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# National Conference

On

**Current Research & Innovations in Biotechnology,  
Nanotechnology and Environmental Science**

**SOUVENIR & ABSTRACTS**

**CRIBNE**  
**MARCH 23-24, 2018**

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**Department of Science & Technology**  
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**Sunil Sharma**  
**Chairperson**  
Suresh Gyan Vihar University

### ***Message***

I am profoundly happy to learn that the **National Conference on “Current Research & Innovations In Biotechnology, Nanotechnology And Environmental Science (CRIBNE-2018)”** is being organized by **School of Applied Sciences** in collaboration with School of Pharmacy, Suresh Gyan Vihar University, Jaipur on March 23-24, 2018.

In the recent year Biotechnology, Nanotechnology and Environmental sciences have developed as a new era in research. Modern biotechnology provides innovative technologies to cure rare diseases, reduce our environmental footprint, feed the hungry, cleaner energy, and have safer, cleaner and more efficient industrial manufacturing processes. On the other hand Nanotechnology breakthrough the purpose of manufacturing new materials at the Nano scale level. Due to the distinct properties of metallic nanoparticles these are being extensively used in physical sciences, chemical sciences, computer sciences, biological sciences as well as in biomedicine. Further, Environmental sciences are also addressing environmental problems, such as the removal of pollution, renewable energy generation or biomass production, by exploiting biological processes. I am sure that this conference would provide an excellent opportunity for the fruitful interaction to exchanging ideas among senior scientists, young researchers and students to discuss the latest advances made in Biotechnology, Nanotechnology and Environmental Sciences.

I welcome you all to the **National Conference on “Current Research & Innovations In Biotechnology, Nanotechnology And Environmental Science (CRIBNE-2018)”** and extend my best wishes for the grand success.

**Sunil Sharma**



**Dr. Sudhanshu**  
**Chief Mentor**

Suresh Gyan Vihar University

### ***Message***

I am glad to know that **School of Applied Sciences** in collaboration with School of Pharmacy, Suresh Gyan Vihar University, Jaipur, Rajasthan is organizing National Conference on “**Current Research & Innovations In Biotechnology, Nanotechnology And Environmental Science (CRIBNE-2018) on March 23-24, 2018.**”

It is a matter of privilege for the Schools as Eminent Scientists, Professors, Research Scholars and Students from various renowned Institutes/ Universities would be deliberating on the theme related with Biotechnology, Nanotechnology and Environmental sciences which has immense significance on health care and environment protection. I am sure the deliberations would be enlightening and professionally enriching for the participants.

I wish the Conference grand success.

**Dr. Sudhanshu**



**Dr. D. Buddhi**  
**President**  
Suresh Gyan Vihar University

### ***Message***

It is a great pleasure to know that the **School of Applied Sciences** in collaboration with School of Pharmacy, Suresh Gyan Vihar University, Jaipur, Rajasthan is organizing National Conference on “**Current Research & Innovations In Biotechnology, Nanotechnology And Environmental Science (CRIBNE-2018)**” on March 23-24, 2018.

I hope it will be a great interaction of Eminent Scientists, Professors, Research Scholars and Students. Participants will share their knowledge on recent updates in Biotechnology, Nanotechnology And Environmental Science. I take this opportunity to appreciate and thanks the School of Applied Sciences and School of Pharmacy for such an endeavor. The conference will certainly help in the academic advancement of University, Schools and Students.

I congratulate the organizers and wish this national conference would be a grand success.

**(Dr. D. Buddhi)**



**Dr. (Commodore) H. P. Singh**  
**VSM, Pro President (Academic)**  
Suresh Gyan Vihar University

### ***Message***

It is a matter of pride & professional satisfaction that **School of Applied Sciences** in collaboration with School of Pharmacy is organizing a two days National Conference on "**Current Research and Innovations in Biotechnology, Nanotechnology & Environmental Science**" on March 23-24, 2018. During the last three decades, much has been witnessed by the world in so far as development in broad variety of sectors including life sciences and biotechnology are concerned and these are considered as the main innovation driver sectors world over. The innovations in life sciences have led to new growth and competitiveness in traditional sectors, such as paper and pulp and chemical industries (including the pharmaceutical industry), textile companies and many others.

In fact Biotechnology is considered as a Key Enabling Technology together with three other technologies: nanotechnologies, advanced materials, and advanced manufacturing and processing. Research in biotechnology is aimed at boosting technological innovations and industrial leadership in these sectors. In our country under the ambitious Make in India project, a lot of impetus has been given to Bio technology sector. In fact this sector has seen high growth with a CAGR in excess of 20% and the key drivers for growth in the biotech sector are increasing investments, outsourcing activities, exports and the government's focus on the sector.

The setting up of national research laboratories, centers of academic excellence in biosciences, several medical college, educational and training institutes offering degrees and diplomas in biotechnology, bio-informatics and biological sciences are some of the initiative undertaken by the Government and the results are visible. Our university has also given lot of attention to research & academic excellence in these sectors. The CRIBNE -2018 is therefore very appropriate, timely and likely to generate very intense professional discussions in the technical sessions on various integral components of the Conference.

I wish the Conference (CRIBNE-2018) all the success.

Jai Hind  
Dr. (Commodore) H P Singh, VSM



**Dr. (Brig.) V. Vadehra**  
**Pro-President (Admin)**  
Suresh Gyan Vihar University

### ***Message***

It is indeed heartening that **School of Applied Sciences** in collaboration with School of Pharmacy is organizing National conference on “ **Current Research & Innovations In Biotechnology, Nanotechnology And Environmental Science**”. I am glad that this conference will focus on its application in diverse area like Biotechnology, Microbial technology, Nanotechnology in health care and Bioprospecting. The presentation by Eminent Scientists, Prestigious Professors/Associate Professors/Assistant Professor, Dynamic Research scholars and students will certainly lead to vigorous discussions among them and will also be motivating to participants.

I wish the organizers a grand success.

**Dr. (Brig.) V. Vadehra**



**Prof. (Dr.) Dr. Dinesh Goyal**  
**Dean Academics**  
Suresh Gyan Vihar University

### ***Message***

It is my kind pleasure to congratulate the Organizing committee of Department of Science & Technology (DST), Rajasthan Sponsored National Conference on **"Current Research and Innovations in Biotechnology, Nanotechnology and Environmental Sciences"** organized by School of Applied Sciences in Collaboration with School of Pharmacy at Suresh Gyan Vihar University on 23-24 March 2018

At the very Outset I appreciate the organizers for providing educationist, research Scholars and Industry experts across the Country a platform, where in they can discuss and resolve the challenges, Research Innovations and future prospects in the field of Biotechnology, Nanotechnology and Environment Sciences.

