NATIONAL CONFERENCE ON "ANALYTICAL TECHNIQUES AND OPPORTUNITIES IN LIFE SCIENCES"

INDEX

Structure, function and evolution of J-like proteins of *Arabidopsis thaliana*

[2]**V. Zambare***, [1]C. Tamadaddi, [1]A. K. Verma, [3]D. Diwan, [1]A. Vairagkar and [1]C. Sahi

[1]Department of Biological Sciences, Indian Institute of Science Education and Research, Bhopal.

[2]School of Biotechnology and Bioinformatics, D Y Patil Deemed to be University, Navi Mumbai.

[3]Department of Biology, University of Alabama, Birmingham, U.S

*E-mail- vyankatesh.biotech@gmail.com

Hsp40, also known as J-domain proteins (JDPs) and Hsp70 represent highly conserved class of molecular chaperones performing myriad cellular functions including protein assembly, disassembly, and folding. The defining feature of JDPs is the "J-domain", has crucial HPD (His, Pro, Asp) motif. J-like proteins (JLPs), highly similar to J proteins have an altered HPD in their J domain. As J-domain is dispensable for some of the J proteins activities and JLPs have altered J-domain, evolutionarily they might be related. Considering *Arabidopsis thaliana* as a model organism, we have identified 24 JLPs. Sequence and structural analysis of 12 JLPs among 24 showing significant homology with the J-domain suggested that JLPs have plausibly descended from JDPs. HPD restoration in 5 of the JLPs didn't rescue the normal growth of Δ*ydj1* (*Saccharomyces cerevisiae*) cells indicating that other residues also are important for the function. The real-time PCR analyses revealed a unique expression pattern for these 6 JLPs under various abiotic stress conditions and different developmental stages. Similar to JDPs, JLPs also have expanded in their number. However, their significance in terms of their function and evolution needs to be addressed. The aim of the study is to understand the basis of evolution of JLPs and their biological significance especially in model plant *Arabidopsis thaliana*.

Keywords: Hsp40, Chaperone, J-like proteins, Δ*ydj1*

Floristic diversity of endemic medicinal plants from western ghats of Nasik district

[1]H. P. Shinde*

[1]Department of Botany, K.V. N. Naik College, Nasik-422005, Maharashtra.

*E-mail- shindehemant79@gmail.com

Entire Western Ghats (Sahyadris) is considered as a major genetic reserve with an enormous biodiversity of ancient lineage. More than 9000 plant species are found to be used for health care in India under folk and codified Indian Medical Systems. Nearly 18,000 species of flowering plants that account almost 11% of the total plant species in the world. (Singh et.al. 2015). According to the current official records; raw drugs obtained from 1,178 plant species are in active trade with annual trade volume of >5 lakh MT. About 90% of medicinal plant used by the industries are collected from the wild. Though there has been considerable work done in terms of floristic diversity of Western Ghats; the floristic diversity of Western Ghats especially in terms of endemic medicinal plants as well as their utilization; is incompletely known which can potentially open up several new avenues for the effective utilization of such indigenous and endemic medicinal plants as a promising resource for the welfare of local people and mankind to the large extent. (Kambale *et.al*. 2017; Shinde *et.al*. 2018; Wagh *et.al.* 2018). As the Western Ghats of Nasik district cover regions from Nasik district like Trimbakeshwar, Harsul, Peth, Kalwan, Surgana contribute significantly to the floristic diversity of India, the present proposed work aims to highlight not only the floristic diversity of endemic medicinal plants but also their potential utilization as resources in a conservation perspective. During the last decade; places like Nasik city is being emerged as one of the megacities having enormous expansion in industries especially pharmaceutical industries that causes an increasing pressure on diversity of endemic medicinal plants from these regions.

Keywords: Endemic medicinal plants, Nasik district

Isolation of *Saccharomyces* sp. from flower nectar and determination of alcohol tolerance of isolates

[1]**S. Sherly***, [1]V. Mohakar, [1]D. Bangera and [1]C. Sengupta

[1]Department of Microbiology, Fergusson College (Autonomous), Pune-411004, Maharashtra.

*E-mail- ssherly29@gmail.com, vijaynmohakar@gmail.com

Use of *Saccharomyces* sp. for production of ethanol is a conventional method involving variety of substrates as carbohydrate source. Flowers are widely used in pilgrimage sites for various religious ceremonies with no proper management for its disposal and they end up piling on the streets, landfills and adding to already polluted waterways. An eco-friendly way for the management of pilgrims' flowers can be achieved by using them in various products as a natural substitute or by creating new ways to use them. One such novel way can be to use of flowers in brewing industry to obtain more enhanced and high yield of alcohol. Flowers being a rich source of sugars, ideally harbours natural *Saccharomyces* sp. which brings about natural fermentation process by metabolizing sugars to alcohol. The present project is aimed at isolating *Saccharomyces* sp. from nectar and testing the strains for high productivity and high tolerance to alcohol.

Keywords: *Saccharomyces* sp., Flower nectar, Ethanol, Alcohol tolerance

Comparative analysis of amount of proteins and carbohydrates from *Pinda concanensis* and *Heracelum grande*

[2]**S. Auti*** and [1]S. Bidve

[1]K.T.H.M College, Nasik-422003, Maharashtra.

[2]HPT Arts and RYK Science, College, Nasik-422005, Maharashtra.

*E-mail- autisanjay66@gmail.com

Plants form an important part of our every diet, and their nutritional values have been intensively studied for decades. *Pinda concanensis* and *Heracelum grande* are annual endemic plants of western ghat region belongs to family Apiaceae. Both plants are wild relative of economically important plant like coriander. Present study focused on comparative estimation of carbohydrates and proteins from *Pinda concanensis* and *Heracelum grande.* In present study dried samples of root, leaves and seeds were analysed for estimation of proteins, total carbohydrates and reducing sugars. Leaves and seeds samples of both plants showed moderate amount of proteins. Leaves of *Pinda concanensis*and *Heracelum grande* showed maximum amount i.e. 70.39±0.050 µg/gm and 65.90±0.049 µg/gm of dried sample respectively. Total carbohydrates were estimated by Anthron method. The Leaves of *Pinda concanensis* showed more amount i.e. 622.23±0.042 µg/100gm of dried sample while root sample of *Heracelum grande* also showed maximum i.e. 645.0866±0.077 µg/100gm of dried sample. Further, reducing sugar was estimated by DNSA method. Comparative analysis of amount of reducing sugar in both plants showed that *Pinda concanensis* more amount of reducing sugar as than *Heracelum grande.* The Leaves of *Pinda concanensis* contain high amount i.e. 383.25±0.024 µg/100gm. Present study depicts that high carbohydrate and moderate protein content in the roots of *Heracelum grande* exhibit modification of roots for food storage. Tribal people eating roots of plants as a source of energy. So present study can be helpful to explore nutritional importance of plant and gives new direction for cultivation of these wild plant as an alternative source of food.

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Keywords: *Pinda concanensis, Heracelum grande,* Protein, Carbohydrate, Reducing sugar

Effect of Natural Fermentation on Finger millet

[1]**S. Auti***, [1]T. Kazi, [2]L. Sharma and [3]D. Ahire

[1]Department of Botany, HPT Arts and RYK Science College, Nasik – 422005, Maharashtra.

