milling facilities and food ware houses and therefore exposed to various surfaces. Insecticides can be applied to floors and wall inside mills, food storage sites. As part of Insect Pest Management program, they are effective in controlling the pest population. Insects come into contact with the insecticides by moving on the treated surface through their vulnerable sites. In the present studies a series of experiments were conducted to evaluate efficacy of pyrrole insecticide Chlorfenapyr (INTREPID<sup>TM</sup>) on treated surfaces like concrete, wooden laminate, metal, tile and glass. Also LC50 values of Chlorfenapyr with respect to various surfaces were calculated. It was found that LC50 values of Chlorfenapyr were maximum i.e. 0.08% on concrete surface and minimum 0.008% on glass and 0.009% on tile surfaces respectively. As the pest Tribolium castaneum are rarely exposed to with glass surface, insecticide can be effectively used to control Tribolium castaneum stored in godowns with tile flooring.

# Bioactive potential of Leaf Extracts of Syzygium Cumini L.against Aedes aegypti

#### Abhay Khandagle

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**Abstract:** Mosquito borne diseases are one of the most severe amongst the diseases transmitted by vectors. Aedes aegypti is one of the mosquito species responsible for the transmission of Dengue fever, chikungunya, yellow fever and the worst, dengue hemorrhagic fever vector borne diseases. World Health Organization (WHO) stated that about 2/5 of the global human population are currently threaten of dengue and the best way to control the transmission of dengue virus is fight the mosquitoes that cause the disease. Indiscriminate use of several conventional mosquitocidal agents though effective cause several problems to non -target organism including human and affect the ecological balance as well. Thus there is a need to develop an alternative strategy to manage mosquito populations. Biological products like plant extracts are one of the ways to deal with mosquito control. The secondary metabolites of several plants due to their co-evolution with insects are known to have novel mosquitocidal molecues. The objective of the present study is to evaluate the bioactive potential of Syzygium Cumini L. against Aedes aegypti. The leaf extract was assessed for its larvicidal and repellency activity. The larvicidal activity was obtained at LC<sub>50</sub>=102 ppm while 100 % repellency was exhibited by the extract upto 210 minutes. These results reveal that the selected plant has a potential to be considered in mosquito control program.

Keywords: Syzygium Cumini L., Aedes aegypti, larvicide, repellency.

## Water Quality Assessment of Tridhara River In Relation To Pilgrimage Season

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**Abstract:** The present study was conducted to assess the impact of pilgrimage on Tridhara River. For this purpose water sample were collected during Pilgrimage and off season. The significant changes in certain physico-chemical properties of water of Tridhara River were noted. Tridhara River is the confluence of the rivers like Godavari, Narmada and Purna. Pilgrims use this river water for various sanitary purposes during the pilgrim season. The river water also influenced by various other anthropogenic activities. The Rivers occupies a unique position in the cultural ethos of India. From the times immemorial the Indian rivers is faith, devotion and worship. Millions of Hindus accept its water as sacred. The physico-chemical parameters were analyzed for a period of 12 months, which shows revealed decrease in the dissolved oxygen, free carbon dioxide, whereas increase in the total dissolved solids, total hardness, and temperature during the Pilgrimage period. On the basis of these changes it is concluded that level of pollution increases in Tridhara River due to religious activities and adversely effects on water quality of this river.

Keywords: Tridhara, Pollution, Water quality, Pilgrim, Environment

# Anti-cataract effect of aqueous extract of Catharanthus roseus on diabetic goat lenses.

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Abstract: Cataractogenesis is an avascular secondary complication. Diabetic patients are at higher risk in developing cataract. Once cataract formation takes place it is followed by the swelling and destruction of lens fibers. In India, significantly more people develop cataract at an earlier age than in the US. Cataract is now became the leading cause of blindness all over the world. The widespread prevalence of diabetes in developing countries like India may create a major problem in the management of blindness. IAldose reductase mediated intracellular polyol accumulation was associated with accumulation of high levels of water in the lens, causes vacuolar stage in lenses and disruption of the lens fibrils.,which finally leads to opaque cataract. Aqueous extract of Catharanthus roseus was studied with its effects against sugar-induced lens opacity in vitro. The results showed potential application in the prevention of sugar cataract.

Keywords: Diabetes mellitus, cataract, aldose reductase, cataractogenesis, polyol pathway.

#### Botanicals as potential insecticides against Musca domestica L.

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**Abstract:** The housefly Musca domestica L. is a pest of public importance. It vectors several pathogens causing human diseases throughout the tropical subtropical parts of the world. Chemical method even today is the most commonly used method to control housefly. Though effective this method has significant disadvantages like development of insect resistance, mammalian toxicity and bioaccumulation. To avoid these disadvantages an alternative strategy must be developed and used. Presently, natural products, especially those derived from plant origin, have been progressively assessed in controlling pest/vectors of medical importance. In order to search for effective and user friendly control agents, the essential oils of Lemon (Citrus limon) Basil (Ocimum basilicum) were evaluated for their larvicidal, attractant/repellent, and oviposition attractant/deterrent activity against M. domestica. The highest larvicidal activity, i.e.,  $LC_{50}= 97$  ppm was shown by Ocimum basilicum. This oil also exhibited 96.76 % repellency at the concentration of 1 %. The highest oviposition deterrence activity of 96.22 % was also exhibited by Ocimum basilicum oil at the concentration of 1%.

Keywords: Musca domestica, Ocimum basilicum, Citrus limon, larvicide, repellency, oviposition deterrent

# Determination of Calving Interval by Path Analysisin 5/8 Gir Crossbred Cows

#### D.S. Gaikwad, P.M. Gaware, O.V.Shinde and B.B. Khutal

Department of Animal Husbandry and Dairy science, Mahatma PhuleKrishiVidyapeeth, Rahuri 412 722, Dis. Ahmadnagar (Maharashtra) Abstract: The present investigation was undertaken on the basis of records of 5/8 Gir crossbred cows maintained at RCDP on Cattle, MPKV, Rahuri, M.S.(India) from 1994 to 2012. Least squares means of gestation period, service period, lactation length, dry period and calving period were worked out by considering the effects of period of calving, season of calving and lactation order and compared by DMR Test. The data were corrected for significant effects and used for estimation of correlation between reproductive and productive traits and path analysis. The overall least squares mean of LL, DP, GP, SP and CI in 5/8 crossbred cows were  $335.22 \pm 4.14$ ,  $99.65 \pm 4.67$ ,  $281.27 \pm 0.31$ ,  $154.62 \pm 6.31$  and  $434.06 \pm 6.42$  days, respectively. The influence of season of calving and lactation order on LL, DP, GP, SP and CI was non-significant. The influence of period of calving on LL was significant (P<0.05), while it was non-significant on DP, GP, SP and CI. The correlation of calving interval with lactation length, dry period and service period was positive and highly significant (Table =0.1173). While the correlation of calving interval with gestation period was positive and non-significant. The path analysis of calving interval by taking reproductive components revealed that service period explained the maximum variability, whereas the effect of gestation period was almost nil. The total effect of service period was almost completely due to its direct effect. By taking the productive components of calving interval, the dry period was found to have more effect than lactation length. The total effects of dry period and lactation length were 0.1857 and 0.1541 respectively. Both the traits contributed mainly by their direct effects. The gestation period showed significant correlation with calving interval which was 0.0169. The 86 per cent variation in calving interval was explained by studying four traits.

Keywords: Calving interval, path analysis, crossbred cows

### Fish Diversity from Manas Lake, Bhugaon, Pune Maharashtra

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**Abstract:** The present study deals with the Ichthyofaunal diversity from Manas Lake, Bhugaon, Pune (M.S). A total of 16 species of fish belonging to 6 orders and 9 families were recorded. Inflow of lake is Ram River. No study has been undertaken to study the Ichthyofaunal diversity of this lake so the present attempt has been made to find out the Ichthyofaunaldiversity of lake during the period October 2014 to December 2015. The order Cypriniformes were dominant by 8 species followed by Perciformes 3 species, Siluriformes 2 species and Osteoglossiformes, Mugiliformes and Synbranchiformes 1 species each respectively. **Keywords:** Ichthyofauna, Bhugaon, Diversity

# Changing Biodiversity Scenario in Lonar Meteoritic Crater, (MS), India, as revealed by the studies on insects (Order- Lepidoptera, Orthoptera and Odonata)

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**Abstract:** The Indian sub-regions hosts about 1,504 species of butterflies of which peninsular India hosts 351, and the Western Ghats 334 (Kunte 2009, Tiple 2011). Lonar Lake (19°59'N and 74°34'E) is situated about 155km from Parbhani town in Buldhana District of Maharashtra State. The Lonar crater has a circular outline with a diameter of 1,830 m and a depth. This is the only one meteorite crater made by the basaltic rock in India. In the present investigation, 20 Arthropod species were found out of which 13 species of butterflies were reported and they belonging to 4 families of order Lepidoptera, 5 species of order Orthoptera and 2 species of order Odonata. Compare to previous studies of order Lepidoptera by Palot (2003), present conditions was drastically declining Lepidopteron diversity in the Lonar Lake.

Keywords: Diversity, Lepidoptera, Orthoptera, Odonata, Lonar Lake.

### Study of Microbiota from L. marginalis w.r.t. Enzyme Production

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**Abstract:** The objective of the present work was to study the bacteria associated with the gut of freshwater L. marginalis and their biochemical potential. The standard microbiological methods were used to achieve these objectives. The freshwater L. marginalis was collected from the upstream of Mula river. The gut contents were removed and analysed for the bacteria. In all, 22 bacterial isolates were obtained. These isolates were subjected to cultural, morphological and biochemical characterization. All these isolates were studied for their potential to degrade different polymers viz, starch, cellulose and pectin. Most of these isolates have a potential to degrade

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some of the polymers. In conclusion, bacteria associated with the gut are diverse and have a potential to degrade polymer. Therefore, the gut associated bacteria can be exploited for promoting growth of L. marginalis. **Keywords:** Gut, Polymer, Starch, Pectin, Cellulose.

### "Ground Water Quality Assessment of Aurangabad (M.S.)"

#### Ayesha Nuzhat Durrani

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**Abstract:** Water is a neutral liquid with a high dielectric constant and high density. The most of the requirement of water was fulfilled by rain water which is deposited in surface and ground water resources. Water is purified time to time by various ways. For maintaining the quality of water which is deteriorated day by day due to increase in industrialization and urbanization. In the present paper we report ground water quality of Aurangabad. The water samples were collected from six sampling sites and their physic-chemical parameters such as pH, Conductivity, Chloride, Sulphate, Temperature, Turbidity, DO, COD, TDS etc. It is observed that water quality is found to be good in some cases but in some cases the parameters were above the permissible limits.

Keywords: Aurangabad, Water Quality, Parameters, Ground Water.

# Sustainable Agricultural Development a case Study of Purandhar Tahsil of Pune District

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Abstract: The present study has attempted to understand the levels of agricultural development at village level. The study has adopted a geographical approach in which the first steps is to understand physiographic and socio- economic resources. The Purandhar tahsil has 108 villages .The geographical spread of the tahsil is 1204.18 sq.kms (120418.4 hectares). Thetahsil has 79998.44 hect. NSA (66.43 %) out of TGA. The tahsil has only 18.1% (21789.75 hect.) area under irrigation. The area occupied by the forest is 8441.8 hect. Cropping pattern in the tahsil shows variation due to the distribution of rainfall. In the low rainfall area in the eastern part of the tahsil the farmers cultivate jowar, bajara and pulses and in the western part due to high rainfall rice is cultivated in small patches along the streams of river Karha and Nira. The quantification of available water in a village has been used to quantify the available water resource in the region. As per the socio economical parameter we classify the villages into four categories and then find out the availability of water for the agriculture and the requirement for the crops which formers are grown. In the backward region (17 villages) total available water is 3429.50 mhbut requirement was 4053.29 mh, in the poor category of region (37 villages) available water is 14115 mhbut requirement was 19356.15 mh, such as in the moderately developing region (39 villages) available water is 17723.32 mhbut requirement was 22124.40 mh and in the developing category of region (15villages) available water is 10915.43 mhbut requirement was 11386.53 mh. These entire categories are showing the severe deficit (10737.11 mh) of water resource available for agriculture. In the rainfield area like Purandhartahsil experienced frequently droughtphone conduction. If a farmer grow the crops as per the availability of water then the yield of crop was good in position, but some time on the previous experience the farmer wants to take more area under the crops. Increase in the area under fruit cultivation like Sitaphal, Anjir and Mango.Area under the fruit cultivation can achieve the inclusive and sustainable development in the Purandhartahsil. It is geographically feasible according to discussion with the knowledgeable persons in the village.

Keywards: physiographic, agricultural and allied sector, geographical approach, strategy.

#### **Bioethanol production from fresh water algae**

Waghmode M.S<sup>1,</sup>Gaikwad S.R<sup>1</sup>, Gaikwad V.S<sup>1</sup>., Jadhav A.S<sup>1</sup>. Patil N.N.\* 1 PDEA'S Annasaheb Magar ,Mahavidyalaya, Hadapsar , pune -2

**Abstract:** Use of only fossil fuel energy resource is unsustainable, therefore it is necessary to develop alternative renewable energy bio-resources. Algae are photosynthetic micro organism, can grow in fresh water as well as in marine water. Algas contain high amount of carbohydrates. In the process of fermentation of carbohydrates, it yield ethanol. Freshwater algae were collected from fishery at Manjari. It was isolated and identified as Spirogyra. From dried powder of algae carbohydrates were extracted. These carbohydrates were fermented by using Yeast, Saccharomyces cerevisiae to produce ethanol. The results show that ethanol is produced and confirmed by Ester Test, Litmus Test and Iodoform Test.

Keywords: Algae, Carbohydrates, Ethanol, Yeast, Fermentation.

# **Biocontrol of Bacterial blight on Pomegranate**

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**Abstract:** Bacterial blight has damaged pomegranate cultivation over more than 30,000 hectare in Maharashtra, causing loss of Rs. 1000 crore. Screening of pathogen Xanthomonas species was done from infected pomegranate skin on Nutrient Agar. The pathogen was enriched in Luria Bertani broth. Soil sample from pomegranate field was added to the enriched broth. Qualitative plaque assay were performed. The plaques were detected. Hence use of bacteriophage is most convenient method to control of Bacterial blight on pomegranate. **Keywords:** Bacterial blight, Pathogenic bacteria, Biocontrol

# Overview on comparison of methods used for recycling of electronic waste

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Abstract: Emerging new technologies rely on electronic devices which become trash after their use. E waste contains harmful materials like Lead, Mercury, Cadmium and Beryllium as well as precious metals. Disposal of e waste is carried out by land filling which cause leaching into water bodies with detrimental effects. Hence remediation has to be employed for E-waste disposal. The remediation techniques include physical, chemical and biological methods. Types of remediation techniques using biological agent includes phytoremediation, vermiremediation and bioremediation. Bioremediation even though require more time compared with physical and chemical methods it is economical. Disadvantages associated with all these methods could be overcome by combinatorial therapy of earthworm, plants and microorganisms. Leaching of heavy metals from the site contaminated can be overcome by using plants associated with earthworms and bacteria. Extraction of precious metals can also be achieved by using this approach. Entry of heavy metals into the food chain could be thus restricted by means of combinatorial bioremediation approach.

Keywords: E-waste, bioremediation, phytoremediation, vermiremediation

### Biodiesel production from algae as renewable energy source

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**Abstract:** The basic source of energy are Petroleum, natural gas, coal, hydro and nuclear. The disadvantages of this petroleum fuel is environmental pollution. Combustion of this fuel creates increase in level of CO<sub>2</sub>. Biodiesel (monoalkyl esters) obtained by the trans esterification of triglyceride oil with monohydric alcohols. Biodiesel can be obtained from Canola, Soya bean, Palm, sunflower, Oil and Algal oil, Coconut oil, fish oil, Chicken fat. Biodiesel has no side effects on environment hence it is safe to use. Among others biomass, Algal oil has higher capacity to produce biodiesel. Both micro and macro algae are used. From the pond water we were isolated and identified as Spirogyro was used as source for biodiesel production. The extraction of algal oil from biomass was done by two chemical methods, one of these was trans esterification of algal oil with methanol and NaOH as base catalyst was used. In another method extraction of oil using soxhlet apparatus with hexane as solvent. By this two methods extraction of biodiesel from algal biomass was successfully done. **Keywords**: Algal oil, Biodiesel, Transesterification, Soxhlet.