I hope this Conference will also explore the research opportunities and their social Implications in the field of Medical Sciences, Health Care, Nutrition, hygiene and Better life at Large. The growth in science and technology has also raised concerns for Environment too, by discussing such issues and drawing solutions for better tomorrow, during this conference will surely benefit the society.

I congratulate team for successful organization of the conference.

Wishing you Best of luck

**Prof. (Dr.) Dinesh Goyal**



**Prof. (Dr.) Ritu M Gilhotra**  
**Dean Research**  
Suresh Gyan Vihar University

It is overwhelming to learn that **School of applied sciences** and school of Pharmacy, SGVU is organizing Conference **“Current research and innovations in Biotechnology, Nanotechnology and Environmental Sciences.”** I must congratulate the organizers to select the most researched areas of the time that is Biotechnology, Nano technology and Environment Sciences. Both Biotechnology and Nanotechnology have a huge scope in the upcoming generations. It is the third highest booming field when compared with IT and Internet. Both Biotechnology, Nano technology are highly interdisciplinary field and is considered to be a confluence of engineering, technology and pure sciences such as physics, chemistry, biology and material sciences. Recent research in these fields are widely affecting industries such as cosmetics, food and agriculture, consumer products, medicine and pharmaceuticals, electronics and biomedical engineering. Similarly the Environment sciences are related to novel research on the fate and behavior of emerging contaminants, human impact on the environment, human exposure to environmental contaminants and their health effects, and environmental remediation and management. All these research agendas are highly important to add value to everybody life in terms of better health, economy, technology and better life states.

I wish the organizers my heartfelt wishes for the success of the conference

**Prof. (Dr.) Ritu M Gilhotra**





**Dr. Gaurav Sharma**  
**Convener**  
Suresh Gyan Vihar University

### ***Message***

The National Conference on “**Current Research & Innovations In Biotechnology, Nanotechnology And Environmental Science**” (CRIBNE-2018)” aims to bring together the leading academicians, scientists, researchers, research scholars and students to exchange and share their experiences and research result on biotechnology, nanotechnology and environment science.

I feel an immense pleasure to extend a warm welcome to all the participants from across the country to this mega event **CRIBNE-2018** which is being organized by **School of Applied Sciences** in collaboration with School of Pharmacy and hope that two days scientific deliberations of this august congregation will go a long way in shaping the philosophy and action, and make a valuable contribution to the diverse field of Conference.

I wish a grand success to this conference.

**Dr. Gaurav Sharma**



**Dr. Rishabh Charan Choudhary**  
**Organizing Secretary**



**Dr. Mohd. Irfan Ali**  
**Organizing Secretary**

### ***Message***

It is a great moment for welcoming you all to the National Conference on **“Current Research & Innovations In Biotechnology, Nanotechnology And Environmental Science ” (CRIBNE-2018)** is being organized by **School of Applied Sciences** in collaboration with School of Pharmacy, Suresh Gyan Vihar University, Jaipur on April 8-9, 2016.

The main aim of this academic event is to bring together eminent scientists, Professors/Associate Professors/Assistant Professors, industrialist, research scholars and students from India on one single platform for purposeful discussion and reflections on the ways of recent updates in Biotechnology, Nanotechnology and Environment Science adopted in order to enhance, health security and livelihood through innovations in this new growing field. We gratefully acknowledge and thank one and all for the success, and all for their tremendous response and enthusiasm. We take this opportunity to extend a warm welcome to all the delegates of the Conference. We hope that they would enjoy their stay in the pink city and we also hope that their brief stay here will prove to be academically stimulating and personally memorable.

We wish the Conference a grand success.

**Dr. Rishabh Charan Choudhary**

**Dr. Mohd. Irfan Ali**

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## BIOTECHNOLOGY FOR IMPROVEMENT OF FODDER CROPS- AN OVERVIEW

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India is the largest producer of milk in the world with over 150 million tonnes of production. The livestock population is also maximum in the country. However, the productivity of ruminants is low in the country as compared to many developed countries. Forages represent up to 80% of the daily ration of ruminant: dairy cows, heifers, beef cattle, bulls, cull cows, sheep, and goats. Deficiency in the fodder availability is major factor for this situation. Furthermore, the available fodder is not of good quality, in terms of nutritional composition. The improvement of forage crops through biotechnological approach has started in late eighties but at global level it has made remarkable progress. Biotechnological approach offers opportunities for creation of novel variations in forages which as such not possible through conventional methods. The various means of creating variation in forage grasses and achievement are somaclonal variation, somatic hybridization, genetic transformation etc. Embryo rescue has well been exploited to develop interspecific hybrids in *Trifolium* as well as *Lolium/ Dactylis*. Regeneration of the plantlets from reproductive parts such as anther results in haploid plant production. Artificial introduction of some foreign gene in the plant genome is genetic transformation. Insertions of genes may be by chemical, electrical, physical or micro-projectile transfer. In grasses it has been only limited success so far. There are several molecular techniques viz., RFLP, AFLP, RAPD and isozymes that may be used from time to time for characterization of germplasm, cultivar identification, detection of hybrids and genetic mapping and gene tagging. Efforts have been made for characterizing the varieties based on RAPD, RFLP markers and discrimination between the varieties can be based on gene frequencies. Identification of genes controlling apomixis is an area that can pay good dividends in grass breeding. Identification and cloning of these genes can be used in transferring in other cross pollinated crops for fixing heterosis and thus save on the account of producing hybrid seeds every year. Although, this aspect is receiving global attention, success has been little till date. Another aspect on these lines is identification of sexual lines in grasses. There is need to develop reliable molecular technique for screening of the grass species for existence of sexuality as it would accelerate the breeding process in such grasses as many of these plants could be used in crossing. The plants with better agronomic traits and apomixis can be selected and advanced for developing varieties. Nutritional improvement of forage crops have been possible using Biotechnological tools. Genetic transformation have been used to enhance digestibility by lowering lignin content in plants. Recently, use of microRNAs, the metabolic pathways have been successfully engineered to produce specific secondary products as well as enhancement of growth and survival of plants. In this presentation, these new developments will be discussed in details.