[2]Department of Microbiology, HPT Arts and RYK Science College, Nasik – 422005, Maharashtra.

[3] Department of Botany, New Arts, Commerce and Science College, Ahmednagar - 414001, Maharashtra.

*E-mail- autisanjay66@gmail.com, tahsin495@gmail.com

Fermentation is a desirable process used to enhance bio-accessibility and bioavailability of nutrients in different crops. The study aim to determine the effect of fermentation (8, 16 and 24 hours) on nutritional, anti-nutritional compounds and antioxidant activity of finger millet landraces. The effect of fermentation on proteins has yielded inconsistent results, it showed reduction in the content of protein (59-61%) during the process and gradually increased at 24 hours. This is likely due to variation in fermentation durations and variation in the initial protein or amino acid profile of landraces. Reduction in the content of reducing sugar and carbohydrates was observed. Reduction in the content of protein, reducing sugar, carbohydrates are due to loss of dry matter as a result of microorganisms hydrolysing and metabolizing carbohydrates and fats as source of energy. The amount of phenol and flavonoid content showed 71% increase in the first 8 hours of fermentation. Tannin content showed significant decreased (17% to 49 %) over to other compounds. Transformation of tannins to phenols occurring during fermentation increases phenol content. The reason behind the changes in the contents of compounds is the production of different enzymes like Proteolytic enzymes, Polyphenol oxidase, Tannase and Esterase. It was noted that fermentation time and antioxidant activity is directly proportional to each other. Thus, Natural fermentation is a potential process for reduction of anti-nutritional compounds and developing a food product of improved nutritive value and antioxidant activity.

Keywords: Antioxidant activity, Finger millet, Natural fermentation, Phenol, Tannin

Fermentation studies of fruit waste

[1]D. K. Jadhav*

[1]Department of Botany, H.P.T. Arts and R.Y.K. Science College, Nasik-422005, Maharashtra.

*E-mail- dkj040698@gmail.com

The generation of bio-fuels from waste forms attractive solutions towards both waste management and energy generation. The utility of fruit rinds as a possible source of cellulosic ethanol in a process without aeration was investigated by using rinds of fruit namely Banana, Potato, and sweet potato. In this study different fruit wastes were used as a raw material for the production of bioethanol by using *Saccharomyces cerevisiae* and the result were compared. Obtained results suggest that waste from fruits contain fermentable sugar should not be discarded into environment, but should be converted to useful products like bioethanol that can serve as an alternative energy source.

Keywords: Fruit waste, Fermentation, Alternative energy source

Allelopathic effect of some weeds on seedling vigour of Finger millet

[1]**C. Paul***, [1]T. Kazi and [1]S. Auti

[1]Department of Botany, H.P.T. Arts and R.Y.K. Science College, Nasik-422005, Maharashtra.

*E-mail- chandrikapaul2@gmail.com

Finger millet is highly nutritious rain fed crop. Area under cultivation is decreasing due to shifting of land for cash crops and lack of improve cultivation practices and high yielding varieties. Present investigation deals with the allelopathic effect of *Cassia tora, Amaranthus, Euphorbia hirta* and *Parthenium hysterophorus* on germination and seedling vigour in Finger millet landraces. The extract of leaves of selected weeds were prepared in distilled water in the ratio 1:10 w/v. Germination was recorded at 3,5,7,9 and 11 days after sowing and root shoot lengths were noted at 11 days and 22 days. Different extract produced inhibitory allelopathic effects. Among the selected weeds *Cassia tora* and *Amaranthus leaf* extract produced minimum inhibitory effect while *Parthenium* and *Euphorbia* leaf extract showed maximum highest inhibitory effect on germination and seedling vigour of finger millet. Present study helps farmers to aware with the lethal allelopathic effect of obnoxious weeds.

Keywords: Allelopathic effects, Weeds, Germination and finger millet

Documentation of some wild edible plants of Nasik district of Maharashtra, India

[1]**S. D. Golait*** and [1]S. G. Auti

[1]Research centre and PG Dept. of Botany, HPT Arts and RYK Science College, Nasik-422005, Maharashtra.

*E-mail- sacgol85@yahoo.com

Nasik district of Maharashtra is considered as the home of large number of wild plants. Many wild edible plants are used by tribal community to meet their nutritional, medicinal and economical demand since for long time, but urban population is less known or unknown about these plants. Detailed information of 52 species of wild edible plants used by tribal community of Nasik district. is documented in the present paper. Nutritional importance of these plants were found out from the local peoples. Study shows that these plants are playing a significant role in the sustenance of rural life, but due to less awareness and anthropogenic activities, many species of wild edibles are on the line of rarity. Therefore, it is necessary to study their nutritional and medicinal values scientifically and urgent need to conserver and domesticate these valuable resources before whipping out. Present work deals with the identification, documentation with respect to botanical name, common names, family, seasonal availability, habit, along with their part used, and form of use.

Keywords: - Wild edible plants, Documentation, Nutritional Values, Nasik district

Application of indigenously isolated species as a biofertilizer on Cowpea and Gram

[1]R. Mohod *

[1]Department of Microbiology, K.G.D.M. College, Niphad, Maharashtra.

*E-mail- rupali.mohod@gmail.com

Phosphorus is one of the essential macronutrient for the growth of plant. Bacteria are more effective in phosphate solubilisation than the fungi. Availability of phosphorus for the crop is frequently low because phosphates react with iron aluminium calcium in soil to form insoluble phosphate. Insoluble phosphate in soil is unavailable for plant utilization. Phosphorus deficiency in soil can limit plant growth and productivity since phosphorus is important in several physiological process of plant especially in photosynthesis carbon metabolism and membrane formation also it plays important role in root elongation and proliferation. The objective of this study was to isolate screen application of the phosphate solubilising bacteria on Cowpea and Gram plant, which can be eco-friendly alternative to the plant as a biofertilizer. Out of total isolates 03 isolates were chosen which gives better phosphate solubilisation index i.e. 1.5, 2.66, and 3 respectively on Pikovskayas medium this three isolates were characterizes by biochemical test and morphological characterization were done . The organism was applied in the soil which previously tested for the presence of phosphate. On application of the phosphate solubilising bacteria it is found that plant shows better and healthy growth.

Keywords: Pikovskayas medium, Phosphate solubilisation

Nickel induced Histopathological alterations in the kidney of freshwater fish, *Channa gachua* (Ham.)

[1]**S. Kawade (Bansode)***

[1]Department of Zoology, Shri Shivaji Science College, Amravati, Maharashtra.

*E-mail- sujata_4980@rediffmail.com

Industrial effluent containing heavy metals, on entering aquatic environment causes histopathological disturbances in the fish. The present study deals with the toxic effect of heavy metal - Nickel (Ni) as $NiSO_4$ on the kidney of fresh water fish, *Channa gachua*. The acute toxicity test was based on the 96 hrs static renewal bioassay which resulted in the 96 hours LC_{50} value of 150 ppm. Kidney was examined in the 96 hrs LC_{50} acute test. Histopathological examination of kidney revealed degenerative and necrotic changes like degeneration of renal tubules, blocking of glomerulus, tubular necrosis, cell necrosis, hypertrophy and degeneration of hematopoietic tissue with shrinkage of renal tubules and destruction of blood vessels were noticed.