# Bioactive compounds from fresh water algae.

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Abstract: Fresh water Algae have gain much importance in cosmeceutical. cosmeceuticals of natural origin has no side effect as compare to synthetic cosmetics. Algae are rich in carbohydrates, polysaccharides, lipids. They also produce secondary metabolites such as Phlorotannins. Phlorotannins act as antioxidant, antiwrinkling and whitening agent. Matrix Metalloproteinase are responsible for skin related disease and wrinkle formation . Matrix Metalloproteinase are capable of digesting extra cellular matrix of skin. In present review phlorotannins have been discussed towards cosmeceutical application. Fresh water algae was collected from fishery at Manjari and Annasaheb Magar College campus at Mahadev Nagar. These samples of algae were isolated and identified to be Cocconeis pediculus, Spirulina, Spirogyra . Phlorotannins were estimated by folin-ciocalteu Method and TLC was performed. Inhibition of Matrix Metalloproteinase activity by extracted phlorotannins was studied by Gelatinase assay. The studies indicate that, fresh water algae can be good source of bioactive compounds like Phlorotannis with potential in cosmetic industries.

Keywords: Matrix Metalloproteinase, Phlorotannins, Algae, Gelatinase assay, TLC.

INNOVATIVE TRENDS IN CHEMICAL, PHYSICAL AND BIOSCIENCES -2016

# Reuse of Mushroom Waste (Agaricusbisporus) as a biosorbent of synthetic dyes in textile industrial effluent

### Shinde A.D., Shivangekar K.V., Harale P.M. and Patil N.N.

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**Abstract:** Agaricusbisporusa button mushroom is an edible mushroom cultivated on large scale. The cultivation of A. bisporus involves the production of tones of spent A. bisporus substrate (SAS). It is an urgent need to reuse the SAS. Present study is aimed to, recycle the SAS for the sorption of synthetic dyes from effluent of textile industry and study the use of treated water for irrigation. Hence the irrigation purpose water and aqueous solution of Methylene blue, Basic fuchsin and Crystal violet were passed through the SAS. To check the possibility of use of treated water for the purpose of irrigation, the seed germination assay was carried out. Seeds soaked in dye solution did not germinate where germination of seeds were observed in the treated water. The result of present study suggests that spent Agaricusbisporus substrate can be used to treat the effluent containing synthetic dyes.

Keywords: A. bisporus, biosorbent, seed germination assay, spent A. bisporus substrate

#### Biodegradation of domestic waste by vermicomposting method

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Earthworms are generaly used for degredation of various wastes. In this experiment we have used earthworms to prepare vermicompost. Vermicomposting is the process by which worms are used to convert organic materials into humus like material, In 60 days time good quality compost was prepared by earthworms using the domestic waste. The earthworms used were of indigenous species. Vermicompost contain micro and macro nutrients which are beneficial to plants health as it is growth promoting for plants. This method is ecofriendly because it is nonhazardous. In this process domestic wastes were broken down rapidly by earthworm resulting in a nonhazardous material. It has great application in Nurseries .C/N ratio was found to be decreased in vermicompost process with incubation period.

Keyword: Domestic wastes, Earthworms, Indigenous, Ecofriendly

# Synthesis and Characterization of Zeolite-A from Fly ash and use as a remediating tool for removal of heavy metals and color from synthetic waste water

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**Abstract:** Fly ash resulted from coal burning is a waste that can be used in wastewater treatment for removal of dyes and heavy metals by adsorption. In this study fly ash collected from a thermal power plant in Maharashtra was hydrothermally modified with NaOH and NaAlO<sub>2</sub> to synthesize zeolite A. This new zeolite A was characterized with respect to by surface structure (XRD, BET), composition (FTIR), and morphology (SEM), and was found to have good adsorption capacity for dyes and heavy metals from synthetic waste water. Contact time, optimum amount of substrate zeolite A were the parameters optimized for obtaining the maximum efficiency in the adsorption process. The results indicate that the novel substrate composite with modified fly ash can be used as an efficient and low cost adsorbent for simultaneous removal of dyes and heavy metals. It is expected that this methodology can be extrapolated for purification of effluents to a level that meet discharge regulations.

Keywords: Fly ash zeolite, Hydrothermal synthesis, Dyes, Heavy metals, XRD, FTIR, BET, SEM

#### 7. Microbiology

# Decolourization of textile dye Orange F2R by bacterial isolates

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**Abstract:** Rapid industrialization has necessitated the manufacture and use of different chemicals in day to day life .The textile industry is one of them, which extensively use synthetic chemicals as dyes. Wastewaters from textile industries pose a threat to the environment, as large amount of chemically different dyes are used. Reactive dyes have been used increasingly in industries because of their ease and cost effectiveness in synthesis compared to natural dyes. Most reactive dyes are toxic, carcinogenic and mutagenic. However, they can be degraded by bacteria under aerobic and anaerobic conditions. In the present study, an attempt was made to examine the potential of isolated bacterium from waste of textile industries for decolorization of Orange F2R dye. The sample collected from the textile industry was screened for reactive dye decolorizing bacterial strains by using nutrient agar containing Orange F2R dye incubated at 37°C for 24 hours. After incubation the bacterial isolates showing clear zones around their colonies due to decolorization of dye were selected for further studies. These isolates were screened for their ability to decolorize Orange F2R dye in nutrient broth. The optimum pH and temperature for the decolourization was 7.0 and 37°C, respectively. Out of 7 isolates 3 were showed positive result. The most promising bacterial isolate was used for further dye degradation studies. **Keywords:** Orange F2R dye, dye decolourization, bacteria.

# Isolation of marine microorganisms and screening for biosurfactant producers

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**Abstract:** The biodiversity of marine environment proved to be an important resource for isolation of potent microorganisms to produce biologically active secondary metabolites. Production of biosurfactants using microorganisms have gained increasing attention. The range of industrial applications of biosurfactants includes enhanced oil recovery, bioremediation of environmental pollutants, health care, food processing, medical applications such as adjuvants and as antimicrobial agent. In the present study bacteria were isolated from sea water collected from various locations such as Mumbai, Chennai, Uran beach near ONGC plant, Odisa, and Goa. Zobell Marine broth and Starch casein broth were used for enrichment of bacteria and actinomycetes respectively and Zobell Marine agar and Starch casein agar were used for isolation. Various screening tests for detection of biosurfactant producers were carried out. Screening methods such as hemolytic activity, oil spread method, drop collapse tests, emulsification index, emulsification assay and hydrocarbon overlay agar method were carried out to check the ability of isolates to produce biosurfactants. It was found that most of the isolates showed positive hemolysis test but variation of result was observed for other tests. In future, studies will be carried out on parameter optimization for biosurfactant production and its role as an antimicrobial agent. **Keywords**: Marine microorganisms, biosurfactants, isolation, screening.

# **Screening of L-Glutaminase Producing Marine Bacterial Cultures**

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**Abstract:** L-glutaminase is the enzyme deaminating L-glutamine. The action of glutaminase plays a major role in the nitrogen metabolism of both prokaryotes and eukaryotes. In recent years glutaminase has attracted much attention with respect to proposed applications in pharmaceuticals as anti-leukemic agent. Its commercial importance as anticancer demands not only the search for better yielding viable strains, but also economically viable bioprocesses for its large scale production. In this present research work marine water sample collected from Mumbai seashore was used. 1ml of sample was streaked out in nutrient agar plates, incubated at  $37^{\circ}$ C for 24 hours. Total 33 bacterial colonies were isolated, they were screened for L-glutaminase production. All the bacterial strains collected were spot inoculated on minimal agar medium, contains 0.5% L-glutamine as the sole carbon and nitrogen source and phenol red as pH indicator was used. After two days of incubation at  $37^{\circ}$ C the plates turned pink indicating positive response. The colour change of the medium from yellow to pink is an indication of the extra cellular L-glutaminase production by the colony. This colour change is due to change in the pH of the medium. Out of 33 bacterial strains, 3 are positive. These strains were used for further study. **Keywords:** L-Glutaminase, Anticancer.

# **Probiotic:** solution for aflatoxin toxicity

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Abstract: Aflatoxin contamination of primary food commodities, processed foods lead to sever health problem in developing countries .Aflatoxin are causative agent of liver cancer. Uncontrolled exposure of aflatoxin affects immunity and changes nutrition of human and cattels, growth rate and other productivity measures are critically affected by dietary aflatoxin in animals .Probiotics play important role in maintaining health .In present investigation Lactic acid bacteria were isolated from fermented food sample .Isolates were further assessed for their ability to inhibit enteric pathogen and vitamin B12 production .LAB categorized based on ability to tollerate and degrade aflatoxin extracted from contaminated food .'B' type aflatoxin was extracted from As per gillus flavus contaminated groundnut and maize sample, using Best Food method Keywords: Probiotics, Aflatoxin, Lactic acid bacteria.

### **Bacterial Cells Mediated Gold Nanoparticles Synthesis as Green Method**

#### Ashok V. Bankar<sup>1</sup>, Narendrasing Rajput<sup>2</sup> and B.P. Kapadnis<sup>2</sup>

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Abstract: Synthesis of nanoparticles (NPs) by 'green method' is simple, an eco-friendly, non-toxic and quick method. In this study, a bacterial isolate was isolated from spoiled apple sample. Based on biochemical, morphological and 16s rRNA sequencing bacterial isolate was identified as Acinetobacter. Synthesis of gold nanoparticles (AuNPs) was studied with respect to different parameters such pH, time, temperature, cell biomass concentration and gold salt concentration etc. A variety of gold nanoparticles were synthesized under different conditions. AuNPs were characterized by Uv-Vis spectroscopy, XRD, SEM-EDS and TEM. AuNPs nanoparticles showed a good antibacterial activity against several pathogenic bacteria. AuNPs also have a good anti-biofilm activity against pathogenic bacteria. Thus, AuNPs from green route could be therapeutic agent against human pathogens.

Keywords: Nanoparticles, Eco-friendly, TEM, XRD and Biofilm.

# **Biochemical Analysis of Borewell Water from Salim Alilake Region of Aurangabad District**

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Abstract: Water Samples of four different borewells from the Salim Ali lake region in Aurangabad, during three seasonsie.summer, rainy and winter were collected .Different physicochemical and microbiological investigations of the collected samples were carried out to check the potability of water, as a number of families consume this water due to shortage of water received from municipal water supply A large count of coliforms was obtained indicating fecal contamination during the rainy season, the count was reduced later on in the next season, While the physicochemical analysis showed high concentration of metal carbonates and total dissolved solids (TDS) values. The results implicate that water is not fit for drinking purpose as compared with standard values as prescribed by WHO. thank

Keywords: Potability, Contamination, physicochemical parameters, TDS, metal carbonates.

# Isolation and characterization of HaloalkaliphilicActinomycetes from the Sea water of Coastal Gujarat

#### Dalip Singh I. Rathore, Mahejbin A. Sheikh, Sangeeta D. Gohel, Satya P. Singh

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Abstract: Actinomycetesare important class of microbial resources and well known producers of antibiotics and other bioactive compounds. They are Gram-positive bacteria, found in a wide range of aquatic and terrestrial environments. Haloalkaliphilicactinomycetes can tolerate up to 20 % salt and pH 9-12. Large number of isolates wasobtained different isolation procedures.The present studv describes using marine actinomycetesofhaloalkaliphilic nature from the AlangShip breaking area in Gujarat. For the isolation of the marine actinomycetes, various strategies, such as serial dilution techniques, heat treatment method and treatment of the sample with CaCO3 were adapted for the isolation of maximum number of actinomycetes. The treated sampleswere used for the isolation of the acinomycetes using various media.Based on the enrichment culture International Science Community Association www.isca.in, www.isca.co.in, www.isca.net.co, www.isca.net.in

technique as well as serial dilution and plating techniques, it was observed that the heat treated soil samples with CaCO3 inhibited the growth of bacteria and enhanced the growth of the actinomycetes. Further, on ISP-2 and ISP-6 media, maximum actinomycetes were observed as compared to remaining media that indicated the suitability of ISP-2 and ISP-6 media for the actinomycetes. The isolates were confirmed as actinomycetes based on their colony morphology and gram's staining which showedtheir filamentous nature. Few isolates were related to Nocardiopsis sp. SS15.23 and Nocardiopsis sp. AF333, respectively. Overall, the present study demonstrated wide occurrence of marine actinomycetes that can be diversified based on their growth patterns, morphological features and phylogenetic relatedness.

Keyword: Extremophiles, Haloalkaliphilic actinomycetes, 16S rRNA, Nocardiopsis.

### **Dual Antibiotic Therapy as Initial Treatment for Bacterial Keratitis**

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S.)

**Abstract:** According to World health organization estimates, Number of blind people in the world is 45 million. Out of which 5.4 million blind people are in our country. Bacterial keratitis is a major cause of blindness throughout the world. About 10% cases of blindness are due to Bacterial keratitis. Bacterial keratitis is serious ocular infectious disease that can lead to significant vision loss. Any infectious process in the cornea producing a keratitis, mild or sever, requires prompt and vigorous treatment with an effective antimicrobial agents to minimize corneal scarring and vision loss. It can treat very well by antibiotic but these days antibiotic resistance has been increased therefore dual antibiotic therapy suggested.

Keywords: Bacterial keratitis, Pathogenic bacteria, Dual antibiotic therapy (Combination therapy)

#### Efficacy of Kids toothpaste for controlling dental plaque

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**Abstract:** Kids are fond of carbohydrate containing foods which leads to biofilm formation on tooth surface. Acid formation due to microbial action on food causes breakdown of the bone supporting the tooth. Over a period of time, these acid destroy tooth enamel, resulting in tooth decay. Dental care products are available in market to control dental plaque. Present investigation was carried out to check efficacy of fluoride containing anti-cavity Colgate toothpaste. Pathogens were isolated from dental plaques of ids. Antimicrobial activity of toothpaste was determined using various concentrations of toothpaste in agar well diffusion method. **Keyword:** Tooth decay, plaque, anticavity, toothpaste.

### **Melanin Production by Thermophilic Bacteria**

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**Abstract:** Melanin pigment serve wide application in food, cosmetic and pharmaceutical industry. Melanin pigment found in animals, plants as well as bacteria Based on colour and structural class primarily there are three types of melanin that is Eumelanin, Pheomelanin, allomelanin. Upstreaming anddownstreaming of fermentation product adds the cost. Hence optimization should be carried out on selection of strain, fermentation and recovery. Current study was carried out on isolation of melanin pigment produces from hostile environment and its recovery using cost effective methods. Isolate was identified based on phenotypical characteristics. Extracted melanin was further assessed for antimicrobial activity and antioxidant activity. Quantitative and qualitative detection of melanin pigment was also done.

Keywords: Melanin, Antioxidant activity, antimicrobial activity, Thin layer chromatography.

# Enzymatic bioproduction of low molecular weight N-acetylated chitin oligosaccharides and evaluation of their remedial potential

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**Abstract:** Seafood industries are posed with disposal problems of solid waste which is an estimated 7.3 million tonnes annually. Solid waste is rich in several bioactive compounds. Biological recovery of these compounds is preferred due to their advantages over other methods. Seafood waste, a cheap renewable chitin substrate was employed for the extraction of low molecular weight chitin oligosaccharides (COS):(GlcNAc)<sub>2</sub>-(GlcNAc)<sub>4</sub>

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employing hydrolytic enzymes from bacteria. COS find extensive biomedical and industrial applications. Nearly 5mg of N, N'-diacetylchitobiose was recovered from 1.5% waste after 36 h incubation with 6.6U chitinase from Microbispora sp.V2, 16U chitinase from Bacillus sp. NK-395 and 2.3U protease. A yield of 4.12mg of N, N', N'''- triacetylchitotriose and 3.75mg of N, N', N''', N''''- tetraacetylchitotetraose respectively was obtained under optimized conditions(1% substrate, pH 4.0 and pH 6.0, 40°C) after 6 h with chitinase from Bacillus sp. NK-395(3.0U) and Streptomyces sp. DNK-1 (4.0U). These COS exhibited in vitro radical scavenging activities against hydroxyl, superoxide radicals indicating their curative potential. Seafood waste can be employed as a cheap chitinous substrate for the production of COS leading to an economical, efficient degradation of seafood waste. The bioactive COS recovered could cater to various biomedical and biotechnological industries. **Keywords**: seafood waste, enzymes, chitin oligosaccharides, antioxidant activity.

# Catalysis and stability of the free and immobilized alkaline proteases from a haloalkaliphilic actinomycete, Nocardiopsis sp. Mit-7

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**Abstract:** Haloalkaliphilic actinomycetes have high G+C content and their enzymes can withstand different extmties. In this report, we describe an alkaline serine protease from a haloalkaliphilic actinomycete, Nocardiopsis sp. identified on the basis of 16S ribosomal RNA. The actinomycete was cultivated on the gelatin broth for the protease production at pH 9. The enzyme was purified by the ammonium sulfate fractionation and affinity chromatography on phenyl saffarose 6FF. The enzyme kinetics was measured by varying substrate concentrations. The catalysis and stability of the purified enzyme was determined in the presence of various inhibitors, surfactants, detergent and organic solvents. The protease was optimally active at pH 9 and 70°C. The enzyme retained above 80% of the original activity after 4 hrs incubation with various denaturants. The enzyme was immobilized by physical adsorption and covalent binding show relatively increased protease activity and reusability. Ionic binding was carried out with amberlite IRA 35 and amberlite IR 120, while the cross linking of the enzyme was carried out using agar and I-carragenan. Higher catalytic activity and stability of the immobilized enzyme at different temperature and pH ensure its advantages over free enzyme. PCR amplification of the protease gene yielded a fragment of around 1000kb. High enzyme production and its stability under different harsh conditions highlight the application prospects.