**Keywords:** RFLP, AFLP, RAPD, microRNAs

## **Petroleum Hydrocarbon Degradation by Bacteria isolated from Badopal salt lake (Pilibanga) and cost effective methods to enhance the rate of Biodegradation at the effected sites**

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Large amount of diverse pollutants enter the environment *via* industrial discharges and other anthropogenic sources. Of ubiquitous concern are petroleum hydrocarbons. Petroleum continues to be used as principal source of energy and plays an important role in global environmental pollution. On the other hand it will remain as a major source of energy for few more decades because it has yet not been substituted by a reliable alternative energy source. The fate of Bioremediation of hydrocarbons largely depends upon the salinity of the area concern. The problem of salinity escalation, in and around the globe, is expanding logarithmically and western Rajasthan (India) is no exception to this. Therefore, in the present study an attempt has been made to achieve the biodegradation of the petroleum hydrocarbons by the halophilic and halotolerant bacteria. They were isolated from Badopal salt lake which is situated at Pilibanga (district Hanumangarh). This lake is largely unexplored as far as the microbial studies are concerned. Five Bacteria isolated from this lake (at more than 10% salinity) exhibited the petroleum hydrocarbon degrading potential.

The physico-chemical parameters of the hydrocarbon contaminated soils (which are important for the growth and dwelling of hydrocarbon degrading microbial population), were found to be deviated from the optimal values. Hence, efforts were made in the form of some innovative soil engineering techniques (addition of soluble carbonates, NPK fertilizers and mustard khal) to restore the normal values for these parameters and hence to enhance the population of indigenous hydrocarbon degrading microbes.

**Key words:** Biological activity, halophilic bacteria, petroleum hydrocarbons, salinity, soil respiration.

## **Extremophiles: A potential source for industrially important biotransformations**

**Vikash Babu\***

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180001 (J & K)

Extremophiles are the microorganisms which are found in most severe environments on earth, including hydrothermal vents, hypersaline lakes and pools, alkaline soda lakes, dry deserts, cold oceans, and volcanic areas. From the last two decades, extremophiles have found to produce potential novel enzymes for industrially important biotransformations. Enzymes which are produced by extremophilic microorganisms are called extremozymes and these enzymes have been investigated for tolerance to harsh conditions i.e high or low temperature, high or low pH, high salinity, high metal concentrations, high radiation, high pressure etc. These enzymes are found to exhibit unique catalytic property for various industrial applications. Various enzymes, i.e. protease, lipase, phosphatase, cellulase, xylanase, pectinase, amylase, glucoamylases, DNA polymerases, dehydrogenases etc. have been reported from extremophiles for the production of fine chemicals and pharmaceutical compounds to fulfil the demands of process economics, product specification and to reduce the involved steps.

**Keywords:** Extremophiles, Enzymes, Biotransformation, Protease, Lipase.

## **Extremophiles: A potential source of industrially important enzymes**

**Rahul Vikram Singh, Anshela Koul and Vikash Babu\***

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Extremophiles are the microorganisms which are found in most severe environments on earth, including hydrothermal vents, hypersaline lakes and pools, alkaline soda lakes, dry deserts, cold oceans, and volcanic areas. From the last two decades, extremophiles have found to produce potential novel enzymes for industrially important biotransformations. Enzymes which are produced by extremophilic microorganisms are called extremozymes and these enzymes have been investigated for tolerance to harsh conditions i.e high or low temperature, high or low pH, high salinity, high metal concentrations, high radiation, high pressure etc. These enzymes are found to exhibit unique catalytic property for various industrial applications. Various enzymes, i.e. protease, lipase, phosphatase, cellulase, xylanase, pectinase, amylase, glucoamylases, DNA polymerases, dehydrogenases etc. have been reported from extremophiles for the production of fine chemicals and pharmaceutical compounds to fulfil the demands of process economics, product specification and to reduce the involved steps.

**Keywords:** Extremophiles, Enzymes, Biotransformation, Protease, Lipase.



## DEVELOPMENT OF TRANSDERMAL DRUG DELIVERY PATCH FOR ANTI-ATHEROSCLEROTIC ACTIVITY

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- 3.

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Transdermal drug delivery systems (TDDS) are extracorporeal polymeric device containing dissolved or dispersed drugs that demonstrate sufficient drug flux in an ex vivo and/or in vivo model at a constant rate. Present study carried out on Matrix type transdermal patches containing “Simvastatin” were prepared by solvent casting method employing a mercury substrate by using the combinations of HPMC and Eudragit RL-100 in different proportions. The transdermal patches were evaluated for their physicochemical properties like thickness, % flatness, weight variation, moisture uptake, moisture content, folding endurance, elongation and drug content values, in vitro permeation and skin irritation studies. The permeability of Simvastatin was enhanced with increase in HPMC content. In vitro cumulative amounts of the permeated drug were observed 57.53, 67.46, 86.26 and 99.88% in 48 hrs from the four formulations. The release profile of the optimized formulation S-4;  $r^2 = 0.984$  (Higuchi) showed that permeation of the drug controlled by a diffusion mechanism. The cumulative amount of the permeated drug after 48hrs from S-4 was 344.99 mcg/cm<sup>2</sup>. Permeability coefficient was calculated 7.18 mcg/cm<sup>2</sup>/hr. The patches were found to be free of any skin irritation. Based on the above observations, it can be reliably concluded that HPMC and Eudragit RL-100 polymers may be suited for the development of transdermal patches of Simvastatin for Anti-atherosclerotic activity.

**Keywords :** Transdermal, patch, Anti-atherosclerotic

## ECO-STATUS, MORPHOLOGY AND DISTRIBUTION OF AFRO ASIAN SAND SNAKE (*PSAMMOPHIS SCHOKARI*, FORSKAL: 1775) FROM INDIA

**Rakesh Kumawat and Ashok Purohit**

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In India, the genus *Psammophis* of family Lamprophiidae is represented by four species in which *Psammophis schokari* (Forskal, 1775) is distributed in narrow and restricted areas of arid habitats of northern western part in Thar Desert of Rajasthan.

The snake is known as diurnal species. It is found in dry habitat like sandy desert with scant vegetation. It is mildly venomous in nature and bite can cause pain, swelling and bleeding in human. The ecological habitat matches there is somewhat desert with scant vegetation. It was observed during daytime under bushes mainly of *Lasiurus indicus*, *Leptadenia pyrotechnica*, *Citrullus colocynthis*, *Caparis deciduas* etc. The maximum activity of this snake is noted at relative humidity of  $21 \pm 3$  % and relative temperature of  $31 \pm 3^{\circ}\text{C}$ . The snake occurrence observed in barren sand dunes, stabilised sand dunes and grassland habitats.

It has long, slender body, large eyes has round body, long tail. Strip line at both sides, dark brown mark on head. Lip scale white with black dots. Diagnosis shows smooth dorsal scale rows, in most specimens 18:17:13; or 17:16: 13 or 16:17:12, ventrals  $172 \pm 7$ , anal divided. Maximum SVL recorded as 530mm. Polymorphism also observed in this species of the snake.