Keywords: Nickel, Kidney, Histopathology, *Channa gachu*

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Study of Urinary Tract Infections in diabetic and non-diabetic patients in Nasik and its correlation with Complete blood count

[1]**J. Pagar*** and [2]H. Venkat

[1]Nashik Speciality Laboratory Pvt. Ltd 422008.

[2]Department of Microbiology Yogeshwari Mahavidyalaya, Ambajogai,431 517 Maharashtra.

*E-mail- gaikwadjayashreer@gmail.com

Diabetes is a group of metabolic disorders characterised by high blood sugar levels over a prolonged period. As of 2017 an estimated425 million people had diabetes worldwide. This represent 8.8 % of the adult population with equal rates in men and women. Trend suggests rate will continue to rise. UTI (Urinary Tract Infections) among Diabetic patients is common. Presence of sugar in urine promotes bacterial growth. The patient may have diabetic neuropathy, lazy bladder that does not empty completely. Even the defective immune factors predispose the infections. May all the factors contribute to the pathogenesis of UTI in diabetic patients. The escalating anti-microbial resistance cause recurrent UTI. White blood cells help the body to fight against infections so the increased WBC count may be observed in UTI patients. In this study we selected 21diabetic and 19 non-diabetic patients with symptoms of UTI, and collected their blood and urine samples Blood was checked for CBC and blood sugar. Mid-stream urine sample were collected in sterile container and were further streaked on Nutrient agar and Mc Conkey's agar for isolation of infection causing bacteria. Among these 21 diabetic patients 13 were suffering from UTI (61.9 %). The pathogens we found are *E coli, Klebsiella, Staphylococcus, Streptococcus.* Among 19 non- diabetic patients 5 patients (26.3 %) were suffering from UTI. The isolated pathogens from these samples were *E coli, Staphylococcus* and *Pseudomonas.* All microbiological results are confirmed by VITEK. 8 patients among the 24 who were suffering from UTI were showing elevated WBC count.

Keywords: UTI, Diabetic, Nondiabetic patients, CBC

Study of Urinary tract infection in HIV patient and its correlation with Complete blood count in Nasik.

[1]**D. Dabir*** and [2]H. Venkat

[1]Nasik Specialty Laboratory Pvt. Ltd- Nasik 422008.

[2]Department Of Microbiology, Yogeshwari Mahavidyalaya, Ambajogai, 431517, Maharashtra.

*E-mail- ddabir@hotmail.com

HIV patients are immune-suppressed patients, so they are prone to many opportunistic infections like Tuberculosis, Meningococcal infections, Parasitic & Bacterial infections of stool, etc. Urinary Tract Infection is an important opportunistic infection amongst the HIV patients. Clinicians miss this many times. Study include infection prevalence and cause of infection. To rule out Urinary Tract Infection, urine culture along with antibiotic sensitivity is important among investigations. Infection and Pyrexia also alter the complete blood count picture particularly white blood cells. White blood cells are the important initial infection marker. In selected HIV patients with PUO (Pyrexia of unknown origin), we carried out urine culture, isolated organism in pure culture. Identification and antibiotic sensitivity test, of positive isolated pure culture is carried out by VITEK 2, and complete blood count on an automated blood cell counter to correlate the obtained results. Total 25 specimens were tested and noted the following result & observations; 9 (36%) of them shown growth while 16 (64%) No Growth. Organisms isolated are: *E. coli* in two cases (22.22%), *Pseudomonas* in three cases (33.33%), Enterococcus in three cases (33.33%) & one rare UTI pathogen *Aerococcus* (11.11%). E.coli are sensitive to Artapenum, Amikacin, Gentamycin,Fosfomycin,Nitrofurantoin. *P. stutzeri* shows more sensitivity than *P. aeruginosa*. *Enterococcus faecalis* more sensitive than *E. avium* shows sensitivity to Linezolid, Daptomycin, Teicoplanin, Vancomycin, Tetracycline, Nitrofurantoin One isolated *Aerococcus* shown sensitivity to Gentamycin, Clindamycin, Linezolid, Daptomycin, Teicoplanin, Vancomycin, Tetracycline, Tigecycline, Nitrofurantoin, Rifampicin in Complete Blood Count, WBC are mostly normal except two low count and a high count.

Keywords: Urinary tract infection, HIV, VITEK, PUO, CBC

Study on resurgence of vector mosquito viral and protozoan diseases in district Nasik (MS) India

[1]**R. Abdar*** and [1]Mrs. S. Deshpande

[1]Dept. of Zoology, Shri Amolak Jain's Vidya Prasarak Mandal's

Smt. S. K Gandhi Art's, Amolak Science, and P. H Gandhi Commerce, College Kada Taluka, Ashti District, Beed, Maharashtra.

*E-mail- rameshabdar@ymail.com

Mosquitos have a worldwide distribution, mostly through tropical and temperate regions. They can be found in a variety of habitats with fresh or impure water. Infectious vector borne diseases like malaria and dengue fever infect half the world population. Dengue is a serious health issue in India and other parts of the world. As the outbreak of dengue fever, prevalence of microorganisms in the viral strain, disease severity pattern, early detection of the virus and early management of the disease is essential. Mainly the correlation between climatic condition and transmission of disease is represented by statistical and Graphical representation of increase in positive patients and change in climate in specific period. Dengue Rapid Test along with CBC and biochemical tests such as Bilirubin, SGPT, SGOT and Renal Function Test such as Urea and Creatinine will be done. Mainly Dengue Elisa Test is done for confirmation. Virus isolation and Nucleic Acid Detection are also used but are very costly, which is why they are not routine procedures. Data was analysed for a total of 201 patients. Out of these, 56 resulted positive for dengue by Dengue Elisa Test which gives confirmatory results for extremely low platelet count, high fever, nausea and vomiting, being the physical anomalies. Whereas, the patient might show raised creatinine levels, SGPT and SGOT levels. Furthermore, results for prevalence of mosquito borne diseases and protozoan diseases were calculated along with their control measures.

Keywords: Vector mosquito, Viral and Protozoan Diseases, District Nashik India, Climatic Condition

Therapeutic potential of *Argyreia nervos*a (Burm.f.) Bojer

[1]**V. G. Sonawane*** and A. A. Kulkarni

[1]Savitribai Phule Pune University, Pune.

*E-mail- vgsonawane90@gmail.com

*Argyreia nervos*a (Burm.f.) Bojer (Syn: *Argyreia speciosa*) is a popular Indian medicinal plant, which has long been used in traditional Indian due to nootropic, aphrodisiac, immunomodulatory, hepatoprotective, antioxidant, anti-inflammatory, antihyperglycemic, antidiarrheal, antimicrobial, antiviral, nematocidal, antiulcer, anticonvulsant, analgesic and central nervous depressant activities. Although the plant is rich in different secondary metabolites, their specific therapeutic activities are not reported. We have used leaf extracts in different solvents and their secondary metabolite profile has been studied. These metabolites have been tested for their antibacterial and amylase inhibitory activities and encouraging results have been obtained. These results will be presented.