**Keywords:** Halophiles, Alkaline protease, Haloalkaliphilic actinomycetes, Enzyme purification, Enzyme immobilization, PCR amplification

### "Studies on the bacterial isolates precipitating CaCO<sub>3</sub> for Biocementation"

#### A.S.Gaikwad\* and N.R.Shaikh

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**Abstract:** Cement is a material which maintains durability of structure and conservation of cultural heritage. Although hundred and thousands of successful concrete and buildings are annually constructed worldwide, there are large number of concrete structure ,that deteriorates or become unsafe in loading. All building materials are porous this porosity of building material and reduce their strength and life. The urease producing organisms addresses a solution to the growing problem in a natural way by precipitating the biocement in hard water. The organisms involved in carbonate precipitation , has lead the exploration of this process in the field of construction engineering. Biocement is a product, innovation from developing bioprocess technology called Biocementation. Biocement refers to a CaCO3 deposit, that formed due to microorganism activity in system rich of calcium ions.

Keywords: Biocementation, microbial calcite precipitation.

# Production of Bacterial Cellulase from Soil Isolates using CMC as Substrate

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Abstract: Cellulose is a long chain polymer, made up of repeating units of glucose, a simple sugar, joined together with  $\beta$ -1, 4glycosidic linkages. Cellulase is an important enzyme which can be obtained from cheap agrowastes, as well as cellulose as substrates by using submerged fermentation and solid state fermentation. Cellulose degrading bacteria were isolated from soil sample using serial dilution and pour plate method. The isolation, identification and screening of bacteria with high cellulase activity from soil samples. Bacterial colonies were grown over CMC-Agar medium. Maximum cellulase production was obtained after 24-48 hrs of

incubation at 37 °C in medium containing 1% carboxymethyl cellulose (CMC) as substrate. Cellulolytic bacteria were production of cellulolytic enzymes by staining with 1% Congo red. The diameter of clear zone on bacterial plates, gave an approximate indication of cellulase activities. Bacteria were further identified by morphological and biochemical tests.

Keywords: Cellulose, CMC-Agar, Cellulolytic bacteria, Congo red, Cellulases.

# Evaluation of PSB strains with Rhizobium for enhancing the nodulation and grain yield of Pigeonpea

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**Abstract:** A field experiment was carried out during kharif 2013-14 at Pulses Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.) to evaluate the combined performance of various PSB strains with Rhizobium on nodulation and grain yield of Pigeonpea (AKT-8811). The PSB strains were procured from different agro climatic regions of India. The experiment was laid out in randomize block design with three replications. The carrier based culture of Rhizobium and PSB strains were inoculated @ 25 g/kg and 20 g/kg seed respectively. The combined seed inoculation with Rhizobium (PKVPR-101) and PSB-3 strains resulted in higher grain yield (1131 kg/ha) and maximum (19.93 nodules /plant) nodulation.

# **Optimization of Cronobacter dublinensis subsp. dublinensis DES187(T)** isolated from root nodules of Soybean for exopolysaccharide production

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Abstract: Exopolysaccharides have various applications due to their unique rheological properties as in food, pharmaceutical and in other industries. In present study conditions were optimized by one-factor-at a time method to enhance EPS production by Cronobacter dublinensis subsp. dublinensis DES187(T) isolated from root nodules of Soybean (Glycin max). Effect of different parameters were examined on EPS production and maximum EPS production was observed with 2% D-Glucose as carbon source (750µg/ml), 0.2% beef extract as nitrogen source (770µg/ml) and with 300µg/ml of MgSo4.7H2O as metal ion (820µg/ml) after 66 hours of incubation period (880µg/ml). EPS was harvested with ethanol and estimated by phenol sulphuric acid assay. With all this optimized conditions Cronobacter dublinensis subsp. dublinensis DES187(T) produced 4.0g/l exopolysaccharide as per dry weight and 920µg/ml of exopolysaccharide estimated by phenol sulphuric acid assay.

Keywards: Cronobacter dublinensis, exopolysaccharide, optimization, phenol sulphuric acid assay.

# Anaerobic Digestion: Method of Energy Recovary from Industrial Effluents in India

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Abstract: Disposal of large quantities of biodegradable waste with inadequate treatment results in significant environmental pollution degradation of biodegradable waste by anaerobic digestion results in reduction of greenhouse gas emissions and energy generation. It helps in decrease in use of fossil fuel and use of green house gases such as carbon dioxide and methane gas generated by industrial waste. In India large amount of industrial effluents are released in water. It can be used in production of energy. Anaerobic digestion is one of the methods for waste water treatment. Energy conservation in industrial processes became a major concern and anaerobic processes rapidly emerged as an acceptable alternative. This led to the development of a range of reactor designs suitable for the treatment of low, medium, and high strength wastewater. The aim of this paper is to assess the current status in anaerobic treatment technology and suggest ways to adopt anaerobic digestion for wastewater treatment. Current paper reviews status of anaerobic digestion using different types of reactors suitable for it in India.

Keywords: biodegradable waste, anaerobic digestion, green house gas, industrial effluents, reactor.

# Phylogenetic diversity and numerical taxonomy of haloalkaliphilic bacteria from the coastal saline desert of Little Rann of Kutch, Gujarat

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**Abstract:** Haloalkaliphilic organisms are largely investigated from the Soda Lakes, Solar salterns and Dead Seas all around the world. However, haloalkaliphilic bacteria from deserts are largely explored. In order to capture maximum diversity, 5 different media, SP medium, R2A medium, SE medium, CMB medium and HM medium, were used. The isolated bacteria were studied for their cultural, morphological, biochemical properties and antibiotic sensitivity profile. The isolates were further assessed for salt and pH profile and extracellular enzymes. The organisms were then analyzed for 16S r-DNA sequences and phylogenetic relatedness. The bacterial isolates belonged to the phylum Firmicutes and Actinobacteria of genera: Halobacillus, Virgibacillus, Bacillus, Oceanobacillus, Salimicrobium, Bhargavaea, Staphylococcus and Micrococcus with 16 different species from the Jogad and Surajbari areas of the Little Rann of Kutch. Phenotypic characters were used for the cluster analysis to group these bacteria into phenons using Jaccard similarity coefficient and UPGMA algorithm. The biphasic approach based on the genotypic and phenotypic characteristics was used to judge the diversity. Some organisms with unique phenotypic patterns contradicted their phylogenetic placement.

Keywords: Haloalkalphilic bacteria, Coastal saline desert, Microbial diversity, 16S rDNA, Phenogram, UPGMA algorithm, Extremozymes

# Study of Biofertilizer and Biocontrol Potential of Bacillus coagulans Isolated from Rhizosphere of Red Gram Cultivated in Marathwada Region

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Abstract: The region where the soil and roots make contact is called rhizosphere. The organic phosphorus in soil is unavailable to plant. Microorganisms influence phosphorus availability to plant through the process of mineralization and immobilization. With increasing awareness of environmental hazards biobased technology for sustainable agriculture and bio-pesticides can provide long lasting effective solution. Biological control agents colonize the rhizosphere, the site requiring protection and leave no toxic residues. Bio-control of plant pathogen is an alternative to chemical pesticides which causes environmental pollution and development of resistant strain. In the present work screening of phosphate solubilizing Bacillus coagulans (PSBC) from rhizosphere of red gram was done by using pikovskayas medium. About 70 soil samples were collected from different rhizosphere region of red gram cultivated in Marathwada region. From it isolates of PSBC were isolated and discussed in this paper. Isolates of Bacillus coagulans were identified depending upon their morphological, cultural characteristics and biochemical tests. The isolates of Bacillus coagulans show diverse levels of phosphate solubilizing activity at different temperature and pH. The study of phosphate solubilizzation at different pH and temperature revealed that isolates of Bacillus coagulans showed maximum phosphate solubilizzation at pH 7.5 and temperature 30°C. Efficient isolates of Bacillus coagulans were further tested for antagonistic activity by using agar (well) diffusion method. It was observed that Bacillus coagulans PSBC 07 showed high phosphate solubilizing efficiency (PSE) and antagonistic activity against E. coli NCIM2064, Salmonella typhimurium NCIM623564, Klebsiella pneumoniae NCIM2719, Xanthomonas compestris NCIM2956 and Fusarium oxysporum NCIM1281, hence it could be exploited as biofertilizer and biocontrol agent for sustainable agriculture.

Keywords: B. coagulans, Biocontrol, phosphate solubilization, rhizosphere.

#### **Biosynthesis of silver nanoparticles from various sources**

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**Abstract:** Nano particle possess unique electrical, optical as well as biological properties and are thus applied in catalysis, biosensing, imaging, drug delivery, Nano device fabrication and in medicine. The production of metal based nano particles by chemical reduction, thermal treatment, irradiation and laser ablation often times requires use of organic solvent and toxic reducing agent like sodium borohydride and N,N-dimethyl formed. Therefore biological and biomimetic approaches for the synthesis of nano material's are being explored. Development of reliable and eco-friendly process of synthesis of metallic nanoparticles is an important step in field of application of nanotechnology. In this experiment we have prepared silver nanoparticles from extracted citrus fruit peel, Aloe vera, Azadirecta indica and actinomycete Streptomyces species. Biosynthesis and green synthesis of silver Nanoparticles was carried out followed by characterization and checking antimicrobial activity against human pathogenic microbes.

Keywords: Silver Nanoparticles, Biological Synthesis and Green synthesis, Streptomyces

### Antimicrobial activity of Streptomyces against pathogens

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**Abstract:** An antimicrobial is an agent that kills susceptible microorganisms .Some microorganisms show multiple drug resistance.eg.-Staphylococcus aureus. To inhibit the growth of such microorganisms Streptomycin antibiotic is used. Streptomyces species was isolated by serial dilution method and identified by using morphological characters. Then Streptomyces was analyzed to antimicrobial activity against susceptible organisms by disc diffusion method, well plate method and perpendicular streak method. The Streptomyces species isolated from agricultural soil exhibited broad spectrum antimicrobial activity against test microorganisms.

Keywords: Streptomyces, broad spectrum, Stapylococcusaureus

### Isolation and screening of pigment producing actinomycetes

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**Abstract:** Soil samples were collected from different areas in Maharashtra state for isolation of actinomycetes. Actinomycetes are gram positive organisms which are widely distributed in nature. Actinomyceteswere isolated by serial dilution method using spread plate technique. Actinomycetes were morphologically identified. In this experiment we have got five different pigment producing Streptomyces species. These isolates wereyellow, orange, red, purple and black colored pigment producers. These isolates were used for further studies. **Keywords:** Screening, pigment producers, spread plate, Streptomyces

# Isolation of Plant Growth promoting Rhizhobacteria (PGPR) and Study of Its Plant growth Promoting Potential from Soybean (Glycine Max. L.).

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**Abstract:** Root colonizing bacteria (Rhizobacteria) that exert beneficial effects on plant development via direct or indirect mechanisms have been defined as plant growth promoting rhizobacteria (PGPR). Over the years the PGPR (plant growth promoting rhizobacteria) have gained worldwide importance and acceptance for agricultural benefits. These microorganisms are the potential tools for sustainable agriculture and the trend for the future. In the last two years, soybean was grown in Maharashtra of about2.4 million hectors producing from 1.9 to 2.4 million tonnes, with an average productivity of 822 to 1, 040 kg/ha. The area is increasing rapidly over the years. In this research work bacteria from soil and rhizhosphere of soybean cultivated fields were screened for production of indole acetic acid, HCN,ACC, Siderophore, Phosphate solubilisation, and antimicrobial substances. Potential producers were tested for quantitative production of these plant growth promoting factors by chemical methods and seed germination assay.

# **Evaluation of Antioxidant Activity of G. sylvestre**

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**Abstract:** The present investigation was undertaken to appraise the antioxidant properties and the total phenolic contents of a nobel medicinal plant G. sylvestre. The extract of the plant was prepared with the solvents namely water and ethanol at 5 % concentration levels. Radical attenuating abilities of plant extract were ascertained by 2, 2- diphenyl 1-picryl hydrazyl (DPPH) radical scavenging assay. The total Phenolic content of the extract was determined spectrophotometric ally according to the Folin-Ciocalteu procedure. The total flavanoid content of extracts is determined by Aluminium chloride colorimetric assay. The results of these findings revealed that theradical scavenging activity of medicinal plant extract may be due to the hydrogen donating ability of phenolics.

Keywords: Antioxidant, DPPH, G. sylvestre leaves, Phenolic, Free Radicals

# "Production of Bioethanol from Waste Banana Peels"

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**Abstract:** Increase in worlds energy demand and progressive depletion of oil reserves makes it essential to search for alternative energy resources, especially those derived from renewable material such as biomass.Fruit waste is such a biomass which can be used to produce ethanol.Such bioethanol can be used as alternative fuel source.Banana is one of major constituent, the principle food resources in the world and occupy the fourth world rank of the most significant foodstuffs after rice, corn.Most of the fruit peels are dried, ground,pelletized and sold to the feed manufactures at low price which is not considered a highly viable proposition.Though banana peels is a fruit residue, it accounts for 30-40% of total fruit weight and contains carbohydrates, proteins and fibre in significant amounts.Fermentation of banana peels to ethanol by using culture Schizosaccharomyces pombe was investigated at optimum pH and temperature. Fermentation was done for 4-5 days using banana peels .The optimum pH and temperature for fermentation of banana peels was 7 and 33°C. With the optimized pH and temperature fermentation was carried out at different substrate conc 2% to 10%. Maximum ethanol production is completely achieved in 5 days.The result of the investigation showed that the fermented banana peels produced a significant amount of ethanol.The volumentric production of ethanol was varied according to the different conc.

Keywords:- Banana peel waste, Ethanol, Fermentation, Schizosacchromyces pombe.

# Induction of mutation in Trichoderma harzianum using Ultra-violet light for isolation of mutants deficient in pigment production and study of this mutation on bio-control activity

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**Abstract**: Amongst many mutagenic agents known till date Ultra-violet light is most preferred mutagenic agent. For isolation of mutants using UV light, Trichoderma harzianum spores were exposed to UV light of 254 nm wavelength. Mutants deficient in pigment production were identified by observing colour of the colonies. These mutants showed white coloured colonies in contrast to the green coloured colonies of parental strain and shown retarded growth rate. Morphology of mutants was studied by slide culture technique and it was same as parental organism. Characterization of mutants was done with respect to checking enzyme activities (amylase, cellulose, xylanase, chitinase )and checking the effect of mutants on germination of plant pathogens Rhizoctonia solanii, Sclerotium rolfsii, Fusarium oxysporum.

Keywords: Trichoderma harzianum, UV light, pigment deficient mutants, Rhizoctonia solanii, Sclerotium rolfsii, Fusarium oxysporum, bio-control activity.

### **Bioremediation of Distillery spent wash using Indigenous Microflora**

#### M.N. Sharma and T.B. Sawant

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Abstract: The wastewater released from distilleries and fermentation industries are the major source of soil and aquatic pollution due to presence of water-soluble recalcitrant colouring compounds called melanoidins. Biological decolourisation of these compounds are to be found more advantageous as compared to chemical treatments. Distilleries are responsible for the generationof eco-toxic spent wash. Spent wash contains caramel, melanoidin and much more toxic chemicals. Melanoidin is a recalcitrant pigment responsible to give brownish colour to spent wash.Hence in this study, the bacterial indigenous microflora showing higher decolourization efficiency on distillery spent wash was screened. Physico-chemical properties were analysed for the substrate. The effects of carbon and nitrogen supplementing media were studied and followed by media optimization for different carbon, nitrogen and salt concentrations were carried out using Response Surface Methodology. Hence it is found that higher decolourization of distillery spent wash could be achieved at low carbon and nitrogen concentrations. Thusthis bacterial consortiacan be utilized for melanoidin decolourization of distillery effluent at industrial scale. This approach could be used to develop cost effective, eco-friendly biotechnology package for the bioremediation of spent wash before its disposal.

Keywords: Bioremediation, Spent wash, Melanoidins.

# Isolation, characterization of cypermethrin degrading organisms and Parameter optimization for cypermethrin degradation

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Abstract: Pyrethroids are the botanical origin pesticides. These are commonly used in agriculture for protection against various pests. But large amounts of these pesticides are known to remain in the soil. These residual pesticides enter via rain water to the rivers and shows toxic effects on aquatic life. A Cypermethrin pesticide considered in this study belongs to pyrethroid group. Microorganisms capable of pesticide degradation were isolated from different soil samples. These isolates were checked for their capacity for growth in presence of cypermethrin as sole carbon source. Secondary screening of isolates was done depending on their diazotrophic nature. The parameter optimization was done to find the optimum conditions for cypermethrin degradation. Metabolites of pesticide degradation were analyzed by TLC. Out of the isolated organisms, three strains showed significant results for growth in presence of higher concentrations of cypermethrin and metabolites were detected by TLC.