This species was restricted to desert habitats of Rajasthan specifically in Jaisalmer district. 17 individuals recorded in different localities of Jaisalmer district, among them 8 are adults, 3 are sub-adults and 6 are juveniles. Previous it was reported in Jodhpur, Shahgarh, Mohangarh area but in this study we have added new localities as Sam, Sudasari, Khurdi, Myajlar of Desert National Park, Pokaran and Mohangarh region of Jaisalmer district.

**Key Words:** Thar desert, Afro Asian Sand Snake, Distribution, Jaisalmer.

**CAESALPINIA PULCHERRIMA SWARTZ.: PHYTOCHEMICAL  
ANALYSIS AND EVALUATION OF ANTIOXIDANT CAPACITY OF  
ITS METHANOLIC EXTRACT**

**Swati Vyas<sup>1,2</sup>, Prerna Dhingra<sup>1</sup>, S L Kothari<sup>3</sup>, Sumita Kachhwaha<sup>1\*</sup>**

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Oxidative stress is resultant of imbalance between pro-oxidants and antioxidants in a biological system, and number of disorders are linked to it. Natural sources, especially, medicinal plants serves as potential source of antioxidants. In the present study, morphological and phytochemical analysis of the methanolic extracts of aerial parts, namely, leaves, seeds and flowers of *Caesalpinia pulcherrima* Swartz. were done using standard methods. So as to ensure quality of the plant material, as it is important to ensure its safety, efficacy, quality assurance, stability of finished product and effective clinical as well as industrial employment. Antioxidant capacities of aerial parts were also measured by employing DPPH and TEAC assays. It was observed that out of the studied aerial parts of *C. pulcherrima*, leaves possessed maximum antioxidant capacity. Also, strong correlation between antioxidant capacity and polyphenolic content was observed.

**Keywords:** *Caesalpinia pulcherrima*, Oxidative stress, TEAC assays

## MICRORNAS AS POTENTIAL MEDIATORS OF VIRAL EVASION OF THE HOST DEFENSE

**Dr. C. P. Singh**

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MicroRNAs (miRNA) are a family of small, non-coding RNAs that regulate gene expression in a sequence-specific manner. MiRNAs have emerged as key players in the regulation of several pathways including developmental timing, haematopoiesis, organogenesis, apoptosis, cell proliferation, tumorigenesis and host-viral interactions. Recent studies suggest that viruses encode miRNAs to manipulate their host gene expression to ensure their effective proliferation. Insect viruses have hardly been the subjects of miRNA investigations. We have identified four *Bombyx mori* nucleopolyhedrosis virus (BmNPV)-encoded miRNAs and also functionally characterized two BmNPV-miRNAs (*bmnpv-miR-1* and *bmnpv-miR-3*) using a combination of *in silico* and experimental methods. We demonstrate the sequence-dependent interaction of *bmnpv-miR-1* with Ran mRNA using cell culture and *in vivo* assays, including RNA interference (RNAi) of Ran. Our results clearly show that *bmnpv-miR-1* represses Ran, leading to reduction in the host miRNA population, and consequently, the BmNPV load increases in the infected larvae. Blocking of *bmnpv-miR-1* resulted in higher expression levels of Ran and a decrease in BmNPV proliferation. Whereas, *bmnpv-miR-3* is employed by BmNPV, in titrating out its own genes, to avoid host immune response. Our miRNA overexpression and inhibition results showed that *bmnpv-miR-3* expresses during early stage of infection, and negatively regulates the expression of DNA binding protein (P6.9) and other late genes. These findings provide an insight into the evasion strategies used by the virus to counter the host defense for its effective proliferation and have relevance to the development of insect virus control strategies.

**Keywords:** MiRNA, host-viral interaction, *Bombyx mori*, Silkworm and BmNPV

## Hypoglycemic and Hepatoprotective Effects of Processed *Dillenia indica* in a rat (*Rattus narvegicus*) Model of Alloxan Induced Diabetes Mellitus

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Diabetes mellitus is metabolic disorder which is growing day by day and it is too concern for human being. To evaluate the antidiabetic activity of *Dillenia indica* and hepatoprotective effect.

In this study, alloxan (150 mg/kg b.w) was used to make a diabetic model after making diabetic model the ethanolic leaf extract of *Dillenia indica* at the dose of 200 & 400 mg /kg b.w were administrated to diabetic induced groups for a period of 28 days. The effect of ethanolic leaf extract of *Dillenia indica* leaf extract on serum blood glucose, as well as liver function test [SGOT, SGPT, Billirubin, ALP] were measured in the alloxan induced diabetic rats. **Results:** In the acute toxicity study, ethanolic leaf extract of *Dillenia indica* leaf was non-toxic at 2000 mg/kg in rats. The significantly increased level of blood glucose and liver function test were observed in alloxan induced diabetic rats , after administration of extract , these increased level were significantly decreased on the both doses of ethanol extract of *Dillenia indica* leaf. In Histopathological study were revealed toward normal.

thanolic extract of *Dillenia indica* leaf possesses significant anti-diabetic and rejuvenating capability of tissues.

**Keyword:** Alloxan , liver , *Dillenia indica* liver function test

## **A NOVEL APPROACH TO STUDY BIOCIDAL EFFICACY OF SOME ENVIRONMENTALLY SAFE TRANSITION METAL COMPLEXES DERIVED FROM NITROGEN DONOR LIGANDS**

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In biochemistry and co-ordination chemistry, the role of transition metal complexes with heterocyclic ligands cannot be underestimated. They show moderate anti-microbial activity against gram positive bacteria and fungi. Transition metal complexes with nitrogen donor ligands have often been studied recently because of their technical applications and applications in enhancement of drug action. Copper displays noticeable biochemical action as a constituent of various exogenously administered compounds in human. The co-ordination chemistry of nitrogen donor ligands is an active area of research. The interaction of these nitrogen donor ligands with copper soap gives complexes, which are potentially more biologically active. They play remarkable role as antifungal, antibacterial, antidiabetic, antiviral, anti-inflammatory, antimalarial and anticancer agents. These organometallic complexes show magnificent chromogenic properties. Thus it is worthwhile to construct some copper soap complexes with nitrogen donor ligands. Purity of all the synthesized ligands and complexes were checked by TLC. Biological screening has been done against candida species to produce fruitful results.