Keywords: *Argyreia nervos*a (Burm.f.) Bojer, Secondary metabolite profile, Antibacterial activity, Amylase inhibitory activity

Study of seminal infection among an infertile male population in Nasik and its effect on semen quality

[1]**S. Patil*** and [2]H. Venkat

[1]Department of fertility, Nasik, Maharashtra.

[2]Department of Microbiology, Yogeshwari Mahavidyalaya, Ambajogai -431 517 Maharashtra.

*E-mail- samidhappatil@gmail.com

Semen is considered as the surrogate marker for male fecundity while assessing infertility in men. There are several reasons why a male could be suffering from infertility whether primary or secondary. The role of inflammation or infection of male accessory sex glands are very important or the potential effects that these conditions may have on male fertility. Sperm Bacterial contamination is quite frequent and could contribute to the deterioration of the sperm quality of infertile men. Since the ejaculate is a mixture of secretions derived from the urogenital tract and the male accessory glands, seminal culture identifies the present of germs in any section of the seminal tract. On the basis of clinical and experimental research, it is found that there is association between isolation of bacteria from semen and deterioration of spermatogenesis and spermatozoa function which can ultimately lead to infertility. Semen samples were assessed macroscopically and microscopically. It includes semen volume, semen colour, pH, viscosity, sperm concentration, sperm motility, sperm morphology, microscopic examination of leukospermia and semen culture. In the study of microbiota associated with semen of non-fertile men and also their effect on semen parameter in Nashik city. Total of semen analysis and semen culture of infertile men showed that 85 semen samples were infected. The most common infective organisms isolated on culture come out to be Staphylococcus species and *Enterococcus faecalis, E. coli, Streptococcus spp. Klebsiella spp., Acinetobacter lwoffii.* Also showing adverse effect on semen parameter.

Keywords: Semen, Male infertility, Primary, Secondary infection, Semen parameter, Spermatogenesis, Microbiota, Leukospermia

Morphotypes of *Chionachne koenigii* (Spreng.) Thwaites from Maharashtra, India

[1]**K. V. Gosavi*** and [2]N. A. Madhav

[1,2]Department of Botany, HPT Arts & RYK Science College, Nashik – 422005, Maharashtra.

*E-mail- kumarvinodgosavi@gmail.com

Genus *Chionachne* distributed to South East Asia, Australia, and Polynesia with 12 species. In India the genus is represented by 4 species. Among that, *Chionachne koenigii* is reported throughout India usually in moist climatic regions. Different populations of *Chionachne koenigii* were studied from Maharashtra. The populations were showed variations in its height, forms, leaves and spikelet's. Those variations are classified in present communication.

Keywords: Variations, *Chionachne koenigii*, Morphology, Maharashtra

Toxicological study with reference to protein profile on *Clarias batrachus* intoxicated by *Cestrum nocturnum* and *Cestrum diurnum* extracts

[1]**C. S. Jawale*** and [1]R. Belgaonkar

P.G. Department of Zoology, H.P.T. Arts and R. Y. K. Science College, Nashik- 422005, Maharashtra.

*E-mail- csjawale@hotmail.com

Cestrum nocturnum and *Cestrum diurnum* extracts are well reported piscicides. Before its use in fisheries for removal of predatory and trash fishes, it's of most importance to study toxicological impacts on fishes. Both these plant extracts contain saponin as a poisonous constituent. *Clarias batrachus* was exposed to C.N extract (LC10= 1.9mg/lit, LC50 = 3.5 mg/lit) and CD extract (LC10= 2.6mg/lit, LC50 = 4.4 mg/lit) for 48 hrs duration. Protein changes in muscles, liver and intestine were analysed after exposure period. Toxic effect of these two piscicides caused a remarkable protein fluctuation at sub lethal concentration.

Keywords: Protein profile, *Clarias batrachus, Cestrum nocturnum, Cestrum diurnum,*

Evaluation of biofilm production ability of diarrhoeagenic *E. coli* in different culture media using quantitative technique

[1]**N. A. Raytekar***, [1]N. A. Reshi and [2]S. Roushani

[1]Department of Life Sciences, School of Science, Sandip University, Nashik, Maharashtra.

[2] Department of Microbiology, Rural Medical College, PIMS-DU, Loni, Ahmednagar.

*E-mail- namita.raytekar@gmail.com, nissarreshi@gmail.com

Diarrhoeagenic *E. coli* (DEC) is an important group of pathogens responsible for infectious diarrhoea among children worldwide, especially in developing countries. Various virulence attributes contribute in the pathogenicity of DEC. However, it is difficult to discriminate between non-pathogenic and pathogenic strains of DEC due to similar cultural characteristics. Biofilm production is considered as a significant virulence factor, but none of the available qualitative assay is accurate to identify pathotypes of DEC. The present study aims to evaluate different culture media for biofilm production ability of DEC using quantitative method. A total of 82 strains of *E. coli* isolated from stool sample of children (0-12yrs) suffering from diarrhoea. The biofilm formation ability of all the strains was quantified with tissue culture plate method using enzyme-linked immunosorbent assay (ELISA) plate reader. The interpretation of biofilm production was done according to absorbance in each well of 96-well flat-bottom microtiter polystyrene plates. Biofilm production ability was assessed using different liquid culture media which mainly included BHI broth, Tryptone Soya Broth with 1%, 2% and 2.5% glucose, MH broth, DMEM. All the isolates were characterized into three main DEC pathotypes (EPEC, EAEC, ETEC) by multiplex PCR. The study shows that Enteroaggregative *Escherichia coli* (EAEC) pathotypes of DEC forms thick biofilms as compared to other pathotypes. Most of the EAEC strains form a biofilm when grown in cell culture medium with high sugar after 24hrs. The high glucose concentration appeared to be the strongest signal for biofilm expression. Additionally, the quantitative biofilm assay serves as expedient analytical tool for screening DEC pathotypes like EAEC.

Keywords: Diarrhoeagenic *E. coli*, Quantitative method, ELISA, Tissue culture plate, Biofilm production, Culture media

pH meter: A Dynamic Interdisciplinary Analytical Instrument In biological life

[1]B.U. Patil*, [1]Dr. A.G. Dholi and [1]Dr. D.R. Tope

[1]Department of Chemistry, HPT Arts and RYK Science College, Nashik, Maharashtra.