Keywords: Pyrethroids, Cypermethrin, Bioremediation, Diazotrophy

# Microbial Biofuel –Ethanol produced by fermentation of Biomass.

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**Abstract:** Fermentation is a process by which large organic molecules are broken down into simpler molecules as the result of the activity of microorganisms .Biofuels are a wide range of fuels which are derived from biomass . Biofuel are gaining increased public and scientific attention, driven by factors such as oil price hikes the need for increased energy security and concern over greenhouse gas emission from fossil fuel. Bioethanol is produced by the activity of some bacteria and yeast their action on substrates containing carbohydrates. The different substrates like rotten potato, Corn cobs, Wheat and Sugar beet were used for bioethanol production. Different isolates from Vegetable waste, Fruit waste, Molasses waste and Molasses soil were selected which were able to ferment carbohydrate and produce bioethanol which was found to be Gram Positive Rod arranged in chain and stack manner . Further Studies and Identification through 16s RNA of this isolates is for process. Index Terms –Fermentation, Biofuel, Bioethanol, Bacteria.

# **Bioprospecting of dairy industry effluent for biomethanation**

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Abstract: Mother liquor is the waste residue remaining after coagulation of milk in the milk processing dairy industries. The physicochemical characteristics of mother liquor are studied so as to be used as an alternative efficient substrate by dairy industries in biomethanation process. Biomethanation using mother liquor as a substrate is found to be efficient giving a yield of  $0.6m^3/day$  of methane gas. This biogas is a solution for future energy crisis due to depletion of LPG and products. The physicochemical composition of mother liquor have shown the 7.3 % of carbohydrates and 12.3 % of proteins and is found to be an alternative source of carbon and energy. Present study have shown that at inlet effluent analysis COD value of 408000 mg/litre. The analysis of COD at outlet sample after treatment of Microbial consortia of methanogens have shown COD value of 52000 mg/ litre. The study has shown a total reduction of COD by 52 %. The sustainability and feasibility of the process is studied with respect to several parameters such as substrate dosage, temperature, pH, C.O.D. and biogas generation. These parameters are optimized for the biomethanation process. The chemical composition of biogas produced is verified with gas analyser. The purified biogas is obtained using CO<sub>2</sub> scrubber.55-60 % of methane gas is produced in biogas.

Keywords: Biogas, mother liquor, gas analyser, CO<sub>2</sub> scrubber.

# Green Approach for synthesis of Gold Nanoparticles by an isolatedbacterium Bacillus marisflavi YCIS MN 5and their characterization

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INNOVATIVE TRENDS IN CHEMICAL, PHYSICAL AND BIOSCIENCES -2016
Abstract: The development of an eco-friendly protocol for synthesis of nanomaterial is an important aspect of research in nanotechnology.Goldnanoparticles have drawn remarkable research interest during the last two decades because they are highly stable and show size related electronic, magnetic and optical properties hence widely applied in areas such aselectronics, drug delivery,medical imaging, chemical sensing and catalysis. We report,green approach for extracellular synthesis of gold nanoparticles (GNPs) using anisolated Bacillus marisflavi YCIS MN 5. Addition of gold chloride solution into cell free extract of B. marisflaviresulted in the synthesis of GNPs at room temperature within 96 h. The as-synthesized GNPs were characterized by UV-visible spectroscopy, XRD, FTIR, FESEM, DLS for structural and morphological analysis. The XRD revealed FCC crystalline nature of GNPs. The spherical shaped morphology of GNPs was observed in FESEM images. According to DLS analysis, the particle size was found to be in the range of 10- 60nm with average particle size ~14nm.The FTIR analysis confirmed the involvement of biomolecules in synthesis of these GNPs. This process of biological synthesis ofGNPs is simple, non-toxic and environmentally benign as compared to other chemical and physical synthetic routes.

Keywords: Bacillus marisflaviYCIS MN 5, eco-friendly, GNPs, XRD, FTIR, FESEM, DLS.

# Optimization of the extraction of metagenomic dna from sea water of gujarat coast

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**Abstract:** Metagenomicshas opened a new window for the genomics of the cultivable and non-cultivable microorganisms. Only a minute fraction of the total microorganisms could be cultivable under the normal laboratory conditions. Therefore, information of 95-99% microbe's genomes and its dynamic role in ecosystem is not accessible. Till date marine habitats of Gujarat coastal region, particularly sea water, has not been explored by the metagenomics approach. Extraction of the metagenomic DNA from Sea water is quite challenging since it's a much diluted environment. In this study, sea water sample collected from Kachhigadh of Dwarka, Gujaratwas used. The physicochemical properties of the collected seawater, such as Color, Odor, pH, Salinity, Chloride, Organic carbon and Sulphate were measured. The sea water sample was alkaline with high salinity and low organic content. The extraction of high quality metagenomic DNA in good quantity from the sea water is puzzling and important step of the metagenomic studies. In this study, direct DNA extraction methods, such as soft lysis, harsh lysis and combination of both were developed. Agarose gel electrophoresis and spectrophotometric analysis revealed that the extracted metagenomic DNA was relatively pure and intact with high molecular weight. The extracted metagenomic DNA, Physico chemical analysis, DNA extraction

## Simultaneous Decolourisation of Methyl Red and Electricity Generation in Microbial Fuel Cell by Bacillus circulans NPP1

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**Abstract:** This study examined azo dye methyl red (MR) decolorisation in a 2 chambered microbial fuel cell (MFC). The primary objectives of the study were to construct MFC, screening of dye decolorizing bacteria having electro-chemical activity and optimization of physiochemical parameters. In MFC design both the chambers were connected by Nafion 117 Proton exchange membrane instead of salt bridge. Graphite electrodes were placed in cathode and anode chamber to have to best electron transfer performance. Open circuit system were established as reference to study the roles of electrode in Methyl red dye decolorisation and electricity generation As compared to traditional anaerobic technology higher decolorisation and electricity generation efficiency was achieved by MFC. Under an optimal condition complete MR decolorisation and a maximum electricity production of 710 mV were achieved simultaneously by using Bacillus circulans bacteria. The MFC performance and MR decolorisation were found to be strictly dependent on the cathodic and anodic conditions, such as pH of the medium, strict anaerobic conditions. Catholyte potassium ferricynide enhanced the electricity generation in the MFCs involving MR degradation owing to its electron proton-relay effect. After 7 hours, almost all of the MR (98%) was decolorized. Bacillus circulan may have potential in simultaneous decolorization and electricity generation in field conditions.

Keywords: MFC, Methyl red, decolorisation, proton exchange membrane

## Phytochemical studies and evaluation of antimicrobial and other pharmaceutical properties of Allamanda cathartica

#### International Science Community Association www.isca.in, www.isca.net.co, www.isca.net.in

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**Abstract:** Medicinal plants form the backbone of traditional medicine in the last few decades with intense pharmacological studies. They are the potential sources of new compounds of therapeutic value and lead compounds in drug development. Phytochemical screening of Allamanda plant extracts were carried out by chemical analysis. Antimicrobial properties were evaluated by agar diffusion method. Antioxidant and anticancer activities were detected by antioxidant assay and antitumor potato disc assay, respectively. The identification of phytocompounds were carried out by GC-MS analysis and compared with NIST08, WILEY8 or FAME mass spectral library. Methanol and ethanol were found to be efficient solvents for extraction. Thin layer chromatography detected Morine, 6-hydroxyflavon, chrysin, quercetin, ferulic acid, apigenin and flavanone in stem and flower extract. Phlobatannins were present only in flower extract. Stem and flower extract showed 71.66% antioxidant activity and 40% anticholesterol activity of the standards tested. GC-MS analysis of flower extract showed the presence of ethane, ethyl ether, acetaldehyde, acetone, carbonic acid, ethyl methyl ester and ethyl acetate. The proposed research work might be helpful to predict the structure and formula of bioactive compound in Allamanda which can be used as a drug and to develop the natural medicine to combat the emergence of antibiotic resistant pathogens.

Keywords: Allamanda, potato disc assay, anticholesterol activity, antidiabetic activity.

## Biodiesel Production: Using Microalgae Isolated From Different Locations of Pune City

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**Abstract:** Samples of microalgae were collected from different locations of Pune city of Maharashtra state, India (Latitude 18.5203° N, Longitude 73.8567° E). A single microalgae isolate was selected based on its morphology and ease of cultivation at our test conditions. By further microscopic analysis this culture was identified as a strain of Chlorella vulgaris. Media optimization was carried out. It was seen that Chlorella showed best growth in Modified Chu's10 medium. The isolated organism was further cultured and examined for chlorophyll content, total carbohydrate content using Phenol sulphuric acid method and Total Protein content using Folin-Lowry protein assay. For the determination of lipid content Nile red staining method was used. Lipid content was found to be maximum at 25<sup>th</sup> day of growth. Further it was seen that highest lipid accumulated at 8th concentration of nitrogen limitation. Biodiesel was extracted by direct trans-esterification method. Cow dung can be used as a cheap source for large scale production of microalgae.

Keywords: Microalgae, Chlorophyll estimation, Biomass estimation, Lipid extraction, Nile red, Biodiesel.

# Comparative study and Statistical analysis to evaluate microbial load of various suture materials after open flap debridement

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Abstract: Surgical site infections (SSIs) are infections occurring within 30 days after a surgical operation which can cause prolonged illness. SSI occurs when pathogenic organisms proliferate in the wound. This study focuses on comparative analysis of various suture materials (to stitch a row/series of stitches holding together the edges of a wound or tissue or surgical incision together) used for open flap debridement. Four types of sutures have been used in this study viz. MERSILK, VICRYL, ETHILON, ePTFE. These are compared for plaque accumulation, wound healing, bleeding in the operated area and microbiological analysis. There was a significant decrease in microbial count in case of Ethilon, whereas no significant difference was observed in the remaining three. Out of four different types of sutures, MERSILK and VICRYL sutures have shown more plaque accumulation and uncountable microbial growth (>400). A microbial load of 2\*107/ml was observed in case of ETHILON but mild tissue irritation was observed due to its sharp ends. The load of ePTFE was comparatively higher as compared to MERSILK and VICRYL which is 200\*10<sup>7</sup>/ml and 240\*10<sup>7</sup>/ml respectively. Statistical analysis was done of the data obtained for microbial load and standard deviation was calculated, which was found to be for MERSILK- 1.0055, VICRYL- 0.3225, ETHILON- 0.2635, ePTFE-0.1874 . Biofilm formation on different types of sutures was studied which is an indication of role of sutures in causing SSIs. Hence it can be inferred from this study that the traditional suture materials can be replaced by antimicrobial sutures which may promise less SSIs.

### Insectivorous Toad Duttaphrynusmelanostictus digests Chitin by using Bacterial chitinase

#### R. N. Parde, O.U. Kinkar and T.B. Sawant, N.R. Shaikh

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**Abstract:** The gastrointestinal tract of animals is adapted to their primary source of food to optimize resourceuse and energy intake. Duttaphrynusmelanostictusmainly feed on arthropods such as earwigs, grasshoppers, crickets, moths and butterflies etc. These arthropods consist of up to 75% chitin, the energy-rich carbohydrate chitin, which is indigestible for the endogenous enzymes of a typical gastrointestinal tract. However, the gastrointestinal tract of toad species adapted to their diet and be able to digest chitin. Chitinase has wide application in agriculture, pharmaceutical industries and waste treatment. Chitinase breaks down complex chitin into smaller oligomers. This ability of toad species is due to presence of chitinolytic bacteria in their digestive tract. In this present study Chitinolytic bacteria were isolated from stomach (p<sup>H</sup>- 3.5) as well as from intestine (p<sup>H</sup>- 8.5) of Toad. Chitinaseproducing bacteria were isolated using colloidal chitin agar and the isolates were characterized and identified. This paper presents results of characteristics of chitinolytic bacterial isolates obtained from gut flora of the toad. Further studies on bacterial isolates is in progress. **Keywords:** Chitin, Bacterial Chitinase, chitin degradation.

## Replacing Synthetic Food Preservatives with Natural Antimicrobial Food Preservatives – A Feasibility Study for Small Scale Industries

#### Patil.Y.S. and Barabde R.B.

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**Abstract:** It has been reported that the naturally occurring antimicrobial compounds could be applied as food preservatives to not only protect food quality but also extend the shelf life of foods and beverages. Since, these compounds are naturally produced and isolated from various sources, including plants, animals and microorganisms (in which they constitute part of host defence systems), they are safer. Many naturally occurring compounds, such as nisin, plant essential oils, and natamycin, have been widely studied and are reported to be effective in their potential role as antimicrobial agents against spoilage and pathogenic microorganisms. However, their utility as well as use in the food products manufactured by the small scale industries is not known. Since, this is an unorganized sector, which is not governed with stringent rules, there appears a higher risk of food borne diseases as function of consumption of these products. In view of above, a feasibility study was carried out to know the existing use of synthetic as well as natural antimicrobial preservatives by the small scale industries in the study area. The data collection was carried out by following survey methodology. Though some of these natural antimicrobials are commercially available and applied in food processing, their efficacy, consumer acceptance and regulation are not well defined with respect to the study area. The results indicate that there is very low awareness amongst the small scale industries regarding the use of natural antimicrobial preservatives.

Keywords: natural antimicrobial compounds, food preservatives, food quality, shelf life of foods

### "Biotreatability studies on the Dairy effluent using cement-concrete biocontactor"

#### M.A. Patil and N.R. Shaikh

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**Abstract:** This paper investigates the effectiveness of a bio-contactor filter for the treatment of effluent produced by a dairy, manufacturing dairy products. First a bio-contactor column with a height of 30×20 cm was packed with cement sand from building construction waste. The contactor column was aerated using air lift circulation from bottom to top. This helped to maintain aerobic condition throughout column. The contactor was set initially by aerating the effluent for 20 days. After the microbial flora was developed on the blocks,fresh dairy effluentwas added to column for treatment. The treatability was determined by carrying out analysis of BOD, COD, total nitrogen, TS, TDS, TSS and OD before and after treatment. The studies also include optimization of aeration rate and retention time. Aeration time of 10 lit of air per 31.20 min with retention time of 24 hrs gave maximum reduction in COD and BOD. Results show that the average chemical oxygen demand (COD) and biological oxygen demand(BOD) and total nitrogen decreased effectively using biocontactor developed on cement concrete waste material.

Keywords: Dairy waste, Bio-contactor, cement-concrete sand.

## Studies on PGPR of saline soil

**Rane Supriya M.<sup>1</sup> and Pawar Sunil T.<sup>2</sup>** <sup>1</sup>Department of Microbiology, T.C. College, Baramati- 413102 <sup>2</sup>Savitribai Phule Pune University Pune, Maharashtra, India

**Abstract:** Salinity of soil is a severe problem for agriculture system. Salt stress affects the growth of plant by ionic imbalance, hyper osmotic condition in plants. Use of chemical fertilizers and continuous irrigation increase salt concentration in soil. Biofertilizers are ecofriendly and have been proved to be effective and economical alternative to chemical fertilizers with lesser input of capital and energy. Bacterial inoculants play very important role in increasing soil fertility and plant growth promotion. Plant growth promoting rhizobacteria (PGPR) is known biofertilizer which fixes atmospheric nitrogen, reduce plant pathogen in rhizosphere, produce IAA, siderophore, solubilize minerals and produce phytohormone. PGPR with ability to survive in higher salt condition were isolated from different regions of Baramati taluka. Isolates were found to be Rhizobium leguminosarum and Azatobacter vinelandil were used for detailed study of their growth promotion activity. Study of PGPR isolates on Trigonella foenum pot assay was carried out. Rhizobium, Azatobacter and vermicompost were used as inoculants for vegetative study of Trigonella foenum in pot assay. PGPR shows increased soil fertility resulting in slightly decrease in electrical conductivity of soil and increasing nitrogen content of leaf. Statistical analysis shows that treatment number 5 and 6 are better for soil fertility and plant growth promotion.

Keywords: PGPR, salinity, soil fertility, plant growth promotion.