**Keywords:** TLC, Candida species, Nitrogen donor ligands, Antifungal, Anti-inflammatory.

## INTERVENTION OF BIOTECHNOLOGICAL TOOLS FOR IMPROVEMENT OF GUAVA (*PSIDIUM GUAJAVA* L.)

**Shashank Singh\* & Pradyuman Singh\*\***

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Guava (*Psidium guajava* L.) is considered as poor man's apple in India. Guava fruits are in demand as fresh fruit as well as in processing industry. However, some of the long-standing problems such as lack of soft seeded, coloured variety and wilt of guava require urgent attention of researchers. There is a need to produce guava variety resistant to guava wilt disease with delayed ripening quality. Conventional breeding has been of not much help so far. Biotechnological interventions may fetch in desired traits in commercial guava varieties like Allahabad Safeda, Sardar, Lalit and Pant Prabhat. Marker-aided breeding and recombinant DNA technology could help in development of desired trait in guava cultivars. There is a need to develop genetic map of guava. There is a need to engineer genes controlling ethylene biosynthesis and ethylene sensitivity in guava for better shelf life. Work on transforming guava with cold hardiness gene (CBF1, CBF2 & CBF3) is going on. Insertion of genes encoding hydrolytic enzymes (which can degrade fungal cell wall) such as glucanase and chitinase could also be useful for controlling diseases in guava. Many groups have reported in vitro regeneration protocol in guava using somatic embryogenesis and organogenesis pathway. For clonal multiplication, shoot bud culture is the most preferred pathway. Guava is a recalcitrant species and in vitro oxidative browning, in vitro contamination, low in vitro shoot proliferation and poor survival of micro propagated plants during acclimatization are some of the problems which makes micro propagation protocols of guava commercially unviable. There is a need to devise a more efficient and economic system of micro propagation of guava.

**Key words:** *Psidium guajava* L., Biotechnology, glucanase and chitinase

## THE METHOD TO IMPROVE PRE-PROCESSING OF MAMMOGRAPHY IMAGE FOR EARLY DETECTION OF BREAST CANCER

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The breast cancer occurs when some breast cells begin to grow abnormally. The suspicious breast cancers appear as white spots in mammograms, indicating small clusters of micro-calcifications. The cells in cancer divide more rapidly than healthy cells do and continue to accumulate, forming a lump or mass. The new cells form when the body doesn't need them, and old or damaged cells don't die as they should. The extra cells may form a mass of tissue called a lump or tumor. Cancer that forms in the tissues of breast, usually in the ducts (tubes that carry milk to the nipple) and in the lobules (glands that make milk) is the breast cancer. The early detection helps to save the life of the women. Two major factors which affect mammographic screening are the radiologist's level of expertise and the high volume of cases examined in a screening programme. Double reading on screening data could improve accuracy, but manpower limitations and a high level of intra-observer variability restrict its deployment. Computerized mammographic image analysis can improve both speed and accuracy apart from avoiding intra-observer discrepancies. Mammography is the basic screening test for breast cancer. It consists many artifacts, which negatively influence the detection of the breast cancer. The accuracy of the computer-aided systems decreases due to some factors like density of the breast, presence of labels, artifacts or even pectoral muscle in the mammogram image. Image pre-processing techniques are necessary, in order to find the orientation of the mammogram; therefore, removing artifacts and enhancing the quality of the image is required in Computer Aided Diagnosis (CAD) for better results and early detection of cancer. Before any image-processing algorithm can be applied on a mammogram, the preprocessing steps are very important in order to limit the search for abnormalities without undue influence from the background of the mammogram. Digital mammograms are medical images that are difficult to be interpreted, thus the preprocessing in mammography can improve the image quality and make the segmentation results more accurate. The objective is to improve the quality of the image to make it ready for further processing by removing the unrelated and surplus parts in the background of the mammogram. Breast border extraction and pectoral muscle suppression is also a part of preprocessing. The types of noise observed in a mammogram are high intensity rectangular labels, low intensity labels, tape artifacts. The types of noises present in a mammogram can be removed with the help of Adaptive Median Filter / Mean Filter and thus results for finding the cancer through CAD can be improved.

**Keyword: CAD, Median Filter, Artifacts, Preprocessing**



## ADVANCES STATISTICAL TECHNIQUES FOR DETECTION OF GLOBAL TREND IN ENVIRONMENTAL POLLUTION

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Environment pollution is increasing day by day due to the advancement of technology and urbanization. Environmental pollution is a complex topic as so many factors are responsible for the poor quality of our environment. Identification of factors which affect environment at constant rate or vary over a period of time and detection of trend (change over the time period) are important for monitoring environment pollution and planning environment control policy for better future. Time series data for the environment pollution may suffer some problems such as autocorrelation, heteroscedasticity, non-normality *etc.* so, conventional methods *i.e.* simple linear regression and non linear regression can't give efficient result to detect the trend of environment pollution over the time. Advances statistical methods *i.e.* Box-Jenkin time series model *i.e.* ARIMA (Autoregressive Integrated Moving average), ARCH/GARCH (Auto regressive conditional Heteroscedasticity/Generalized Auto regressive conditional Heteroscedasticity) and Mann Kendal test for detecting for monotonic trend in single or multiple situation are advisable in this situation. Base on the problems in environment related information or data, appropriate model should be selected from the available models. For autocorrelation problem ARIMA model, for Heteroscedasticity problem ARCH/GARCH model should be useful for detection of environment pollution trend. If the residual from the fitted regression model can't fulfill the assumption of normality, Mann Kendal test should be used for detection of trend. In general these advance statistical methods are inexpensive and efficient in estimation of environment trend.

**Keywords:** Environment pollution, ARIMA, ARCH/GARCH (Auto regressive conditional Heteroscedasticity Generalized Auto regressive conditional Heteroscedasticity)

**Effect of temperature, salt stress and pH on seed germination of  
*Stevia rebaudiana* Bertoni**

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Poor germination of seeds of *Stevia rebaudiana* Bertoni is a phenomenon with unknown reason and the research are still in progress for the further improvement. The present study aims at the evaluation of impact of temperature, salt stress and pH on seed germination of *Stevia rebaudiana*. Mature seeds were isolated at post-flowering stage. The *in vitro* seed germination tests were carried out in the dark in Petri dishes using an aqueous media. The influence of temperature, salt stress and pH was evaluated by following the evolution of germination over time. The results showed a maximum germination percentage of 81% in the seeds which were placed in open at room temperature for 3 days and then placed at 20 °C in continuous light with a maximal an optimum pH equal to 6.8 with 71% as a maximal germination percentage and a negative correlation between NaCl concentration and seed germination. The seed germination was poor with a germination percentage of 35 % at high temperature (28-30 °C) and was null at high NaCl concentration (>7.5 g/l) as well as at acid pH (pH <3.5).