*E-mail- bupatil29@gmail.com, dholi.arun@gmail.com, dipaktope@gmail.com

Most cell can only function within very narrow limits of pH and require buffer systems to resist the changes in pH that would otherwise occur in metabolism. In plasma pH depend on ratio of bicarbonate to carbonic acid. Kidney, play vital role in maintaining of acid- base balance so that pH of urine can normally vary from 4.8 to 7.5 in man. The extracellular fluid usually has alkaline pH 7.4. Animal cell pH about 6.8 at 37 ^{0}C. Majority of land plants work excellence in the pH range 5.2 to 6.5. Some plant juices like orange and grape are very acidic of pH 3. Organisms pathogens has optimum range of growth at pH 7.2 to 7.6. To separate phospho protein casein from milk, the pH requirement is 4.8. Optimum pH is characteristic of enzyme. The main instrument to record pH of any buffer is pH meter. Coffee, red wine and white wine has pH 5, 3.8 and 3.5 respectively. To calibrate the pH meter, primary standards KH-phthalate, K-disodium phthalate, Di Sodium hydrogen phosphate and Sodium tetraborate are used. The blood which is very good biological buffer has pH 7.2. In addition, Barbiton and Calcium Codylate has pH 8.6 and 6 respectively. Blood bank use the Citrate, Phosphate, Dextrose and Adenine buffer system (pH 7) for Storing the blood for almost thirty-five days. The pH meter used with a pH responsive electrode and a reference electrode. Nowadays pen pH meter widely used. The whole water engineering and management would be incomplete without is pH determination. So, the pH and pH meter prove effective role in analysis of biological systems, blood, plant, cell, protein, blood, plasma food material, fruits, antibodies many lists are endless.

Keywords: pH meter, Metabolism, Plasma, Bicarbonate, Carbonic acid, Acid-Base, Alkaline, Cell, Organisms' pathogens, Casein, Optimum, Calibrate, Reference electrode, Pen pH meter

Extraction of chitosan from crustacean waste and its application

[1]D. Patil*, [1]P. Pawar and [1]A. Bhagwat

[1]K.T.H.M College, Nasik-422003, Maharashtra.

*E-mail- dhrutipatil198@gmail.com, Pratikshapawar14@gmail.com

The main source of commercial chitosan is the extensive deacetylation of its parent polymer chitin. Chitin is present in green algae, the cell walls of fungi and in the exoskeleton of crustaceans. The extraction process of chitosan from chitin involves three steps: 1) Deproteinization 2) Demineralization 3) Deacetylation. The obtained chitosan is characterized using Fourier transform infrared spectroscopy. Chitosan is considered to be one of the most promising and applicable materials in adsorption application. Industrial effluent treatment is carried out using various physical and chemical methods that are expensive, toxic and not always feasible. Chitosan can be used to carried out adsorption of azo dyes and heavy metals in industrial effluent. The extracted chitosan has shown high efficiency of Amido black and Janus green B removal of about 80% and 91% respectively. Thus, Chitosan can prove to be nontoxic, biodegradable and cheaper alternative to the conventional method of treatment. Other than this, being polycationic, nontoxic and biodegradable in nature chitosan has found to be effective coagulating agent. After dissolution in diluted organic acid, it forms viscid polyelectrolytes. Solutions of chitosan are prone to yield fibres, film and coatings. Chitosan coated musline cloth shows good clotting time in comparison with control. Chitosan containing bandage can be used for wound healing property. Chitosan at low concentration can also found to be effective in clarification of fruit juices as compared to physical and enzymatic fining methods that are expensive. Thus, Chitosan can be used as a cheaper, efficient as well as biodegradable alternative to all the expensive chemical as well as physical methods to treat industrial pollution and also as a good clotting agent.

Keywords: Chitin**,** Deacetylation Chitosan, FTIR, Adsorption, Azo dyes, Effluent, Blood clotting, wound healing, Fruit juice, Clarification

Isolation and screening of keratinolytic bacteria and their application in X-ray film treatment

[1]**S. Singh***, [1]R. Vahadane and [1]M. J. Rathod

[1]K.T.H.M College, Nasik-422003, Maharashtra.

*E-mail- singhsushma123456@gmail.com, rushikeshvahadane50@gmail.com

Keratinase enzyme is a proteolytic enzyme. It can break down soluble as well as insoluble proteins. Keratinase enzyme has many commercial applications like X- ray film treatment, animal feed preparation, bio-fertilizer preparation, etc. Enrichment was done using selective media containing feathers as the carbon and nitrogen source. Isolation was carried out on skimmed milk agar plates and colonies with zone of clearance were selected. A total of 5 isolates were obtained out of which C1 gave best activity at pH 10 and 50°C. Complete degradation of feathers was seen in 4 days. Isolate C1 was identified to be *Bacillus.* Purification of keratinase enzyme using 60% ammonium sulphate was carried out. The crude and purified enzyme was used for treatment of X-ray film. Maximum removal of silver was found to be optimum at pH 10, temperature 60°C and a time period of 48 hours. After 48 hours absorption spectrum was generated which showed maximum absorbance at 440nm. Purified enzyme showed better results than crude enzyme and showed maximum silver extraction after 4 hours. Thus, keratinase enzyme from *Bacillus sp.* gave good results for treatment of X-ray film. Silver extraction from x - ray films using keratinase enzyme is an eco-friendly approach. It can be used as an alternative for the methods used now. It is a cheaper alternative. After the enzymatic treatment, both the silver and the polyester films can be reused after the enzymatic treatment.

Keywords: Keratinase, Keratin, Feathers, X-ray film, *Bacillus,* Isolation, Optimization, Purification, Silver, Absorbance

Microbial Decolorization and degradation of Jakofix red azo dye by using isolated Bacteria from Textile Effluent Sample

[1]**N. Dhande* and** [1]U. Shete

[1]Department of Biotechnology Shivchhatrapati College, Aurangabad.

*E-mail- nitin301196@gmail.com

Synthetic dyes are widely employed in textile, coating, paper and printing industries. Currently more than 100,000 types of synthetic dyes are used commercially and 700,000 tons of dyes are manufactured in the world annually. Dyes are carcinogenic to the aquatic animals. Therefore, there is need to explorer research on decolorization of dye by using biological method. There are 12 number of Microorganisms were screened. The present study was undertaken to study screening and isolation of Microorganisms for decolorization of different textile dyes viz. BLUE HERD, Jakofix red Jakofix Golden yellow and Jakofix blue etc. Amongst 12 number of microorganism H, I, J and K isolates show higher decolorization activity

Keywords: Decolorization, Screening BLUE HERD, Jakofix red, Jakofix Golden yellow, Jakofix blue

Bioinformatics: Manager of Molecular Biology

[1]**V. K. Guleria*** and [2]H. Singh

[1]Assistant Professor of Botany, Government PG College, Nalagarh, Solan.

[2] Assistant Professor of Zoology, Government PG College, Nalagarh, Solan.

*E-mail- vk.guleria@gmail.com

This paper is a systematic analysis of bioinformatics base research and education for challenge posed after human genome project to manage huge molecular data. Bioinformatics can help genomics, proteomics, transcriptomics, pharmaceutical and biotechnological industry to keep pace with the world. Equal access of biological data can give wide range of research areas in molecular level within limited resource and provide opportunity to healthcare development as well as personalized medicine. It is an interdisciplinary field of study that uses Biology, Chemistry, Mathematics, Statistics, and Computer Science that are merged to form a single discipline. This sector is mainly involved in analysing the biological data, developing new software using biological tools. Analysing and interpreting such large-scale, complex data requires the help of computers. The human mind, superb as it is, is incapable of handling this much information. Bioinformatics is a hybrid field that brings together the knowledge of biology and the knowledge of information science, which is a sub-field of computer science. The storage and analysis of biological data using certain algorithms and computer software is called bioinformatics. The applications that bioinformatics offer to the civilized world are more than just being a researcher's tool for structural and functional analysis.