## Industrially and Pharmacologically Important Biocolour (Pigment) Production from Soil Bacteria

#### P.B. Konkeri and T.B. Sawant

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Abstract: The natural pigments of microbial origin are of great interest owing to the stability of pigments and the availability of cultivation technology. There is a growing interest in microbial pigment due to their natural characters, medicinal properties, and industrial application. They are safe and less expensive too.Production of pigment, being independent of seasonal and geographical conditions, can give controllable and predictable yield.Microbial pigments are promising alternative to synthetic colour in food, texile and many more industries. Bacterial pigments are having better biodegradability and higher compatibility than other naturally occurring pigments from plants and animals. In these studies, pigment forming bacteria were isolated from soil samples collected from marshy place, garbage area and cultivated land. Colonies of various colours such as yellow, golden yellow, red and brown with diffusible and non diffusible pigments were isolated and purified on nutrient agar with 2% glycerol incubated at 25°C for 48-72 hours.Totalof 10 isolates ofpigment forming bacteria were isolated from soil and identified to genus level as Xanthomonas, Staphylococcus, Serrratia, and Rhizobium. Production and extraction of pigment was done by broth culture technique. Biocolour obtained from the extraction is having antibacterial activity and it is also tested for its Minimum Inhibitory Concentration (MIC) against common human pathogens, thus the biocolours can be a potent alternative to the antibiotics as well.Further studies on biocolours for different industrial applications are in progress. Keywords: Bacterial pigments, Biocolour production.

## Studies of sodium dodecyl sulfate degradation by Acinetobacter

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**Abstract:** Over use of Sodium dodecyl sulfate in domestic product and in various industries and its disposal in water leads to Environmental concern SDS found to toxic for fishes and human beings .In fishes morphological Changes in kidney and spleen as well as behavioral changes are observed .there is need of biodegrading of detergents into harmless products Acinetobacter showed its potential to degrade 83.4% SDS .screening was done using Methylene Blue active substance assay .Bioflocculant property of exopolysaccharide of Acinetobacter was found to be useful in aggregation of SDS which can be subsequently removed .Alkylsulfatase enzyme involved in primary degradation of SDS were extracted .Activity of enzyme was determined using MBAS assay and found to be 83.4%. alkylsulfatase activity was determined. **Keywords:** Acinetobacter, SDS, alkylsulfatase enzyme,

## Bioremediation of plastic waste by thermophilic actinomycetes

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**Abstract:** The thermophilic actinomycetes Microbispora sp.V2 strain was screened for degradation of synthetic polymers used in plastic manufacturing industry. Screening was done by growing the culture on Caprolactam generated as degradation product of Nylon-6. Owing to the polluting and toxic nature of caprolactam, its removal from waste streams is necessary Quantitative analysis of residual caprolactam was done by Chemical Oxygen Demand and Total Organic Carbon methods. Reduction in COD value and increase in TOC value in artificially generated waste water showed potential of Microbispora sp.V2. Degradation of Nylon 6 membrane was also analyzed using minimal broth containing Nylon 6 as only carbon source and degradation was evaluated based on scanning electron microscopy.

Keywords: Microbispora sp.V2, actinomycetes, caprolactam, Nylon-6, chemical oxygen demand, total organic carbon

### Endophytic studies of important plants and their antimicrobial activity

#### Pravin Swami and Danai-Tambhale S.D. and Shinde S.D.

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**Abstract:** Endophytes are symbiotic microbial organisms that inhabit the interior of plants without causing an apparent harm to the host. Present proposed work includes antimicrobial activity of endophytic fungi isolated from Gymnemasylvestre andPunicagranatumagainst human pathogens. Studies on screening and identification of endophytic fungi isolated from various parts of plant body. The antibacterial activity was carried out against E.coli, S.aureus and Bacillus subtilis. Findings strongly suggested that metabolites of endophytic fungi fromGymnemasylvestre and Punicagranatum could be a good potential source of bioactive natural products against some bacteria. These entophytes can be used for various microbes'inhibition purpose and can be act as biocides.

Keywords: Endophytic fungi, Gymnemasylvestre, Punicagranatum, antimicrobial activity.

## **Isolation of Bacteria Producing Biosurfactant from Lonar lake**

#### **R.S.Awasthi<sup>1</sup> and Rupali Shinde<sup>2</sup>**

<sup>1</sup>Principal Of Shivaji Mahavidhyala - Renpur and Research guide of Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

#### <sup>2</sup>Research Scholar of Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

**Abstract:** In the present studywater and soil sample from lonar lake was collected. Lonar lake is a worlds third largest impact creature situated in Buldhana district. Maharashtra. A soil collected from lonar lake having pH9.99.  $10^3$  and  $10^4$ soil Dilution was used for further examination. Mineral salt medium was used for the enrichment of sample. After enrichment, MSM coated oil plates was prepared and streaked out by enrichment medium. Growth was observed after 48hrs. oil degrading colonies were used for the production of biosurfactant. Gram +ve rods was found as a positive organism for the production of biosurfactant. Confirmation of biosurfactant was done by following indicative tests i.e. E24 index test, oil spreading testand foaming activities .Identification of Bacteria is under contruction.

Keywords: Biosurfactant, Lonar lake, E-24 index, oil coated plates.

### Studies on PGPR of saline soil

**Rane Supriya M.<sup>1</sup> and Pawar Sunil T.<sup>2</sup>** <sup>1</sup>Department of Microbiology, T.C. College, Baramati- 413102 <sup>2</sup>Savitribai Phule Pune University Pune, Maharashtra, India

Abstract: Salinity of soil is a severe problem for agriculture system. Salt stress affects the growth of plant by ionic imbalance, hyper osmotic condition in plants. Use of chemical fertilizers and continuous irrigation increase salt concentration in soil. Biofertilizers are ecofriendly and have been proved to be effective and economical alternative to chemical fertilizers with lesser input of capital and energy. Bacterial inoculants play very important role in increasing soil fertility and plant growth promotion. Plant growth promoting rhizobacteria (PGPR) is known biofertilizer which fixes atmospheric nitrogen, reduce plant pathogen in rhizosphere, produce IAA, siderophore, solubilize minerals and produce phytohormone. PGPR with ability to survive in higher salt condition were isolated from different regions of Baramati taluka. Isolates were found to be Rhizobium leguminosarum and Azatobacter vinelandil were used for detailed study of their growth promotion activity. Study of PGPR isolates on Trigonella foenum pot assay was carried out. Rhizobium, Azatobacter and vermicompost were used as inoculants for vegetative study of Trigonella foenum in pot assay. PGPR shows

increased soil fertility resulting in slightly decrease in electrical conductivity of soil and increasing nitrogen content of soil. PGPR shows overall plant growth promotion, as enhanced shoot length, root length and total nitrogen content of leaf. Statistical analysis shows that treatment number 5 and 6 are better for soil fertility and plant growth promotion.

Keywords: PGPR, salinity, soil fertility, plant growth promotion.

## "Insectivorous Toad Duttaphrynusmelanostictus digests Chitin by using Bacterial chitinase"

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Department of Microbiology, YashawantraoChavan College of Science, Karad, Vidyanagar- 415124, Karad, Maharashtra India

**Abstract:** The gastrointestinal tract of animals is adapted to their primary source of food to optimize resourceuse and energy intake. Duttaphrynusmelanostictusmainly feed on arthropods such as earwigs, grasshoppers, crickets, moths and butterflies etc. These arthropods consist of up to 75% chitin, the energy-rich carbohydrate chitin, which is indigestible for the endogenous enzymes of a typical gastrointestinal tract. However, the gastrointestinal tract of toad species adapted to their diet and be able to digest chitin. Chitinase has wide application in agriculture, pharmaceutical industries and waste treatment. Chitinase breaks down complex chitin into smaller oligomers. This ability of toad species is due to presence of chitinolytic bacteria in their digestive tract. In this present study Chitinolytic bacteria were isolated from stomach (p<sup>H</sup>- 3.5) as well as from intestine (p<sup>H</sup>- 8.5) of Toad. Chitinaseproducing bacteria were isolated using colloidal chitin agar and the isolates obtained from gut flora of the toad. Further studies on bacterial isolates is in progress.

Keywords: Chitin, Bacterial Chitinase, chitin degradation.

## Biosynthesis of metal nanoparticles by endophytes isolated from Amaranthus spinosus

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**Abstract**: Endophytes are defined as the micro-organisms which complete a part of their life cycle within a plant. In the present study Amaranthus spinosus, a relatively less characterized weed was used for isolation of bacterial, fungal and actinobacterial endophytes. Amaranthus spinonsus is an annual troublesome weed heavily impacting the rice fields. Bacterial isolates were obtained from within the root, stem and leaf of the plant and prominent cultures were used for study. Three fungal isolates and two actinobacterial isolates were obtained from within the root. The isolates were used for the synthesis of metal nanoparticles and plant growth promoting hormones. Synthesis of gold and silver nanoparticles was performed using the above isolates with some cultures showing higher efficiency.

Keywords: Amaranthus spinosus, Endophyte, Nanoparticle.

## **Isolation and Identification of Chromobacteria from Various Sources**

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**Abstract:** Pigments are molecule that have colour. Some bacteria produce pigment as part of their normal metabolism including black, white, brown, golden, silver, florescent green, yellow or blue. The specific colour of the pigment is characteristic for bacterium, pigmented bacteria will form cultures that exhibited some colour. They display all colors from rainbows. The microorganisms such as Staphylococcus aureus, Serratia marcens, Pseudomonas aureginosa, Sarcina maxima, Micrococcus roseus, Micrococcus leteus etc. produce large number of pigments, these chromobacteria were isolated from various sources and identified. An ideal pigment producing microorganisms should be capable of using a wide range of Carbon and Nitrogen source, have tolerance to pH, temperature and minerals and give reasonable color yield. **Keyword:** Chromobacteria, Bacterial pigment

## Study of antimicrobial properties of indigenous strain of edible mushroom Agaricusbisporus

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Abstract: Infectious disease remains one of the major threats to human health. Although a number of natural synthetic antimicrobial agent have been isolated and developed to kill pathogenic microorganism effectively. Global antimicrobial resistance is an increasing public health problem. A various specific plant has continued to be an important therapeutic aid for alleviating to elements of humankind. Therefore novel antimicrobial agents from different biological sources are continuously sought. There is a renowned interest in traditional medicine and an increasing demand for more drugs from plant sources. Edible mushroom serve as a source of antioxidant and nutraceuticals. Study was carried out for qualitative analysis of antimicrobial compounds present in the edible mushroom and its antimicrobial action against human pathogen. Agaricusbisporus contains phytochemicalsviz, proteins, amino acids, carbohydrates, alkaloids, saponins and triterpenoids in both water and ethanolic extract. Aquaeous and ethanolic extract of Agaricusbisporus showed antimicrobial action against Bacillus cereus, Klebsiellapneumonie, E. coli and Psedomonasaeruginosa. Therefore Agaricusbisporuscould be consider to play an important role as a natural antioxidant and antimicrobial agent in food industry and pharmaceuticals.

Keywords: Mushroom, antimicrobial activity, pathogens.

## Heavy Metals Tolerance of Actinomycetes Isolated From Various Soil Sample

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**Abstract:** Heavy metals in soil affect microbial diversity as well as plant growth. Heavy metals such as Pb, Cd, Hg etc. which have no biological role but are toxicand detrimental even at very low concentrations. In the present study salts of heavy metals like Cu, Cd, Cr, Hg, Mn, Ni, Pb and Zn were added in Casein starch agar (CSA) under laboratory conditions with different concentrations (10,50, 100, 250 and 500 mM). In this experiment 30 isolates of Actinomycetes were checked for metal tolerance against heavy metal using Agar well diffusion and tube dilution method. Casein starch agar (CSA) media with heavy metals such asCuSO<sub>4</sub>, ZnSO<sub>4</sub>, Pb (CH<sub>3</sub>COO) <sub>2</sub> was used in this study. Out of 30 isolates A and T showed maximum tolerance till 250 mM of CuSO4 and ZnSO4. While isolate A showed resistance at 500 mM of CuSO4 and ZnSO4. Isolates Bf2,Bf3,Bf4,Bf12,H1,H2,WB,T2 showed maximum tolerance till 10 mM concentration of Pb. Use of bioinoculants is limited by presence of heavy metals in soil as they are unable to survive under such condition .So this study shows use of actinomycetes consortia as a bioinoculant for the soil containing heavy metals. Further, experimentation is needed to check efficiency of organisms as bioinoculant at field level. **Keywords:** Actinomycetes, Casein Starch Agar (CSA), Heavy Metals

# Isolation, Identification and characterization of siderophore isolated from actinomycetes of rhizosphere soil near Pune region.

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**Abstract:** One of the most strategies for iron uptake in aerobic environment is with the synthesis and excretion of low molecular weight chelators called as Siderophore. They have high affinity for Fe<sup>+++</sup>. Siderophore producing bacteria help the plant to uptake iron in iron stress condition while present in the rhizosphere. Present study deals with the isolation, screening and characterization of siderophores produced by actinobacteria for plant growth promotion. Out of 33 actinobacteria, 12 isolates were producing siderophore. Screening for siderophore production was carried out by the universal Chrome Azurol S assay (CAS).Ferric chloride test and Tetrazolium tests were used for detection and confirmation of hydroximate type of siderophore respectively. Characterization of siderophore was carried out using TLC. Quantitation of siderophore was carried out using CAS shuttle assay. Quantitave estimation of siderophore by CAS shuttle assay revealed the yield in the range of 58- 82 % siderophore units. Promising isolates were used for seed germination and plant growth promotion. Pot assay using the isolates with maximum siderophore production proved promiscuous candidates for the growth promotion of Chilli and Tomatoes. Anatomical study of root revealed faster rate of development of conductive tissue compared to control. There is also remarkable increase in root, shoot and biomass of inoculated plants. So this study revealed potential of actinobacteria as bio-inoculants for iron deficient soil. **Keywords:** Sederophore, tetrazolium test, actinobacteria

## Antimicrobial activity of toothpaste on commonly occurring

## microorganisms in mouth

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Abstract: Toothpaste is available in the Indian market in two forms viz. gel and paste. It is used with toothbrush to clean teeth. Due to its mechanical and abrasive action it removes tarter, dental plaques, and gum infections like gingivitis. It also maintains oral hygiene. Various artificial chemicals and herbal extracts are added to the paste These include Salt, Sodium bicarbonate ( baking soda), clove, lemon, active carbon, borate, mint, triclosan, sodium fluoride, surfactant , flavorants, colours, sugar, potassium nitrate, eucalyptus oil, whitener, polishing agent, cinnamon, and burnt alum. Toothpaste is not supposed to be swallowed due to the fluoride content. Mouth has its own normal microflora. It is built after childbirth progressively. However many pathogenic bacteria, fungi and viruses may enter the mouth unknowingly through contaminated air, food and water, These pathogens must be removed after every time one eats food. This can simply be done by applying oral mouthwash or toothpaste, Present study includes work to check: whether the toothpaste itself is a potent source of pathogens? Whether various ingredients in the paste are really active? Which paste is better in removing the pathogens from the teeth? Our observation is that many pathogens like Staphylococcus sp. were present in the toothpaste.

Keywords: Toothpaste, Oral hygiene, Pathogens, Active ingredients, Antimicrobial action.

## Isolation and characterization of PGPR from rhizoplane and roots of Ficus religiosa growing on concrete walls and its effect on plant growth in drought conditions

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**Abstract:** Plant growth promoting rhizobacteria (PGPR) are natural soil bacteria inhabiting rhizosphere, rhizoplanes and roots of plants, promoting plant growth by a variety of mechanisms. Ficus religiosa growing on concrete walls or rocks experience stress condition, hence rhizobacteria of such plants may get acquainted to such adverse conditions to support plant growth. 30 samples of roots of Ficus religiosa were processed and screened for isolation of PGPR and 48 different microorganisms were isolated. These isolates were characterized for their ability to produce plant growth hormones like IAA , siderophores, ability to solubilise Zinc, potash and phosphate. To check antagonistic effect of these rhizobacteria, HCN productions was also checked. Out of 48 isolates, 5 isolates were used for seed germination plate assay and pot test . The ability of rhizobacteria to support plant growth in drought condition was checked in pot test.

### **Biocontrol of Various Fungi with Plant Derived Oils**

#### Shirurkar D.D and Sherkar S.D.

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**Abstract:** Fungi are significant destroyers of foodstuffs and grains during storage, rendering them unfit for human consumption by retarding their nutritive value and often by producing mycotoxins. A significant portion of the agricultural produce in the country and the world over become unfit for human consumption due to mycotoxins contamination of grains. Thus, there is a need to search for alternative approaches to store grains/cereals for human consumption without toxicity problems that are ecofriendly and not capital intensive. Plant derived oils have been reported to exhibit antibacterial, antifungal and insecticidal properties under laboratory trails. Plant derived oils were tested for inhibitory activity against fungal infection and mycelium growth in post-harvest maize grains during storage. It was observed that the oils of Nilgiri controls mycelium growth if A. oryzae while clove oil recorded significant antifungal activity against Aspergillus niger, A. oryzae, Al.flavus and A.terrus as well as Fusarium solani and F.verticilliod. Mustard oil and Caster oil were could not check mould growth.

## Water Quality Index of Tapti River in Burhanpur District.Madhya Pradesh, India

#### Sheetal Patel and M. Musaddiq

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S.)