**Key words:** *Stevia rebaudiana*, germination, temperature, salt and pH.

## CANCER STEM CELL (CSCs) EXPRESSION PROFILING USING ADVANCE TECHNIQUES

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Cancer stem cells (CSCs) have been suggested as central drivers of tumor initiation, progression, recurrence, and therapeutic resistance. Thus, identifying stem-like cells within cancers and understanding their properties is important for the development of efficacious anticancer therapies. Lysed cancer stem cells can be analyzed at genome, transcriptome, and proteome level from a single biological sample can provide better understanding. Cancer biomarker based genome analysis can provide cancer diagnosis, prognostic, pharmacodynamics. Microarray based transcriptome profiling can provide better understanding at RNA level and also post transcription modifications, that are responsible for cancer. Proteomics techniques include gel-free and gel-based methods. Gel free method include isotope coded affinity tagging (ICAT) is upgraded and better technique for Chemical proteomic, a combination of isotope coded affinity tagging (ICAT) and mass spectrometry, have proposed as powerful tools for identifying drug targets and explaining complex latent mechanisms of drug action against CSCs. Extracted protein can be analyzed by liquid chromatography (LC) coupled to MS/MS. This detection method permits for high resolution separation, thereby precisely revealing differential protein expression profiles. Gel-based methods employ, Two-dimensional difference in gel electrophoresis (2D-DIGE) is a method in which protein samples labeled by different fluorescent dyes are mixed with identical concentrations. A comparison generated 2D-DIGE fluorescence images allows for quantification of each spot. Hence, 2D-DIGE can reduce gel-to-gel variation by allowing simultaneous separation and comparison of several samples on one gel. Molecularly targeted drug delivery by Immunoliposomes, in which molecular targeting of cancer cells via liposomes conjugated with antibody or other ligand.

**Keywords:** Cancer stem cell, Drug designing, Molecular targeting and Immunoliposome

## **SAFETY EVALUATION OF RISUG<sup>®</sup> INDUCED CONTRACEPTION AND ITS REVERSAL THROUGH GENOTOXICITY AND APOPTOTIC MARKERS IN MALE RABBITS**

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RISUG induced contraception has been proven as a novel approach with a single intervention that provides non-invasive, long lasting and reversible male contraceptive method. The present work focussed on the evaluation of toxicity in male rabbits following vas occlusion with RISUG and its reversal with DMSO and NaHCO<sub>3</sub> using genotoxicity tests and apoptotic marker assays. Animals were divided into seven groups, viz., sham operated control, vas occlusion with RISUG for 3 & 12 months, reversal with DMSO and NaHCO<sub>3</sub> after 3 & 12 months, respectively. The samples (bone marrow, cauda epididymal spermatozoa, blood sample, testis and cauda epididymis) were evaluated for genotoxicity through micronucleus, chromosomal aberration and *in vitro* DNA damage tests and apoptosis through caspase 3, TUNEL, comet and annexin V assays. Results observed in bone marrow marked with minimum incidences of micronuclei in erythrocytes and frequency of aberrant chromosomes in all the studied groups, whereas, marked damage was observed in their respective positive control samples. Caspase-3 and TUNEL positive cells in testis and cauda epididymis were observed within control limits, i.e., 0.3% and 10% with the primary localization in spermatogonial cells and spermatids of testis and principal and basal cells of cauda epididymis. Olive moment, comet length and %DNA through fluorescence images of both leukocytes and testicular cells of experimental groups recorded with negligible cell damage as compared with positive control. DNA damage in cauda epididymal spermatozoa was observed between 2-3% and annexin V assay indicated minimum number of positive cauda epididymal sperms. We, therefore, conclude that, RISUG is unlikely to produce any toxicity in either of the samples, both during its injection into the vas deferens under prescribed dose as well as during its reversal. Hence, RISUG is compelling interest in the nearby future to be beneficially adopted by men as a successful non-invasive reversible contraceptive approach.

**Keywords:** RISUG, DMSO and NaHCO<sub>3</sub>, TUNEL

## HYPOCHOLESTEROLEMIC AND ANTIATHEROSCLEROTIC POTENTIAL OF *PROSOPIS CINERARIA* POD IN DIET INDUCED HYPERCHOLESTEROLEMIC RABBITS

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Hypercholesterolemia plays a crucial role in the development and progression of atherosclerosis which can be ameliorate through various therapeutic strategies. The present study assigned to investigate the hypocholesterolemic and antiatherosclerotic potential of aqueous extract of *Prosopis cineraria* pod in diet-induced hypercholesterolemic rabbits. The healthy albino rabbits were used for experimental animal model and randomly divided in various experimental groups. Hypercholesterolemia was induced by oral administration of high fat diet and cholesterol powder supplementation (500mg/kg body weight/day for 15 days). The treatment of aqueous extract of *Prosopis cineraria* pod caused significant

( $PP \leq 0.001$ ) alterations in lipid profile i.e. total cholesterol, LDL cholesterol, VLDL cholesterol and triglyceride at the end of completion of the course of 45days of experiment. Consequently, the significant ( $PP \leq 0.001$ ) reductions were shown in arterial wall thickness and atherosclerotic plaque. Rabbits were then administered with Aqueous extract of *Prosopis cineraria* pod for 45 days. Whereas, the renal function, hepatic function and hematology parameters were remained under normal ranges after the completion of experiment. Supportively, LPO (Lipid peroxidation) and antioxidant parameters were also revealing free radical scavenging potential without shown any adverse effects. Based on the result it can be concluded that finding of this investigation suggest that *Prosopis cineraria* extract have some particular kinds of bioactive compounds which may lead to deposition of hypercholesterolemia and atherosclerosis which could be considered as a potential lead in developing therapeutics.

**Key words:** Hypercholesterolemia, Atherosclerosis, lipid profile, Atherosclerotic plaque, *Prosopis cineraria* pod.

## ANTIHYPERLIPIDEMIC AND ANTIOXIDATIVE ACTION OF WHEAT GERM OIL IN RABBITS

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Hyperlipidemia is a metabolic dysregulation characterized by elevated serum level of cholesterol, triglycerides (TG) and low density lipoproteins (LDL) which are the major risk factors for the premature development of cardiovascular diseases like atherosclerosis. The aim of the study was to investigate the possible antihyperlipidemic and antioxidative effects of Wheat (*Triticum aestivum*) germ oil in diet induced hyperlipidemia in rabbits. Wheat germ oil was orally given to hyperlipidemic rabbits at the dose of 0.5 ml/kg body weight and the results were compared with the reference drug, that is, Atorvastatin (0.25 mg/kg body weight) and healthy control. Blood samples were collected via direct cardiac puncture after 60-day treatment and lipid profile, Catalase, Superoxide dismutase and Malondialdehyde estimations were done. The treatment resulted in significant improvement in serum lipid profile ( $P \leq 0.001$ ) when compared to the hyperlipidemic animals. It also significantly increased the activity of antioxidant enzymes, Catalase and Superoxide dismutase while decreased the malondialdehyde levels. Histomorphological studies of the thoracic aorta also revealed significant reductions in plaque area which correlated with the decreased cholesterol deposition. Our results showed that Wheatgerm oil has protective effect on diet-induced hyperlipidemia and can be used as a regular diet supplement to manage serum cholesterol levels.