Keywords: Bioinformatics, Genomics, Proteomics, Gene, DNA

Herbaceous plants richness on lateritic plateaus of northern Western Ghats and their conservation

[1]R. R. Kolte*

[1]Department of Botany, Goa University, Goa – 403 206.

*E-mail- rutuja24kolte@gmail.com

Lateritic plateaus in northern Western Ghats consisting of rocky outcrops are unique habitats. Most of these species are endemic, habitat specific and restricted to narrow areas. They are rich in herbaceous plant diversity. However, intensive studies are very sporadic. In addition to that, plateaus are treated as barren lands by people. Hence study was carried out to check herbaceous endemic species richness of lateritic plateaus. For this, data have been gathered from published works from northern Western Ghats specifically dealing with new taxa. In addition, number of herbaceous endemic taxa from Goa and South Konkan has been documented by extensive field visits (October 2015 onwards). The analysis shows, most of the herbaceous new taxa described are from lateritic plateaus and are endemic. Study reports a total of 115 herbaceous endemic taxa from Goa and South Konkan. The family Poaceae ranks first with maximum number of endemic species. The field study has also resulted into some important findings such as, new species, rediscovery of rare taxa, extended distribution of newly reported taxa, etc. Study concludes that, lateritic plateaus are rich in herbaceous endemic plant diversity and several critical and intensive studies are needed to generate the robust data. Efforts were taken to initiate awareness among locals about such habitats. Local people and organizations were involved in various activities. Day by day, participation of locals increasing and the people from surrounding areas are showing interest in replicating this. Hence, taking taxonomic knowledge to local communities, training and involving them seem to be better working model for biodiversity conservation.

Keywords: Lateritic plateaus, Herbaceous plant diversity

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Microbial dye degradation by bacteria

[1]**A. S. Sawant***

[1]Shivchhatrapati college, Aurangabad, Maharashtra.

*E-mail- ajaysawantpatil45@gmail.com

In the presence study an attempt was made to examine the potential of different bacterial strains for decolorization of (azo dye) in batch reactor. The effect of media condition, pH, temperature and initial concentration of dye was studied with an aim to determine the optimal condition required for maximum decolorization and degradation. The bacterial strains used in the study were, *Pseudomonas fluorescence, Bacillus subtilis* out of this *Pseudomonas fluorescence* emerged out to be most potent decolourizer, being selected for further studies. The selected bacterium shows higher decolorization in static condition as compared to shaking condition. The optimum pH for decolorization by *Pseudomonas fluorescence* was 7.0. It shows good decolorization efficiency even in alkaline region. The optimum temperature was 37^0C. The result shows that the selected culture has good potential in removal of Azo dyes from waste water under static condition.

Keywords: Azo dye, *Pseudomonas fluorescence,* Decolorization, Degradation

Isolation and identification of MTB and extraction of magnetosomes from Lonar lake

[1]V. Waghmare*

[1]Shivchhatrapati college, Aurangabad, Maharashtra.

*E-mail- vrushabhwaghmare1997@gmail.com

Magnetotactic bacteria (MTB) compose a group of diverse, motile prokaryotes that have the ability to passively align themselves along earth's geomagnetic field due to the presence of intracellular organelles called magnetosomes. From literature study we came to know that Lonar lake is a rich source of diverse species of magnetotactic bacteria. So, we selected this ecosystem for the isolation of magnetotactic bacteria. We collected water samples from the Lonar Lake and were used for the isolation of magnetotactic bacteria. In the present work, we isolated the magnetotactic bacteria, from lonar lake sample and confirmed it by using hanging drop technique and Agar plate method. Their response to a magnetic field was observed employing the 'hanging drop technique' under a microscope and use of a semisolid medium. The bacteria showed a typical response in the form of movement towards the respective magnetic poles and precise alignment at the edge of hanging drop. Biochemical identification of isolated magnetotactic bacteria was done by performing various tests like Gram's staining, Catalase, oxidase, nitrate reduction, sugar fermentation test, starch hydrolysis, casein hydrolysis, growth at different temperatures and pH, etc. Also, magnetosomes were isolated from these magnetotactic bacteria and which was confirmed by FTIR analysis to ensure the presence of Fe-O group.

Keywords: Lonar Lake, MTB**,** Magnetosomes**,** Hanging drop technique, FTIR

Histological effect of Tetrahydroxy-p-benzoquinone on the reproductive organs of a female *Dysdercus cingulatus*

[1]**S. Singh-Gupta***, [1]A. Shere-Kharwar and [1]S. Lachke

[1]Department of Zoology, HPT Arts and RYK Science College, Nasik, Maharashtra.

*E-mail- supriya_hm@yahoo.co.in, adushere@gmail.com

Maharashtra has the largest area under cotton cultivation and cotton being a cash crop receives a disproportionately large amount of pesticides. Despite of this enormous usage of the pesticide in the cotton fields the loss due to pest continues to scare us. *Dysdercus cingulatus* is a common pest of Cotton and Okra. Both the crops are economically important crops for Maharashtra. To combat *Dysdercus cingulatus* many pesticides have been used without affecting it actually. Now it is the high time that we must think about a compound with a much broader application, where the preliminary task of an insecticide would be to induce a disruption in physiology and in turn the life cycle of a pest, making it more susceptible to its natural pathogen. In the present study a quinone compound, Tetrahydroxy-p-benzoquinone has been used to observe fecundity of *Dysdercus cingulatus* by observing any effect on the histology of ovaries. Upon treatment many deformities or changes were observed in the histology of ovaries like, detachment of follicular epithelium, loose arrangement of cells in germarium region, thickening of follicular epithelium, thinning or breakage of intrafollicular bridge, decreased size of oocytes and their distorted shape, slight shrinkage in ooplasm at some places, intense vacuolization in the ooplasm of oocytes, and overall reduction in the size of ovary. Hence, all these degenerative changes in the ovary of *Dysdercus cingulatus* suggest that Tetrahydroxy-p-benzoquinone affects the reproductive potential of *Dysdercus cingulatus* that has been reflected in the histology of its ovary. So, Tetrahydroxy-p-benzoquinone has a potential to be developed as an insecticide against *Dysdercus cingulatus,* though further studies are required.

Keywords: Histology, Ovary, *Dysdercus cingulatus*

Antibacterial activity of Iron Nanoparticles Synthesized Using *Elaeocarpus ganitrus*

[1]A. D. Pimpalwadkar*, [1]B. M. Shinde, [1]M. M. Wagh, [1]S. P. Bhavsar and [1]L. P. Sharma

[1]Department of Microbiology, G. E. Society`s H.P.T. Arts and R.Y.K. Science College, Nasik 422005, Maharashtra.