**Abstract:** Tapti River of Burhanpur district is Major River. River is under constant threat of pollution by floral wastes general on account of pilgrimage agricultural runoff, derange from cities, cattle grazing, fecal contamination and washing of clothes by ladies. The present study is aimed to assessing the Water Quality Index (WQI) of Tapti River by using physicochemical analysis. The present study fifty water samples (Ten water samples from one village) are taken from five different villages of Burhanpur are have been considered:  $p^{H}$ , The physicochemical parameters which were analyzed include  $P^{H}$  Calcium hardness, Magnesium hardness, Total hardness suspended solids alkalinity, Sulphate, Nitrate, Dissolved Oxygen BOD and COD to calculate

Water Quality Index(WQI). The WQI of these samples ranges from 38.73 to 53.34. The analysis reveals that the river water in Burhanpur district need some treatment before consumption and to protected from contamination. **Keywords:** Tapti River, Water quality index, physicochemical parameters.

## Optimization for the production of cellulase enzyme from soil by the Aspergillus niger

#### Shilpa Lokhande and M.Musaddiq

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**Abstract:** The main objective of the study is to explore easier and cost effective method to produce the cellulase enzyme by fungi. In the present investigation, we aim to isolate the novel cellulase producing fungi, Aspergillus niger from soil and to optimize the physicochemical parameters for cellulase production. Optimum temperature and pH of the medium for the cellulase production by Aspergillus niger was 45° C and 6.5.Carbocxy methyl cellulase serve as a best carbon source for Aspergillus niger. Cellulase production from Aspergillus niger can be an advantagious as the enzyme production rate is normally higher as compared to other fungi.

# Antimicrobial properties of Carica Papaya (Papaya) leaf extract against different Bacteria.

#### Shinde Shubhangi R.

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Abstract: Many herbal remedies individually or in combination have been recommended in various medical expositions for the cure of different diseases. Free radicals are used for many diseases including diabetes, arthritis, cancer, aging etc. In the treatment of these diseases, antioxidant therapy has gained most importance. Now days there have been an increased interest to identify antioxidant compound that are pharmacologically potent and have low or no side effects. As plants are rich sources of natural oxidants, much attention has been given to plants. Medicinal plants represents a rich source of antimicrobial agents. Besides nutritional values, Carica Papaya has antibacterial potentials. This study evaluates the antibacterial potentials of different leaf extracts of papaya plant, in comparison with standard drugs. Dried and grinded papaya leaves were mixed with extraction solvent (water, ethanol, acetone, petroleum ether) for 24 hrs and were used for this study. The compounds were filtered and were used for inoculation in different mediato verify the sterility of the solutions for utilization. Result showed high antimicrobial activity for extract of C.papaya in petroleum ether with minimum inhibitory concentration for the standard drugs. The antimicrobial activity for extract of C.papaya leaves can be used in medical applications.

Keywords: Antimicrobial properties, Carica Papaya, antioxidants, pharmacologically potent.

## Study of antimicrobial properties of Mentha arvensis(L).

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Abstract: Natural products provide one of the most important sources for development of novel therapeutics in the area of infectious disease. Mentha shows antibacterial, antiseptic, antifibrile and slightly anesthetic activity. The Pudina contains menthol, menthone, menthyl acetate, pulegone. The present work was designed and carried out for the investigation of antimicrobial potential of Mentha arvensis L. leaf extracts. Plant extract were prepared in menthol, ethanol and ethyl acetate by cold extraction method and evaluated for above mentioned effect. To check antimicrobial activity of M. arvensis leaf extract against skin pathogen, two organisms were isolated from pus in acne were isolate 1 and isolate 2 The antimicrobial activity of each extract was screened against isolated organisms using agar by agar well diffusion method. Using thin layer chromatography the separation of compounds of extracts was done. The silica gel plates were further processed for Bioautography. Using standard extracts. Ethanol and methanol extracts of M. arvensis showed antimicrobial activity against both the organism cultures and ethyl acetate extract of M. arvensis shows antimicrobial activity against organism culture 1. The phytochemical and FTIR analysis shows presence of alkaloids, flavonoids, saponins in extract.

Keywords: M. arvensis Linn, antimicrobial activity, Phytochemicals.

# Qualitative phytochemical screening, TLC profiling and FTIR analysis of leaves extracts of Mentha arvensis L.

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**Abstract:** Mentha arvensis L. belonging to family Lamiaceae, is extremely useful in traditional system of medicine for various ailments. The present study was aimed to analyze phytocompounds with functional groups in M. arvensis L. leaf extracts using TLC and FTIR spectrometry. The preliminary phytochemical analysis of the ethanol, methanol and ethyl acetate extracts of M. arvensis leaves revealed the presence of flavonoids, alkaloids, tannins, steroids, phenolic compounds, glycosides and sugars. TLC analysis revealed 7 different Rf values indicating the presence of diverse groups of phytocompounds. The FTIR spectrum exhibited characteristic absorption peaks identifying presence of different functional groups such as alkenes, phenolic compounds, alkanes, aldehydes, alkyl halides, aromatics and carboxylic acids. The results of present study suggest that M. arvensis leaves possessing various bioactive compounds can act as a potential source of useful drugs in the treatment of various ailments.

Keywords: Mentha arvensis L., phytocompounds, FTIR, functional groups, bioactive compounds.

# Qualitative analysis of external rind of Allium cepa and Pisumsativum to obtain value added products.

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Abstract: Food wastes are generated by a variety of process ranging from Agricultural operation of household consumption. This valorisation can be achieved through the extraction of high value components such as Protein, Polysaccharides, Fibre, Flavour components, Resins, Tannin, and Phytochemical which can be reused as nutritionally and pharmacologically functional ingredients. Qualitative phytochemical screening of Allium cepa and Pisumsativum rind extract was studied. Qualitative analysis for plant acid and phenol and phenolic compound were achieved by using Thin Layer Chromatography. For other phytochemical analysis, powder plant extract were subjected to qualitative chemical analysis .It was found Quinones, Flavonoids, Tannins, Resins ,Phenols were found in Allium cepa and Pisumsativum. Hence, value added products can be generated from Allium cepa and Pisumsativum.

Keywords: Phytochemical, TLC, Qualitative analysis.

## Development of Bioinsecticides against Spodoptera Frugiperda Using Chitnolytic Bacteria

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**Abstract:** The products chitinase are increasingly finding applications in various fields such as biomedicine, agriculture. Chitinase bring about hydrolysis of chitin which is widely distributed in cell wall of fungi, plants and insects. An attempt has been made to use chitinase producing bacteria for development of aBioinsecticides againstSpodoptera frugiperdawhich feeds on over 60 species of plants and is a periodic.But it is serious pest of maize, rice, sorghum, turf grasses, cotton, and peanuts, etc. In this attempt enrichment and isolation of chitinase producing bacteria from soil was carried out and isolates were examined for potential producing chitinase and killing the larvae of Spodoptera frugiperda.

Keywords: Bioinsecticides, Chitinase, Spodoptera frugiperda

## Bioprospecting of endophytes from indigenous medicinal plants for plant growth promoting activities and biotechnological applications

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**Abstract:** Endophytes are endosymbionts that live within plants without causing disease. They are important as they produce compounds that can enhance plant growth (PGPR) or enzymes with biotechnological applications. They may contribute to the production of medicinal compounds by medicinal plants. Roots of the indigenous medicinal plants Chaai, Tamboli and Kalalaavi were used for the isolation of bacterial endophytes. Twenty bacterial endophytes were isolated. Of those screened, some produced plant growth promoting compounds such as IAA or enzymes having biotechnological applications such as amylase, cellulase, gelatinase, chitinase and protease. These endophytes were further characterized.

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Keywords: Endophytes, PGPR, IAA, enzymes, bioprospecting, medicinal plants

## Hematological Study of Neonatal Septicemia

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**Abstract:** Septicemia in neonates refers to generalized bacterial infection documented by positive blood culture in the first four weeks of life and is one of the four leading causes of neonatal mortality and morbidity in India, so the study is carried out by taking 65 neonates blood samples which were proceed by blood culture and sepsis screening by hematological test, total 38 samples were found to be blood culture positive and in the screening of proven cases abnormal values were seen in total leucocytes count 30 (46.1%), Neutrophils count 33 (50.7%), Hemoglobin level 22 (33.8%), Platelet count 24 (36.9%) positive C-reactive protein was seen in 32 (49.2%), rise ESR level 28 (43%). The results showed that abnormal TLC count, Neutrophil count and positive CRP were significantly associated with blood culture proven septicemia.

Keywords: Neonatal Septicemia, neonatal blood, hematological screen.

## Effect of sucrose concentration on biofilm formation by oral microflora

#### Sonia V. Ambade

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**Abstract:** The aim of this study is to check the effect of different sucrose concentrations on oral bio-film forming bacteria. A biofilm is a complex aggregation of micro–organisms growing on a solid substrate. Oral microbial-plaque communities are biofilms composed of numerous genetically distinct types of bacteria that live on host surfaces. It is now recognized that biofilm formation is an important aspect of many diseases, including dental caries. In present study, oral microorganisms were isolated from local dental plaque samples. The identified nine isolates and six standard cultures were screened for their ability to form biofilm by microtitre plate method. All fifteen organisms were exposed to four different 1%, 2%, 3% and 4% sucrose conctrations. The quantitative amount of biofilm formed was measured by taking absorbance using ELISA reader. The result shows that biofilm formation increases with increase in concentration of sucrose.

Keywords:, Oral micro-organisms, Oral diseases, Biofilm, Dental caries

# Synthesis and Characterization of Zeolite-A from Fly ash and use as a remediating tool for removal of heavy metals and color from synthetic waste water

#### Sonia Varandani and PradnyaPrabhu

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**Abstract:** Fly ash resulted from coal burning is a waste that can be used in wastewater treatment for removal of dyes and heavy metals by adsorption. In this study fly ash collected from a thermal power plant in Maharashtra was hydrothermally modified with NaOH and NaAlO<sub>2</sub> to synthesize zeolite A. This new zeolite A was characterized with respect to by surface structure (XRD, BET), composition (FTIR), and morphology (SEM), and was found to have good adsorption capacity for dyes and heavy metals from synthetic waste water. Contact time, optimum amount of substrate zeolite A were the parameters optimized for obtaining the maximum efficiency in the adsorption process. The results indicate that the novel substrate composite with modified fly ash can be used as an efficient and low cost adsorbent for simultaneous removal of dyes and heavy metals. It is expected that this methodology can be extrapolated for purification of effluents to a level that meet discharge regulations.

Keywords: Fly ash zeolite, Hydrothermal synthesis, Dyes, Heavy metals, XRD, FTIR, BET, SEM

## Bio efficacy of plant essential oils against drug resistant bacteria from Mutha river

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**Abstract:** Antibiotic charged environment is a selective pressure that favours the emergence of resistance in bacteria. Spread of drug resistance among bacteria is a major concern and alternative therapies have gained great importance in limiting this. Plants have been used in therapeutic purposes and are in greater demand as they are known to have fewer side effects. The study focussed on isolating antibiotic resistant bacteria from Mutha river, Pune. Mutha river is very diverse in its aquatic ecosystem. Pollution due to various factors has caused an imbalance in this natural ecosystem. The study deals with isolation of bacteria present in Mutha river and

determining their antibiotic resistance profile. The antibiotic resistant profile of isolates was determined by antibiotic susceptibility test using broad spectrum antibiotics. 21 pure isolates were obtained of which, 12 were identified by MALDI-TOFF and two were further identified by 16s rRNA gene sequencing. Two strains of Klebsiella pneumoniae were found to be resistant to more than three antibiotics. The study also included use of natural resources that is plant oils- Eucalyptus globulus and Brassica napus as a potential therapeutic agent against these antibiotic resistant bacteria. Eucalyptus globulus showed more antibacterial activity compared with Brassica napus. The phytochemical analysis of Eucalyptus globules essential oil showed the presence of secondary metabolites such as of alkaloids, steroids and phenolics.

Keywords: antibiotic resistance, Klebsiella pneumoniae, Eucalyptus globulus, Brassica napus, therapeutic agent

### Antibacterial activity of silver nanoparticles synthesized from Buttermilk

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Abstract: Buttermilk consists of approximately 91% water and contains about 9% total solids like (Casein, whey proteins, MFGM proteins) present in milk.Dairyproteins like milk fat globule membrane (MFGM) found in buttermilk contain antimicrobial peptides such as lactoferrin and  $\alpha$ s2-casein.Lactic acid bacteria in buttermilk also have a proteolytic activity and capacity to produce such peptides, e.g., a starter culture containing a Lactobacillus helveticus strain has been reported to produce bioactive peptides. Milk peptide activities include binding to opioid receptors, inhibition of angiotensin converting enzyme (ACE) 6 and modification of antithrombotic and immune responses. The presence of antibiotics in the ecosystem induces the development of an antibiotic resistance mechanism in microbial communities. Hence, the synthesis of Silver Nano Particles (AgNPs) and their antimicrobial properties are emerging as areas of great interest among researchers. Accordingly, the objectives of the present study were to synthesize AgNPs using fresh buttermilk and filtered buttermilk, characterize them and to evaluate their antimicrobial activity. Addition of silver nitrate to fresh buttermilk andmembrane filtered buttermilk resulted in production of silver nanoparticles. The reduction of silver ion to silver nanoparticles was reflected in spectral data obtained by using a UV-Vis spectrophotometer. It shows an absorbance peak around 450 nm, which is specific for silver nanoparticles. The fresh buttermilk and membrane filtered buttermilk synthesizednanoparticles exhibited inhibitory activity against phyto-pathogenic Xanthomonasaxonopodis, and animal/human pathogens E. coli and S. aureus. Maximum antibacterial activity was found against X. axonopodis(20mm).Least activity was recorded against S. aureus(8mm).Present study revealed that fresh buttermilk and membrane filtered buttermilk have significant antibacterial activity against X. axonopodis, E.coli and S. aureus. Thus instead of using different chemicals that are very hazardous to environment, use of alternativebiocontrol agents motivates cost effective eco-friendly management of bacterial disease control in future.

# Phosphate and zinc solubilizing potential of Actinomycetes and its effect on wheat, maize, chili and tomato plants.

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Abstract: Phosphorus is one of the major essential macronutrients and Zinc is an essential micronutrient for plants. Majority of P in soils is fixed, and hence scarcely available to plant, despite the abundance of both inorganic and organic P forms in soils. P is applied to soil in the form of phosphate fertilizers. However, a large portion of soluble inorganic phosphate which is applied to the soil as chemical fertilizer is immobilized rapidly and becomes unavailable to plants. Phosphate-solubilizing bacteria (PSB) are group of soil bacteria capable of transforming insoluble P into soluble. Zn is required for the normal healthy growth and reproduction of crop plants. It acts as a cofactor for various enzymes. There are reports which reveal that Actinomycetes are able to solubilize phosphate. Present study aims to isolate efficient phosphate and zinc solubilizing Actinomycetes strains from different soil sample. Thirty three actinomycetes strains were isolated and characterized by microscopic characteristics and biochemical tests. These 33 isolates were screened for phosphate solubilization, zinc solubilization, ammonia production and HCN production. Out of 33 isolates, 15 isolates show phosphate and zinc solubilizing activity. 5 isolates namely A<sub>2</sub>, BF<sub>11</sub>, Br<sub>1</sub>, D and T<sub>1</sub> are positive for all selected PGPR traits. Pot assay were carried out using wheat, maize, chili and tomato seeds. All 5 isolates showing PGPR traits were used for pot assay. Optimum phosphate solubilization at different pH, temperature and incubation period was determined, which shows maximum solubilization activity at pH 7, temperature 28°C and incubation period of 15 days. The maximum increase in all plant shoot length was seen when seeds were inoculated with isolate A<sub>2</sub>. Isolate T<sub>1</sub> shows maximum phosphate solubilizing index (SI) and increase in root length for all plants. The

present study indicates that all the 5 isolates of actinomycetes species would play a major role in solubilizing the phosphate and zinc thereby enhancing the productivity of wheat, maize, chili and tomato crop. Keywords: Actinomycetes, Phosphate solubilizing bacteria, Zinc solubilizing bacteria, phosphate solubilizing index (SI), PGPR traits

## Production of Polyhydroxyalkanoate from bacteria isolated from oil contaminated soil sample of Osmanabad region

#### Tabssum A. Hamid Shaikh and R.M. Khobragade\*

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Abstract: Most of today's plastic is a growing problem across the country. Plastics are produced from petrochemicals which is non biodegradable in nature. Owing the hazardous effect of synthetic plastic, industry is looking into replacing our plastic which is not biodegradable with Polyhydroxyalkanoates (PHAs) because they are biodegradable polymers unlike current plastic. PHAs are currently being used in many industrial purposes such as packaging materials (mostly cosmetic containers and food packaging material), moisture barrier in sanitary towels and nappies etc. Total 40 isolates were collected from oil contaminated soil sample. By using Rapid screening method (Sudan Black B) only 4 isolates showed potent results, from which 3 isolates were inoculated in nutrient broth supplemented with 2% glucose and was incubated at 37°C. After 48 hrs of incubation bacterial cultures were collected by centrifugation and biodegradable plastic was extracted from bacterial strains by using sodium hypochlorite extraction method.