**Keywords:** cholesterol, lipid profile, wheat germ oil, rabbits, atherosclerosis

## **WATER RESOURCE ACCESS IN SUB-SAHARAN AFRICA: CONTEMPORARY ISSUES AND PROSPECTS**

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Water resource is mans’ most vital resource in the world. Water is not equally distributed around the world. Africa is one of the continents with high scarcity of water resource. Conversely, poverty in Africa is epidemic which is often accelerated and pronounced with lack of access of water resource. The Saharan and Sub-Saharan Africa is suffering from severe water shortages. However, this continent is for long being suffering from political instability, ethnic conflict, drought, climate change, pollution, and other form of disaster. It is a norm in Africa especially in the Sub-Saharan and Saharan region to travel for in order to access clean and safe water for domestic and other purposes. This study was conducted in the Northern region of Nigeria. The study aimed to depict the diagnostic outlook of key issues related to surface fresh water resource through critically assessing contemporary surface water resource concerns, and identify prospective mechanisms that will enhance access to clean and safe water in the sub-Saharan Africa. The present study is qualitative in nature that depend on secondary data that were collected from peer reviewed literature, government reports and documents, non-governmental reports and charts, etc. The study found that there are well structured documented policies regarding the Nigeria’s surface water resource, this give people guarantee non restricted access to surface water resource. Though availability of surface water resource depend greatly on it seasonality and proximity to communities. However, there are obvious duplications and overlapping among different government institutions regarding water resource issues. Hence, there are reasonable effort by the government at all level in providing clean and portable water for the people, but this issue is far from over. With the current imminent and obvious effects of climate change in this region, there is need for declaration of state of emergency on water resource sector in this region. There is need for close collaboration between the government, non government, and private institutions in order to bulldoze this menace in this region.

**Keywords:** Water Access, Climate Change, Poverty, Nigeria, Sub-Sahara

## AVAILABILITY OF ANESTHETIC EXPERTS IN FUNAKAYE LOCAL GOVERNMENT, GOMBE STATE

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Anesthesia is a techniques commonly used in surgery to control pain during surgical procedure through administration of medicine called anesthetics. These drugs help in controlling patient blood pressure, breathing, body temperature, blood flow and heart rate bit as well as rhythm. Anesthesia can be local or genetic, and only administered by an expert physician called anesthetic. Administration of general anesthesia requires continuous monitoring of vital parameters of the body including body temperature by the anesthetic. Recently in most developing nations, surgical procedures were conducted without anesthetic experts, the anesthesia were administered by either a nurse or medical doctor. The prime aim of this study is to investigate the availability of anesthetic expert in hospitals in Funakaye Local Government in Gombe State, Nigeria. In order to get the diagnostic picture of the situation, a survey research design was adopted for the study using questionnaires with closed ended questions on the sample population. This study found that there is no certified anesthetic expert within the surveyed hospitals, though the respondents admit to be carrying out both minor and major surgical operation within these hospitals. This study recommends the utmost need for federal and state ministry of health as well as local government primary healthcare to make it mandatory to have at least an anesthetic expert in any hospital that is carrying out any surgical operation, and lastly there is need for collaborative monitoring of this issue to ensure strict compliance.

**Keyword:** Anesthesia, Anesthetic, Surgery, Gombe, Nigeria



## THE N-TERMINAL DOMAIN OF DnaB HELICASE (*HELICOBACTER PYLORI*) IS IMPORTANT FOR DNA BINDING MODULATION

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Replicative helicases are essential molecular machines that bind to DNA and utilize energy derived from NTP hydrolysis. It moves along double stranded DNA for its unwinding. The DNA binding properties of replicative helicases helps in loading onto a forked structure DNA at initiation or in translocation during elongation. Our earlier findings of DnaB hexameric helicase from *Helicobacter pylori* (HpDnaB) suggested that N-terminal domain is responsible for switching from weak DNA binding to strong DNA binding activity. Further, the DNA binding activity of HpDnaB is also modulated by loading factor i.e. Hp0897. In present study, we have tried to explore the important amino acid residue responsible for its enzymatic (DNA binding) modulation. On the basis of crystal structure of HpDnaB-N-terminal domain, we have identified few conserved residues which may have key role in switching the DNA binding activity by unmasking the DNA binding motif through inter or intra subunit interactions. Here, we have demonstrated that the substitutions at these conserved residues in HpDnaB enhanced the DNA binding activities several fold higher than wild type protein. We have also observed the increased ATPase activity in these mutants compared to wild type. An enhancement in DNA binding activities and ATPase activities, did not leads to increase in helicase activity which is required while translocation of helicase. Interestingly, inspite of being present on the interface of HpDnaB helicase and HpDnaG primase, these conserved amino acid residues of HpDnaB NTD, have no defect in DnaG primase mediated enzymatic activities of HpDnaB helicase.

**Keywords:** *Helicobacter pylori*, HpDnaB helicases and HpDnaG primase, ORF: Open Reading Frame

## APPLICATION OF SOIL BIOTECHNOLOGY IN ENHANCING THE QUALITY OF WASTE WATER

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Waste water treatment is the process in which the waste water having high pollutants can be converted into a water which can further be used as water with minimum environmental issues and can be used safely. In the present time many technologies have been developed. The soil biotechnology is a system of treatment by using cultural media for micro and macro organisms to process the water. The soil biotechnology along with the cultural media for microorganisms also uses sand, silt, gravel and coal. The macro and micro organisms used in soil biotechnology are *bacillus*, *pseudomonas*, *azatobacter*, *actinomycetes*, earthworms and some plant species. Analysis is done for various parameters such as temperature (°C) , pH, conductivity (micro S/cm), DO (mg/l), turbidity (NTU), COD (mg/L), BOD, ammonia (mg/L), phosphate-P (mg/L), SS(mg/l), alkalinity(mg/L), fecal coliform(cfu/100ml), nitrate N (mg/L). This process has various advantages and applicability such as it can be used in small and large scale, has no running costs excepts pumps, no smell, no sludge and has natural aeration. The computational fluid dynamics model is used to analyse the hydrodynamics as well as other parameters. For different configuration of the bioreactors simulation are being performed and the results are compared with the field and lab data. The computational fluid dynamics models gives us the best results. Thus the soil biotechnology is the modern technology which is ecofriendly, and least costly.