***E-mail-** amruta10pwadkar@gmail.com, shindebhavna99@gmail.com, mayuri19wagh97@gmail.com

Elaeocarpus ganitrus, commonly known as Rudraksh, is a well-known plant for its pharmacognostical properties like anti-diabetic, anti-inflammatory, anti-oxidant activity and anti-bacterial activity. In Ayurvedic medicines, this plant is used in the treatment of blood pressure, asthma, mental disorders, diabetes, gynecological disorders and neurological disorders. In this study, our aim was to synthesize magnetic iron nanoparticles (INPs) from Rudraksh plant material using $FeCl_3$ as a precursor salt. The different extracts prepared using plant material were fresh leaves extract (FLE), hot dried leaves extract (HE), cold dried leaves extract (CE) and Beads extract (BE). The phytochemical analysis of all the extracts was performed to determine the presence of Carotenoids, Saponins, Tannins, Alkaloids, Flavonoids and steroids. It was found that the leaves extracts were able to synthesize INPs which was confirmed by UV-Vis spectroscopy giving absorbance maxima in the range of 250 to 420 nm which was in accordance with the reported references. The antibacterial activity of the green synthesized INPs against *E. coli* and *S. aureus* was determined using well-diffusion method. The results showed zone of inhibition against *E. coli* and *S. aureus* by dispersed INPs. These green synthesized INPs can further be characterized using TEM, SEM, XRD, FTIR. The INPs have various applications in the field of medicine, diagnosis, agriculture, cosmetics etc.

Keywords: Rudraksh, *Elaeocarpus ganitrus*, Iron Nanoparticles, Antibacterial activity

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Screening of Fibrinolytic Enzymes from *Bacillus Spp.*

[1,2]**A. S. Salunke*** and [1,3]A. S. Kharat

[1] Department of Biotechnology, Dr. Babasaheb Ambedkar Marathwada University, Sub campus Osmanabad - 413501, Maharashtra.

[2] BioEra Life Sciences Pvt. Ltd., Survey Number 125, Mumbai - Bangalore Highway, Tathawade, Pune - 411033, Maharashtra.

[3] Laboratory of Applied Microbiology, School of Life Sciences, Jawaharlal Nehru University, New Delhi – 110067.

*E-mail- asha@bioeraindia.com

Decreased fluidity of the blood in the affected vessel results in the pathological thrombi which occlude the blood flow and leads to number of disease conditions like superficial phlebitis, Deep vein thrombosis, Pulmonary embolism, Hepatic vein thrombosis, Renal vein thrombosis, Brain stroke and Cardiovascular disease. Thrombolytic therapies, like use of anticoagulants or antiplateletic drugs have adverse side effects on human body. Hence there is an increased interest and pressing need to develop thrombolytic therapies with greater specificity and effectivity without any side-effect. Fibrinolytic enzymes are therefore looked upon as a promising option. Many organisms produce fibrinolytic enzymes naturally as a part of their life cycle. For identification of effective fibrinolytic enzyme from microbial source, screening of twenty-five *Bacillus spp.* isolated from various environmental samples with potential fibrinolytic activity was done. Six *Bacillus spp.* showed highest fibrinolytic activity analyzed by Agar Culture Plate Assay, fibrin plate assay and fibrin clot tube assay. Six *Bacillus spp.* were producing an extracellular fibrinolytic enzyme measured by crude enzyme preparation using ultrasonication and acetone precipitation method. A further study on characterization of *Bacillus spp.* and fibrinolytic enzyme by other available In-vitro methods is in process.

Keyword: Enzyme, cardiovascular diseases, blood clot, therapeutic agent, Thrombus, Fibrinolytic, Fibrin, *Bacillus*

Extraction of Prodigiosin Pigment from isolated *Serratia marcescens* and its applications

[1]**M. Kachare*** and [1]N. Chavan

[1]Department of Biotechnology,Shivchhatrapati College,N-3,CIDCO,Aurangabad, Maharashtra.

*E-mail- maheshkachare18@gmail.com, chavanneha08@gmail.com

Prodigiosin, a Biopigment, is a secondary metabolite that is a natural red coloured pigment which belongs to the family prodiginines. Prodigiosin has a variety of biological activities such as antimicrobial, antifungal, antioxidant, antitumor, anti-malarial, Antiproliferative and immunosuppressive activity and also has wide application in textile, printing, food, cosmetic and therapeutic industries. The present work was aimed to isolate the prodigiosin producing *Serratia marcescens* from various samples collected from soil, Sewage and surfaces of washrooms. Isolates were identified by Cultural, Morphological and Biochemical Characterization. The production of pigment from this isolate was carried out in Nutrient broth for 3 days at 30^0C.The pigment was extracted using acidified methanol. The extracted pigment was subjected to spectrum scanning in range between 300-700nm using methanol as blank. The pigment was characterized using TLC and FT-IR analysis. The prodigiosin Pigment was used for cotton dyeing and used to check Antioxidant activity and Bioemulsification activity.

Keywords: Prodigiosin, Serratia marcescens, Bioemulsification activity, Antioxidant activity, Cotton dyeing, TLC, FTIR, Biochemical characterization, Cultural characterization

Entrepreneurship Development through Mushroom Farming

[1]V. C. Chandel*

[1]Assistant Professor, Department of Botany, Government College Palampur, District Kangra-176061 (H.P.) E-mail- vivekchandel20@gmail.com

Mushroom cultivation is being commercialized in India past few decades. The mushrooms can grow naturally and, in the room, controlled temperature these can grow in the agro-waste material and also fetches a good price in the market. In the recent years, large numbers of commercials units have been built by the entrepreneurs/farmers throughout the country for the mushroom production. The commonly consumed varieties are Button mushroom, Shiitake mushroom, Oyster mushroom and Paddy Straw mushroom. Mushrooms are nutritious rich food for all age group. Mushroom is an excellent source of proteins, vitamins, carbohydrates, fibres, minerals folic acid and a good source of iron. Research has shown some medicinal mushrooms like *Lentinus*, *Cariolus*, *Shyzophyllum*, and *Ganoderma lucidum* that have promising cardiovascular, anticancer, antiviral, antibacterial, antiparasitic, anti-inflammatory, and antidiabetic properties. Mushroom farming is gaining popularity day by day among new entrepreneurs. They are cultivated with specifically propagated spawns on well prepared compost. Being tender in nature they deteriorate rapidly if not refrigerated or processed in time hence subjected to various processing methods such as drying, freezing, canning, pickling and sterilization. One can take up the business of spawn making/production for mushroom culture and act as the supplier of spawn to others who are growing mushroom on small or large scale as ready-to-use/inoculate spawn. Substrate making can become another source of business. Along with spawn and substrate making one can opt for making of bags/Boxes/Trays which contain composting material for mushroom cultivation. Processing and storage of mushroom can be another option of an enterprise. Now a day's mushroom farming is being practiced in more than 100 countries and increasing its production at an annual rate of 6-7%. The present study reveals that mushroom cultivation/farming can become a good source of income. It provides livelihood to many poor families in one way or other because of low capital investment it is affordable for everyone to take mushroom cultivation/farming as an enterprise.

Keywords: Mushroom, Entrepreneur, Spawn, Compost

Social Benefits of Methanogens *Archaebacteria*

[1]**A. S. Jadhav***

[1]Department of Zoology, HPT Arts and RYK Science College, Nasik, Maharashtra.