Keywords: Polyhydroxyalkanoates, bacteria.

## **Biodegradation of Dimethoate from pesticides contaminated agricultural** soil.

#### Ganvir V.N., Ashwini Udagi and Shweta Singh.

Waghire College Saswad

Abstract: Soil was collected from two different locations namely, Saswad and Baramati which was sprayed with Dimethoate for past few years. In vitro studies were carried out using nutrient broth inoculated with soil for enrichment and isolates were obtained using Davis Mangolis medium supplemented with Dimethoate (4ml/L).Pesticide degrading microorgnamisms were isolated and identified on the basis of morphology, biochemical tests and by using Bergey's manual of determinative bacteriology. The isolated organisms were belonged to Pseudomonas spp. Minimum inhibitory concentration and Minimum bactericidal concentration was determined for all isolates.TLC was performed to check pesticide degradation and degraded metabolites of the pesticide. The isolated organisms were subjected to different concentrations of Dimethoate i.e. 3%,11%,19%. All isolated Pseudomonas spp were found to degrade Dimethoate up to higher concentration( approx:- 19% in medium). This research work can help in bioremediation of pesticides contaminated agricultural soil. Keywords: Dimethoate, Biodegradation, Pseudomonas spp.

## Kinetic studyof cellulose induced β glucosidase and xylan induced β glucosidase and $\beta$ xylosidase of Aspergillus niger NCIM 1207.

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Abstract: Background: Aspergillusniger NCIM1207 produced high levels of extracellularß-glucosidase and ß xylosidase enzymes in submerged fermentation. Cellulose induced only  $\beta$ -glucosidase and xylan induced $\beta$ glucosidase as well as  $\beta$  xylosidase. Hyper production of  $\beta$  glucosidase and  $\beta$  xylosidase using Aspergillus niger NCIM1207 in xylan containing media was studied. It produced high levels of  $\beta$  glucosidase (19 IU/ml or 633IU/g of substrate ) and  $\beta$  xylosidase (18.7 IU/ml or 620IU/ml of substrate.(Khisti et al.2011).The extracellular ßglucosidases (cellulose and xylan induced and ßxylosidase ( xylan induced) were purified to homogeneity and studied.(Ujwala Khisti and DigambarGokhale ,2013). The substrate specificity studies of these three enzymes were performed. Also enzyme kinetic studies were performed using pNPG and pNPX as standard substrates respectively under normal assay conditions. Bothß-glucosidases showed highest activity with cellobiose by pNP- $\beta$ -D-glucopyranoside. The highest activity of  $\beta$ - xylosidase was obtained with xylobiose followed by oNP- $\beta$ -D-xylopyranoside and pNP- $\beta$ -D-xylopyranoside. In present study, the V max values forxylan induced  $\beta$  –glucosidase were high 1150mM/min/mg and 714mM/min/mg protein respectively. Thus the enzymes show good affinity towards pNPG and catalytically efficient and exhibited high kcat as well as kcat/Km values.

**Keywords:** A.niger,  $\beta$  glucosidase,  $\beta$  xylosidase.

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### Strain improvement of PHB producing isolate to increase the yield of PHB

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**Abstract:** Poly 3 hydroxybutyrate (PHB) are the most prominent member of the polyhydroxyalkanotes. One option is to produce truly biodegradable polymers, which may be used in the same applications as the exsting synthetic polymers. These materials, however, must be processible, and retain their integrity during normal use but readily degradable in a biologically rich environment. PHAs are of particular interest because they possess thermoplastic characteristics and resemble synthetic polymers to a larger extent. In present study, high amount of PHB producing microorganisms were isolated from soil by using different media. Nile blue and Sudan black staining was done of each 3 isolates for qualitative confirmation of PHB granules. Extraction and estimation of PHB from each 3 isolates was done. The pH 7.5 and temperature 30°C was found to be optimum for the growth and PHB production for all the isolates. Mutation of isolate which shows high yield of PHB was done by using acridine orange. 0.1 % of survival of isolate was found at 150 µg/ml of acridine orange. **Keywords:** PHB, Nile blue stain, Sudan black stain.

### Bacteria on smart gadgets

#### Waghmode .M.S., Shivangekar K.V., Veer P.S., Bhalerao S.S, Jadhav S.A and PatilN.N PDEA's Annasaheb Magar Mahavidyalaya, Hadapsar, Pune-28

**Abstract:** Today mobile phones have become the most essential thing. They are commonly used by health care professional as well as common peoples. Methicillin resistant Staphylococcus aureus has been reported from cell phones of health care professionals. Prevalence of bacteria on touch screen is attributed with maintaining hygienic conditions. Microbiology laboratory contain huge load of bacteria, hence handling of mobile phones by students without keeping any hygienic conditions will lead to bioburden on mobile phones. In the current study an attempt was carried out for finding of bacterial lad on the surface of touch screens of mobile phones of microbiology students. Touch screens were kept on sterile Nutrient agar and Mac Conkeys agar. Plates were incubated at 37 <sup>o</sup>C for 24 hours. Identification of the isolates was carried using phenotypical characteristics like Gram staining, motility and biochemical test. Two Gram negative, nonmotile rod shaped bacteria and two Gram positive cocci were isolated. Antibiotic susceptibility test was carried out. Mobile phones are the source of electromagnetic radiations hence bacteria harboring on the touch screens of mobile phones are EMR resistant bacteria. Isolates were further assessed for determination of its resistance to UV light. **Keywords:** Touch screen, Radiation resistant

## Screening Of Plant Extracts for Their Potential Quorum Quenching Activity

#### Aishwarya Waikar, Shruti Dandekar, Maitreyeekulkarni, Neha Patil, ShitalShevate and Neelima Deshpande

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Abstract: Multidrug-resistance is a problem that we will continue to face unless we come up with alternate efficient drugs capable of counterattacking this problem hence medicinal plants could be one of those alternatives because most of them are readily available, non-toxic, and cheap and affect a wide range of antibiotic resistant microorganisms. Evaluation of plant for quorum quenching activity can be one of those counterattack solutions. Some of the naturally derived plant molecules such as furanones, furocoumarins, carotenoids, limonoids, pectin, coumarin and some enzymes have been reported for their potential of blocking quorum sensing signal molecules, potentially which are very effective in being less toxic compared to bacterial or synthetic molecules. Two mechanisms prominently observed in bacterial quorum sensing are represented by acylhomoserine lactone (AHL)-dependent quorum-sensing systems and autoinducing peptide (AIP)dependent quorum-sensing systems. Quorum sensing (QS) is a key regulator of virulence, biofilm formation and pigment production in many medically relevant bacteria. Hot and cold extracts of sixteen different medicinal plants using four different solvents were examined in this study for their effects on QS system.Violaceinproduction inhibition assay (using ChromobacteriumviolaceumMCC2216) and Biofilm Inhibition assay (using Vibrio parahaemolyticus MTCC\*451) were used to inspect the activity of the plant extracts on the quorum sensing systems. Among these Amla(Embilicaofficinalis), Behda (Terminaliabellerica), Hirda(Terminaliachebula), Indian gum tree(Accacia Arabia), Kusal(Alternantheratenella) and Dudhi(Euphorbia geniculate) caused significant inhibition of biofilm formation and inhibition of violacein pigment production in the test organisms used. Additionally Thin layer Chromatography (TLC) was performed for both Dudhi and Kusal extracts to check individual quorum quenching activity of the components of each extract but no positive

results were obtained suggesting that the effective mechanism of Quorum Quenching (QQ) depends on the synergistic action of two or more components of the extract. Keywords: Quorum Sensing, Quorum Quenching, Acylhomoserine lactone (AHL), Medicinal plants.

## Studies on Putative Probiotic Bacteria Isolated from Buffalo Colostrum, **Focusing Exopolysaccharide Production**

## Rajan A.Walhe, Anushka D. Deshpande and Preeti P. John

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Abstract: The term probiotics is defined as live micro-organisms when administered in adequate amounts, confer health benefit on the host. Health benefits include intestinal health, improving immunity, malignancies, nutritional disorders, etc. Exopolysaccharide (EPS) production is additional property of probiotic organisms desired in some food types. Colostrum is nutritionally rich and useful in prevention of variety of illnesses. Six putative probiotic bacterial cultures named AP2, AP4, AP5a, AP5, AP6 and AP7 were isolated from buffalo colostrum using Lactobacillus MRS medium. The isolates were characterized qualitatively for probiotic properties like acid, bile tolerance, haemolytic activity, antibiotic sensitivity, and antimicrobial activity. MRS broth with bile (0.1%, 0.2%) and (0.3%) was used for bile tolerance. Isolates were exposed to acidic pH buffers (pH2, pH3, and pH4) for different time period. The isolates were nonhemolytic, tolerated acid and bile. Qualitative testing and quantitative estimation of EPS (Anthrone method) was carried out. Isolates AP2, AP5a, and AP6 produced EPS (100µg/ml produced by isolate AP2). Isolate AP5a showed promising antimicrobial activity against E. coli, Salmonella typhi, and Salmonella paratyphi B. The said putative probiotic bacteria could be further tested for properties like vitamin/ bacteriocin production, cell adhesion, etc.

Keywords: probiotics, colostrum, exopolysaccharide

## Strain Improvement of Aureobasidium pullulans for glucoamylase production

#### **Yogini Mulay**

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Abstract: In this study, indigenously isolated amylase producing Aureobasidium pullulans Cau 19 was subjected to UV irradiation. The promising colonies were further screened for glucoamylase production via plate assay and submerged enzyme production at flask level. Total 286 colonies were tested via plate assay, out of which 8 strains were selected for submerged enzyme production. Out of that Aureobasidium pullulans UVm 276 mutant was shown to be the most promising. The yield of glucoamylase generated by the mutant strain was approximately 2.78 fold that of wild strain. It is 2230 U/L which was larger than yield generated by wild type strain. The promising mutant strain Aureobasidium pullulans Cau-19 UV-276 proved stable and consistent in 9 repeated subcultures for extracellular amylase production .Thus these findings have more impact on enzyme economy for biotechnological application of microbial amylases.

Keywords: Aureobasidium pullulans, Amylase,

## **Isolation of Actinomycetes from Water Sample of Beed**

#### Sved Zubair Hussaini and R.M. Gulve.

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Abstract: Actinomycetes are filamentous, gram positive bacteria with G+ C content. They are found in soil.Colonising Plants, fresh water and marine water. Fresh water habitats have been neglected for isolation of it. They are important sources of production of antimicrobial compounds. The purpose of this study was to isolate the actinomycetes from fresh water in Beed region. In present study a total 15 types of actinomycetes were isolated from fresh water sample of Beed region by spread plate technique on Actinomycetes isolation agar plates. Morphological study war carried out by cover slip culture method. According to this streptomycin species was dominant one.

## Production of Lactocin and Sparkling wine using Lactic Acid Bacteria

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Abstract: Lactic acid is an organic acid widely used in the food, cosmetic, pharmaceutical and chemical industries. Lactic acid bacteria have the property of producing lactic acid from various fermentable carbohydrates. Two kinds of lactic acid bacteria Homofermentative and Heterofermentative. The Homofermentative lactic acid bacteria belong to genera Lactobacillus, Lactococcus, Enterococcus,

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Streptococcus, and Pediococcus species.Heterofermentative lactic acid bacteria belong to Leuconostoc, Oenococcus, Weissella and certain lactobacilli. In the present study Lactic acid bacteria were isolated from various sources such as curd, mango pickle, lemon pickle, mix pickle, tomato sauce, jam, cheese, waste milk, fermented idly batter from local sources. Since bacteriocins are applied to food as preservatives this study deals with isolation and characterization of bacteriocin producing local lactic acid bacteria. Lactic acid bacteria especially Oenococcusoenicarry out the secondary or malolactic fermentation (MLF) of wine by decarboxylating L-malic acid.

Key words:Lactic acid bacteria, Sparkling Wine, Bacteriocins.

## Utilization of Trash Fish Solid Waste Extract As Peptone For Potential Bacterial Growth

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**Abstract:** Peptone is partially hydrolysed protein. The commercial peptone has high market value. Large amount of fish waste is generated daily in fish market which is difficult to dispose. Fish waste is used as nutrient source for microbial growth as it contains calcium, protein, vitamins, iron and minerals. This new approach can reduce environmental problems associated with the waste disposal. Present study deals with the production of peptone from fish waste which can be used at laboratory level. Fish waste of Tilapia busumana (chilapi), Rastrelligerkanagurta (bangada), Porthecledinus(dinus) were collected for peptone production. Growth curve studies using commercial peptone and peptone from fish waste were done on B. subtilis, E. coli, P. fluorescence, S. aureus, and Klebsiella spp. Fish protein was hydrolysed using acid and further precipitation was done using trichoroacetic acid and solvents like methanol and acetone. The protein content was measured using Folin-Lowry method. It was observed that fish waste of R. kanagurta has high protein content and promoted the growth of bacteria.

**Keywords:** Fish waste, Peptone, Media component, Acid hydrolysis, Purification, Protein content, growth pattern of bacteria.

## Screening of actinomycetes for production of anticancer enzyme L-Asparginase

#### Neelima Kulkarni, Yogita Patil, Gayatri Sahasrabuddhe

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**Abstract:** L- Asparginase is anticancer agent and used in acute lymphoblastic leukemia chemotherapy. L-Asparginase hydrolyses aspargine and causes deprivation of aspargine which is required in excess for growth of tumor cells. In this study sixty six actinomycetes were screened for L- Asparginase production in liquid and solid culture. Out of sixty soil isolates, nine cultures showed ability to produce L- asparginase, whereas all the six marine isolates failed to produce the enzyme under test conditions. Keywords: L-asparginase, actinomycete, anticancer

## **Exploring the Potential of Bacteriophage in Waste Water Treatment**

**Rajashree B. Patwardhan<sup>1</sup>\*, Bhagyashree R. Mulay<sup>2</sup>, Divya Nagarajan<sup>3</sup>.** <sup>1</sup>\*: Haribhai V. Desai College of Arts, Science and Commerce, Pune 411002.

Abstract: Bacteriophages are viruses that infect bacterial cells. Phages have remarkable antibacterial activity against their specific bacterial host. They can be isolated from different reservoirs where bacterial hosts are present, such as ocean, soil, sewages well as animalintestine. Bacteriophages can be used for the destruction of bacterial pathogens in waste water treatment. Bacteriophages havepromising application in wastewater treatment systems to improve effluent and sludge releases into the environment. This study focuses on isolation and characterization of three bacterial strainsPseudomonas aeruginosa, Enterobacter cloacae and Proteus vulgarisfrom water samples from Pavana River side, Pune. Bacteriophages were isolated from the same environment. Plaque assay was executed against the above bacteria. Plaques were obtained against all three bacterial pathogens. Phage titer and one step growth curve for all the phages were performed. SEM was usedfor the identification of the bacteriophage. TVC for the water sample before and after treatment was calculated and a significant reduction was detected. Phage treatment was also found effective against chlorine-resistant bacteria. The present investigation has developed a new methodology for the control of bacterial pathogens present in waste water.Phage mediated bacterial mortality has the power to influence waste water treatmentperformance by controlling the number of pathogenic bacteria. Hence, bacteriophages can be utilized as potential bio-control agent in wastewater treatment.

8. Physics

## Synthesizing Gold nanoparticles for Medical applications

#### Alaa fadel and Satish Ekar

**Abstract:** Nano particles gold (NPG) structures are most common and have useful applications based on their unique physical and chemical properties. In present study, biosynthesis of Gold nanoparticles (AuNP's) using edible mushroom (Ganodermalucidum) is developed. Producing gold nanoparticles has distinct advantages over chemical methods. It has high biosafety and nontoxic. Studies have shown the ability of gold particles to kill cancer cells and in this study we synthesis nanoparticle to improve some antibacterial drugs. **Keywords:** Gold, Nanoparticle, Edible Mushroom, Biosafety

## Investigating the Impact of Mobile Radiations on Human Health

#### Amiteshwardayal J. Tiwari and S.D. Aghav

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Abstract: The ill-effects of non-ionising radiations emitted from mobile phones in case of increased exposure has been a debatable area of concern. There have been many outputs suggesting its impacts on various health parameters like cancer induction, HRV, male fertility, skin effects, loss of attention etc. The present study is an attempt to investigate its effects on the heart rate, pulse rate, mean arterial pressure(MAP) and saturated percentage of oxygen in 20 healthy volunteers(10 males and 10 females) in the age group of 21-24 years. Measurement of these parameters was done using multiparameter. The location of the experiment was a silent room free from external disturbances. The calling and receiving handsets were kept fixed model (MOTOROLA  $-3^{RD}$  GEN-XT1550) so as to keep the specific absorption rate (SAR) constant. A fixed mobile phone network(AIRCEL-GSM) was used. The distance between the caller and receiver was kept fixed and observations were repeated in cases of call drops or lost networks or power failure. Significance of study was calculated by online students t test and p value is less than 0.05.Precautionns that need to be taken during their continuous use is being discussed.

## Effect of hypergravity on germination of seeds and plant growth

#### Amrapali Vikram Nikalje and S.D.Aghav

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**Abstract:** Gravitational force plays an integral role in the development of plant. Plant roots displays gravitropism, which means they grow in the direction of gravity. Plant roots grow down in response to the pull of gravity. Hypergravity is the condition where the force of gravity exceeds that on the surface of the earth and expressed as being greater than 1 g. The purpose of the experiment is to investigate the effect of hypergravity on the plant growth and the development of seeds. The study deals with the calculation of gravity, its effect on growth of plants and change in proteins, carbohydrates and proline. Hyper gravity caused by centrifugation has been shown to inhabit elongation growth of various plants. In the present study effect of high g values were studied on wheat seeds and the results with respect to protein content, carbohydrate and proline are discussed here.

# MOS sensor based e-nose development and its use for classification of guava fruits (Psidium guajava).

#### Ashok Kanade<sup>1</sup> and Arvind Shaligram<sup>2</sup>

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**Abstract:** Electronic nose is a non-destructive artificial olfactory system to sense aroma, can be used for classification of fruits on the basis of their ripening stage as well as during storage shelf life. The present work deals with the development and use of an e-nose system using MOS gas sensors. This system was used for carrying experiments on guava fruit for classification and prediction of their ripening stage at the time of harvest as well as prediction number of days the fruit has been in storage since harvest. The developed system consists of an array of eight SnO<sub>2</sub> MOS gas sensors commercially available, odor delivery system, signal conditioning circuit and self programmed data acquisition as well as data pre-processing software using LabVIEW2012. The design of this system focused on studying the response of a sensor array to various VOC vapors released by fruit during ripening and optimizing the data acquisition, signal preprocessing, storage. The e-nose data was validated using radar plot technique. The discrimination study was performed by principle component analysis (PCA) and prediction of ripening state of fruit was achieved using ANN .The olfactory system designed is able to classify guava fruit samples into four different states of ripeness as green, ripe, overripe and spoiled with 84.56%

accuracy. An additional feature of the system is its ability to accurately predict ripening stage of fruit and the number of days the fruit has been in storage since harvest with 85.26% accuracy during controlled environment storage. The prediction results were compared with traditional fruit classification methods such as trained human sensory panel, firmness measurement by Penetrometer, Total soluble solid (TSS) changes by hand held Refractometer and pH during different ripening state. The results suggest that this e-nose system is capable to classify fruits and it would be a feasible system to be used in a real scenario.

Keywords: Metal oxide gas sensors, Electronic Nose, Fruit classification, PCA, ANN, Fruit sorting, MOS sensor array,

## Raman Spectra of Cu<sup>2+</sup> ion doped B<sub>2</sub>O<sub>3</sub>-K<sub>2</sub>O-ZnO-BaO Glasses

#### G.N.Devde and L.S.Ravangave

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**Abstract:** Glasses with compositions  $59B_2O_3-10K_2O-(30-x)ZnO-xBaO-1CuO$  were prepared using melt quenching technique. The effect of BaO content in present glass system doped with copper ion in place of ZnO has been studied with respect to structural properties. Raman spectroscopy is an experimental technique appropriate for providing information about the structure local arrangement of the atoms in the present glasses. The Raman spectra of glasses were recorded at room temperature in the range 200-1800 cm<sup>-1</sup> using a He-Ne excitation source having wavelength 632.81 nm. The Raman peaks appeared around 760 cm<sup>-1</sup> assigned symmetric breathing vibrations of six-membered ring with both BO<sub>3</sub> triangle and BO<sub>4</sub> tetrahedra. The intensity of these peaks is slightly varied with the addition of BaO content while the broadness is found to be larger at 30 mol% of BaO than 30 mol% ZnO. This indicates that certain BO<sub>4</sub> units could be preferentially converted while those in ring groups could be stabilized. Raman studies it is concluded that present glasses are composed of [BO<sub>4</sub>] and [BO<sub>3</sub>] units in metaborate, orthoborate, diborate groups. **Keywords:** Borate glasses, Raman spectroscopy.

## Effect of laser radiation on physical properties of blood

#### Hussein Flayyih Oudah, J.V. Yande and S.D. Aghav

**Abstract:** Due to high intensity monochromaticity, unidirectionality and coherent properties of laser, it is widely used in scientific area and research. Lasers are useful in studying various, optical phenomenon like interference, diffraction etc. Lasers medicine consists of using lasers in medical diagnosis, treatments or therapies such as laser photodynamic therapy. Medical areas that employ lasers include: angioplasty, cancer diagnosis, cancer treatment, dermatology such as scar reision, skin resurfacing ,laser hair removal ,tattoo removal, medical imaging ,surgery. In present study, effect of laser radiation on physical properties of blood is discussed.

## Study of Biodiesel from Jatropha

#### Jyoti Patil and Sharmila Chaudhari

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**Abstract:** The depletion of world petroleum reserves and the increased environmental concerns have stimulated the search for alternative sources for petroleum based fuel, including diesel fuel, because of closer properties. Biodiesel fuel (fatty Acid methyl ester) from Jatropha is considered as the best of the applicant for diesel fuel alternate in diesel engines. It is made from renewable biological sources. It consists of the monoalkyl esters formed by a catalyzed reaction of the triglycerides in the oil or fat with a simple monohydric alcohol. Diesel engines operated on biodiesel have lower emissions of carbon monoxide, unburned hydrocarbons, particulate matter, and air toxics than when operated on petroleum-based diesel fuel [1]. Biodiesel fuel (fatty Acid methyl ester) from Jatropha is considered as the best of the applicant for diesel fuel [1]. **Keywords:** Bio-fuel, Jatropha,

## Effect of Silver Nanoparticle on Plant Growth

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**Abstract:** The use of nanoparticles is rapidly expanding in all fields including agriculture. Silver nanoparticles are hypothesized to enhance nutrients use efficiency in plants. Silver nanoparticles are one of the most widely used and are expected to enter natural ecosystem. Nanoparticles have potential to improve growth and yield of wheat crop. They interact with plant causing many morphological and physiological charges. The purpose of this experiment is to observe the effect of silver nanoparticles on wheat plant growth and germination of seeds. This report deals with silver nanoparticles effect of plant growth and change in proteins, carbohydrates and proline. This study investigated the impact of silver nanoparticles on root length, shoot length, seed germination

rate. In the present study effect of silver nanoparticle were studied on wheat seeds and results with respect to protein content and proline are discussed.

## Study of Structural, Morphological and Spectroscopic Properties of Chemically Synthesized ZnO Nanoparticles

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Abstract: ZnO nanoparticles materials have a desirable properties and applications in different field. In this study, ZnO is an important compound semiconductor material due to its direct energy band gap (3.37eV) and large excitation binding energy (60meV) at room temperature. It has the unique physical and optical properties which can be used in a variety of application such as oxide coatings for solar cell, gas sensors, UV photodiode, optoelectronics, chemical catalytic, photochemical and electric properties. ZnO nanoparticles were synthesized using chemical sol-gel precipitation method with solution of zinc acetate and sodium hydroxide as starting materials. The synthesized samples were calcined at different temperature for two hour. The hexagonal structures of the samples have been characterized by X- Ray diffraction (XRD) pattern. The various characterization such as XRD, scanning electron microscope (SEM) and FTIR show the significant structural and morphological changes of ZnO particles. The optical study carried out using UV- Visible spectrophotometer and photoluminescence spectroscopy (PL) of the samples. UV- visible spectra shows that absorption edge of spectra are highly blue shifted with decrease in particles size. Photoluminescence (PL) properties of ZnO nanoparticles at room temperature were studied, the ZnO calcinated at 600 °C exhibit the green photoluminescence emission attributed to oxygen vacancy or interstitial related defects. The significant excitation and emission peaks were obtained at 426 nm and 516 nm in the green region of the electromagnetic spectrum. The ZnO stretching vibration mode assigned to the vibrational band, above, 400 wave number in the IR spectra. The effect of calcinide temperature was clearly observed from variation of absorption band intensity and shift of the vibrational bands in the IR spectra. The morphological changes of the ZnO nanoparticles were investigated from SEM images.

Keyword: ZnO nanoparticles, XRD, SEM, FTIR, UV (Visible absorption), PL (photoluminescence)

#### Magnetic properties of some composite material

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**Abstract:** Sample with ferrite-ferroelectric composite  $(1-x)Ni_{0.5}Cu_{0.3}Mg_{0.2}Fe_2O_4+(x)$   $Ba_{0.5}Pb_{0.5}TiO_3$  for x=0.2 and 0.6.was prepared by conventional solid state reaction. The phase formation of the ferrites was confirmed by X-ray diffraction technique. From X-ray diffraction the structure of present ferrite found as a spinel cubic and that of ferroelectric as a perovskite structure. The hysteresis behavior studied using the Vibrating Sample Magnetometer (VSM) at room temperature. It is observed that the magnetic properties decreases as the ferrite doped with ferroelectric material.

Keywords: Ferrite, ferroelectric, hysteresis loop, XRD, magnetic material.

#### Study of radioactive waste management in Republic of Iraq

#### Saad J.Kadhum and J.V. Yande

Abstract: Iraq had faced two wars in 1991 and 2003, during which massive amounts of new weapons that included Depleted Uranium (DU) .In other parts of the Iraqi Atomic Energy Organization (Al-Tuwaitha site), there were about 200 barrels of isotopes and radioactive materials as well as yellow Uranium Oxides which were spilled on the ground and many nuclear sites containing radioactive material spread without any restrictions. Whenever a strong wind blows, it can carry these quantities to great distances outside can be contact with groundwater and it will be very danger on human. As a result of the radioactive contamination, the humans are suffering from various disease like cancer. The environment is polluted. In practice, there is strategy of decommissioning destroyed nuclear facilities and collect radioactive waste, plans and scientific personnel and technical equipment directed to clean Iraq. But the problem is the permanent store or disposal site. Reviewing the geological, topographical and hydrological data, we have noticed that Umm Chaimin site is a good site to dump all contaminated radioactive scrap and soil. The present study indicates of the landfill will ensure safe containment of the waste for hundreds of thousands of years even if significant climatic changes take place.

## Microwave Spectroscopy for Molecular Interaction of Medicine with Methanol

#### Sharmila Chaudhari

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**Abstract:** The information related to the solute-solvent interaction has been carried out related to thermodynamic properties like activation energy, conductivity, enthalpy entropy etc in the mixture of Ayurvedic Medicine-BALANTKADHA 1 and Methanol. Dielectric relaxation study of BALANTKADHA 1 used in gynaec problems has been carried out at  $15^{\circ}$ C,  $25^{\circ}$ C,  $35^{\circ}$ C and  $45^{\circ}$ C in the frequency range 10MHz to 20GHz for 11 different concentrations of the system. Time Domain Reflectometry (TDR) Technique in reflection mode has been used to measure Thermodynamic parameters viz activation energy, conductivity, enthalpy entropy etc.Further, Fourier transforms and least square fit method has been used to obtain Thermodynamic parameters. With change in concentration and temperature, the systematic changes in Thermodynamic parameters are observed.

Keywords: Molecular Interaction, Microwave.

## Study of Adulteration in Milk Using Gm Counter

#### Mahmood Hashim Mayoof

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**Abstract:** Food adulteration is one of the topics of health care. Quality of valuable product is affected by adulteration. Adulteration in milk is dangerous as it may be toxic and it could deprive nutrients essential for growth. Soap, starch, sugar urea are added in milk to increase fat. Detergent in milk can cause food poisoning and other gastrointestinal problems. Adulteration can damage body tissue and destroy protein. In present study, G M counter is used to find adulteration in milk and results of water, urea and detergent impurity added to milk is discussed here.

## Co-60 gamma irradiation induced synthesis of Gold nanoparticles decorated Graphene Oxide

#### Vilas Y. Kumkale, A.B. Phatangare, R.P.Joshi, S.D.Dhole. S.S.Dahiwale, V.N.Bhoraskar

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Abstract: In this work, we synthesize Au nanorods, nanospheres, and nanotriangles, nanohexagonal decorated on graphene oxide (Au@GO) nanosheets by using gamma irradiation radiolytic technique in the presence of Isopropyl alcohol (IPA), Distilled water (H<sub>2</sub>O) and polyvinyl pyrrolidone (PVP). UV–Visible spectroscopic results showed the peak of GO and surface plasmon resonance of Au nanoparticles. X-ray powder Diffraction (XRD) results revealed the formation of face centered cubic structured Au nanoparticles along with GO signature after gamma irradiation. Transmission electron microscopy (TEM) results showed the decoration of Au nanoparticles of size 5 nm to 50 nm on GO nanosheet with different shapes and size. Raman spectroscopic results of Au-GO showed the increase in the ratio of D to G band ( $I_D/I_G$ ) after gamma irradiation

## Parasitisation of Spodoptera larvae in groundnut under different intercropping systems

#### T. Girija, P.N. Guru, Gaikwad Shrilaxmi and Mahabaleshwar Hegde

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Abstract: The experiment was carried out at Main Agriculture Research Station, UAS, Dharwad. The natural parasitisation of Spodoptera litura (Fab.) larval parasitoids (Campoletis chloridae Uchida and Apantales spp.) were recorded at 45, 60 to 75 days after sowing (DAS). The results revealed that significantly, highest percent parasitisation recorded in groundnut + lucerne (17.00%) intercropping (3:1 ratio) at 45 DAS was statistically at par with groundnut + foxtail millet (16.00%), groundnut + bajra (14.00%), groundnut + sorghum (13.00%), differed significantly with the remaining treatments. Groundnut+ sunflower (12.00%) intercropping recorded at par per cent parasitisation with groundnut + bajra, groundnut + sorghum intercropping and differed significantly with groundnut + chilli (11.00%), groundnut +cowpea (10.00%) and sole crop (7.67.00%). Similarly, at 60 DAS, groundnut + lucerne (22.33%) intercropping recorded significantly highest percentage of parasitisation and was at par with groundnut + foxtail millet (20.33%), groundnut + bajra (19.33%) and groundnut + sorghum (17.33%) intercropping differed significantly with sole crop (10.00%), which recorded significantly least per cent parasitisation when statistically compared to all the other treatments in the trial. The parasitisation level has declined at 75 DAS across the treatments when compare to 60 DAS. Highest percentage of parasitisation recorded in groundnut + lucerne (15.00%) was at par with groundnut + foxtail millet (14.00%), groundnut + bajra (13.33%), groundnut + sorghum (12.00%) and groundnut + sunflower (11.00%). Key words: Intercrops, groundnut, parasitoids, Spodoptera litura

## Yield and Quality of Soybean as Influenced by Potassium Fertilization in Inceptisol

#### P.G. Jamdade and S.R. Patil

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**Abstract:** Field investigation was conducted at PGI, MPKV, Rahuri during kharif 2012-13. The experiment was laid out in a RBD with the seven treatments and four replications. The growth parameters were significantly influenced by potassium application. The highest productivity of grain (31.62 q ha-1), straw(40.80 q ha-1) , protein (32.47%), oil content (20.20%) and total uptake of nitrogen, phosphorus and potassium with application of potassium was highest under treatment T7 and which was at par with treatments T6 and T5. The significant variations in chemical properties and available NPK were observed due to application of various doses of K. The maximum monetary returns per Rs invested on potash fertilizer (Rs 6.93) was recorded in T5 treatment. So, application of 40 kg K2O ha-1 (T5) along with GRD was found optimum dose of potash in balanced fertilization.

Key words : Potassium, yield and quality of Soybean, nutrient uptake

## ISOLATION OF LACTOSE FERMENTING MICROBES FROM CULTURE OF ZOOFLAGELLATES PHYTOMONADS.

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**Abstract:** Most of flagellates of this group have two or four flagella & a large, bright green chloroplast which is usually cup- shaped. They may be solitary, colonial. They are generally held together by gelatinous matrix. [parker & Harshwell 1995].Zooplanktons culture for flagellates was prepared in laboratory& observed for their growth. The growth of Phytomonads flagellate were observed very well within 15 days than other flagellates. Photosynthetic Zooflagellates culture were used for isolation and growth of microorganism the ordinary media and differential media such as nutrient agar and macConkey agar were used, incubate at 37c for 24 hrs. The maximum growth was recorded on nutrient media, pink colour colonies on macConkey agar were observed. Further detection was made by gram staining and organism found to be gram negative, motility- motile. IMViC test were found to be as indole positive, Methyl red- positive, Vages proskauer- negative, Citrate – negative in sugar test organism ferment sugar acid with gas formation. Present work, it is reported that there was beneficial relationship developed between Phytomonads and lactose fermenting bacteria. This will be useful to conserve food chain in aquatic ecosystem. It also help to solve the threats facing in a aquatic habitat. **Keywords :** Zooflagellates Phytomonads lactose fermenting bacteria

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