*E-mail- devika18798@gmail.com

Methanogens are autotrophic *Archaea* that produce methane as a product of their anaerobic metabolism. They are the largest producers of global methane, contributing over 60% of the total methane budget each year. Methanogens have become extremely important industrially as because they are used in the production of biofuels, as well as in treating industrial waste for industrial processes. This report will focus on those successful genetic methods and modifications that have been developed for methanogens and how they have started to contribute to understanding methanogen biochemistry. As many studies have found that methanogens are more metabolically diverse, meaning able to perform methanogenesis using a wider range of substrates, future studies, can focus on using alternative carbon sources for methanogenesis. These studies will be useful in developing the waste reduction applications of methanogens, such as treating industrial wastewater. Also, further studies on how methanogens can be used in the capture of carbon dioxide will be useful due to rising levels of CO2 in the atmosphere. The methane produced by methanogens during all of these processes can be converted into biofuel and used as an alternative energy source.

Keywords: Archaebacteria, Methanogen, Biofertilizer

Screening & isolation of keratinase producing micro-organisms and its application as a Bio-fertilizer

[1]**A. R. Tupe***

[1]Shivchhatrapati College, Aurangabad.

*E-mail- avirtupe143@gmail.com

The aim of the current study was to isolate keratinolytic bacteria from the soil samples collected from different areas in Aurangabad region, Maharashtra, India. The isolation was performed by serial dilution and spread plate method. Total Seven bacteria were isolated from agar plate method, among these seven bacterial isolates, K5 isolates shown highest keratinolytic activity in Feather containing medium. The cultures extract also shown positive effect on plant growth in pot assay while comparing with Urea (a chemical fertilizer).

Keywords: Keratinolytic bacteria, Feather, Pot assay, Urea

Exploring plant saponins in heavy metal remediation

[1]**K. Chinchore***,[1]J. Jamdhade and [1]M. J. Rathod

[1]Department of Biotechnology, K.T.H.M College, Nashik, Maharashtra.

*E-mail- chinchore.kalyani17@gmail.com

Saponins are plant secondary metabolite, which have special molecular structure with hydrophilic glycoside backbone and lipophilic triterpene derivative. Saponins are widely distributed in many plants. Saponins are traditionally used as a natural detergent. Recently saponins are used for heavy metal remediation. The pollution of soil and water by heavy metals is a significant environmental issue. Due to their high toxicity, they show hazardous consequence on human health. Currently, there are many treatment methods and techniques to clean up heavy metal from aqueous solutions and contaminated soil such as soil washing technology. Phytoremediation and adsorption etc. Use of saponins for heavy metal remediation is an effective approach. The phytochemical screening of saponins was done with standard test on 8 plants i.e. *S. mukorossi, B. aegyptiaca, A. auriculiformis, M. sativa, A. concinna, P. ginseng, L. nobilis, T. foenumgraecum.* Froth test and terpenoid test was performed in primary screening method from which 6 plant gave positive result for froth test between 1 to 10 cm as (foam height) and 4 plants gave positive result for terpenoid test. In secondary screening surfactant activity was checked by emulsifying index and oil spread method. Emulsifying index was checked with petrol, diesel and paraffin oil with extracted sample which resulted between 50% to 65%. Oil spread method also shows immediate displacement of oil layer. The purified saponins was used for heavy metal remediation of Cr, Pb, and Cd from the wastewater. A maximum of 55%, 57.28% and 88% metal removal were obtained by saponins for Cr, Pb, and Cd at 50ppm metal concentration and 50mg/ml saponins concentration respectively. These advantages indicate the good prospect of applying saponins in environment remediation.

Keywords: Saponin, Biosurfactant, *B. aegyptiaca*, *A. auriculiformis*, Heavy metals remediation

Reclamation of saline lands by using halophiles with PGPR activities

[1]**J. N. Bandal***, [1]M. Bhadkamkar and [1]M. Shirode

[1]Department of Microbiology, KTHM College, Nashik, Maharashtra.

*E-mail- bandaljayashri@gmail.com

Salinity of soils is one of the major abiotic stresses faced by the agricultural systems across the globe and is also a prominent cause of desertification of land, particularly in arid and semi-arid regions. The possibility of application of halophilic bacteria in saline soil recovery is important in order to visualize their future application in the rehabilitation of saline soils. The plant growth promoting halophilic bacteria help in bio-remediation of salt affected soils and thereby improve the agricultural crop yields. Approximate 5.2 billion hectare of fertile land affected by salinity, erosion and soil degradation and creates huge problems for the agriculturists. Around 50% of this land is only affected by saline stress (Riadh et al., 2010; Ruan et al., 2010). Globally, in terms of environmental stresses, saline stress is considered the most severe stress that effect not only the soil and plant growth but also the microbial population. It can be concluded that halophilic bacteria with PGPR activities can be used as a cost effective and economical tool for salinity tolerance and growth promotion in plants. Previous studies suggested that PGPR has the ability to promote plant growth and enhance their tolerance level towards salt because it improves plant physiological response and antioxidant potential. Previous research performed on plant hormones showed that these hormones ameliorated high concentration of salt stress when halotolerant strains like *P. chlororaphis* and *P. extremorientalis* were inoculated in the soil which restored and improved growth in crops like common bean (Phaseolus vulgaris) (Egamberdieva, 2011; Jha and Subramanian, 2013). The current study aimed to study the PGPR activities of halophilic bacteria isolated from Sea water of Murud sea coast of India. The Halophiles were isolated using Nutrient agar containing 5%, 10% and 15% NaCl. Four strains of halophilic bacteria were isolated and identified. All the isolates were tested for the PGPR activities at 5% salt concentration. All the cultures showed Nitrogen fixation, Phosphate solubilization and IAA production ability. The isolates showed potassium solubilization activity in the range of 17% to 35 %. H4 isolate showed maximum ability for potassium solubilization (35%). The isolates showed phosphate solubilization activity in the range of 15% to 40 %. H4 isolate also showed maximum ability for phosphate solubilization (40 %.). H1, H2, H3 showed maximum IAA production after 96 hrs. of incubation in the range of 35 µg/ml to 53 µg/ml . H4 showed maximum IAA production after 48 hrs. of incubation (58 µg/ml).

Keywords: Halophiles, Saline Land, PGPR

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Herbal bioflocculants for industrial wastewater treatment – an eco-friendly approach

[1]**A. D. Patil***, [1]P. L. Patil and [1]A. D. Bholay

[1]Department of Microbiology, KTHM College, Nashik, Maharashtra.

*E-mail-akshadapatil7597 @gmail.com

Applications of herbal macromolecular bioflocculants are having bright future because of its biodegradability as compared to conventional chemical-based flocculants. Therefore, the present study focuses on use of different herbal bioflocculants to reduce the pollution load from the industrial wastewater. Widely used flocculant is Aluminium sulphate (Alum). But the use of alum is costly and also over dosages causes harmful effects on human being. In order to overcome these limitations, herbal flocculants such as *Moringa oleifera*, *Cicer arentinum*, *Cactus opuntia* etc are used. The use of these herbal bioflocculants have an added advantage over the chemical treatment of effluent because it is biological and has been reported as edible, eco-friendly, economical and locally available.

Keywords: Herbal bioflocculant, Turbidity, BOD, COD, TS. Alum