**Keywords:** Waste water, soil technology micro and macro- organisms.

## BIOREMEDIATION AND POLLUTED ENVIRONMENT

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The bioremediation and natural attenuation area has both basic research and field application foci for the environmental biotechnology. The basic research foci are co-metabolism, biotreatability, biotransformation kinetics, and modeling of biogeochemical processes. The field application foci are co-metabolic techniques, biogeochemical assessment techniques, and modeling of attenuation and environmental fate. Bioremediation can be defined as any process that uses microorganisms or their enzymes to return the environment altered by contaminants to its original condition.

On the basis of removal and transportation of wastes for treatment there are basically two methods- in situ and ex situ have also enjoyed strong scientific growth, in part due to the increased use of natural attenuation, since most natural attenuation is due to biodegradation. Bioremediation and natural attenuation are also seen as a solution for emerging contaminant problems, e.g. endocrine disrupters, landfill stabilization, mixed waste biotreatment and biological carbon sequestration. Microbes are very helpful to remediate the contaminated environment. Number of microbes including aerobes, anaerobes and fungi are involved in bioremediation process. Bioremediation provides a technique for cleaning up pollution by enhancing the natural biodegradation processes. So by developing an understanding of microbial communities and their response to the natural environment and pollutants, expanding the knowledge of the genetics of the microbes to increase capabilities to degrade pollutants, conducting field trials of new bioremediation techniques which are cost effective, and dedicating sites which are set aside for long term research purpose, these opportunities offer potential for significant advances.

**Keywords:** Bioremediation, Biotechnology, Microbes, Carbon Squestration.

## ROLE OF *CARICA PAPAYA* IN HUMAN HEALTH

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The study focused on the secret behind the papaya seed. Well known for its nutritional value. But can also treat cancer, the leaves of papaya having a unique character because they have a milky sap which contain actogenesis, which are essential for preventing and killing the growth of cancer cells. Actogenesis are a group of natural phytochemical that have anti-tumor activities. Especially cancer of the lungs, liver, breast cancer and cervix. Also rich in enzyme papain which is effective against cancer. As it breaks down of fibrin cancer cell and protein into amino acids form. Isothiocynate is one of the form of cancer cells. These enzymes capable of inhibiting both formation and development of cancer. The antioxidants in papaya fruit and seeds and their high fiber content also help in the detox process. As detoxifying and benefits in the treatment of cancer it also contains chemical integrates such as lycopene and others. Study investigated the effect of papaya seeds on prostate cancer using PC-3 cell line. This review summarizes the results of extract based or specific compound based investigation and emphasizes the aspects that warrant future research to explore the bioactivities in Carica papaya for their anticancer activities.

**Keywords:** Carica, Actogenesis etc.

## CLIMATE CHANGE IS THE BIGGEST THREAT IN PRESENT CENTURY

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Climate change is the biggest challenge for the society in the 21<sup>st</sup> century. It is not a problem of any single specific country or continent but it is a global problem. Present world is continuously speeding towards a catastrophe. Our foot is stuck on the accelerator and we are heading towards an abyss. It has far reaching effects, consequences and implication for entire globe in general and developing countries in particular. If sincere efforts are not made on war footing, then the life would become hell on this planet. Now-a-days, seasons are changing, temperature is rising of both earth and seawater and there is no end to it. The globe is entering in era wherein the environment would get intertwined in a spiral of decline and degradation affecting the availability and access to water, food, and energy in a big way. Studies reflects, world over people would consume 10 per cent more water per year than nature could replenish. Increase in global warming has been melting glaciers and receding snowlines. Accordingly, seventy rivers have stopped flowing into the sea and as a result, aquifers are depleting. It has far reaching effects, consequences and implication for entire globe in general and developing countries in particular. Hence, it is high time that globe as a whole must come forward to formulate a collective strategy for meeting or facing the biggest challenge of 21<sup>st</sup> century. Both developed and developing nations are sailing in the same boat. Hence, it is high time that globe as a whole must come forward to formulate a collective strategy for meeting or facing the biggest challenge of 21<sup>st</sup> century.

**Keywords:** Climate, Catastrophe, Energy, Glaciers, Globe

## **ROLE OF AGROFORESTRY IN MITIGATING ENVIRONMENT POLLUTION**

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The integration of trees, agricultural crops, and/or animals into an agroforestry system has the potential to enhance soil fertility, reduce erosion, improve water quality, enhance biodiversity, increase aesthetics, and sequester carbon. It has been well recognized that these services and benefits provided by agroforestry practices occur over a range of spatial and temporal scales. Many of these environmental externalities derived at the farm scale or landscape scale are enjoyed by society at larger regional or global scales. Although recent interest in the clean development mechanism (CDM) under the Kyoto Protocol offers promise for economic returns for carbon sequestration benefits of agroforestry systems, society's willingness to pay for other ecosystem services is yet to be fully explored. Agroforestry helps to conserve and protect natural resources by, for example, mitigating non-point source pollution (e.g. dust), controlling soil erosion and creating wildlife habitat. It facilitates flexible responses to rapid shifts in ecological conditions, while at the same time maintaining or restoring soil and water resources.

Microclimatic improvement through agroforestry has a major impact on crop performance as trees can buffer climatic extremes that affect crop growth. In particular, the shading effects of agroforestry trees can buffer temperature and atmospheric saturation deficit — reducing exposure to supra-optimal temperatures, under which physiological and developmental processes and yield become increasingly vulnerable.

**Keywords:** Agroforestry, agricultural crops, clean development mechanism (CDM)

## INFERENCE OF METAL BINDING TO EHVPS29 IN THE FUNCTION OF RETROMER COMPLEX

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Vps29 is the smallest subunit of retromer complex with metallo-phosphatase fold. Although the role of metal in Vps29 is in quest, its metal binding mutants has been reported to affect the localization of the retromer complex in human cells. In this study, we report the structural and thermodynamic consequences of these mutations in Vps29 from the protozoan parasite, *Entamoeba histolytica* (EhVps29). EhVps29 is a zinc binding protein as revealed by X-ray crystallography and isothermal titration calorimetry. The metal binding pocket of EhVps29 exhibits marked differences in its 3-dimensional architecture and metal coordination in comparison to its human homologs and other metallophosphatases. Alanine substitutions of the metal-coordinating residues showed significant alteration in the binding affinity of EhVps29 for zinc. We also determined the crystal structures of metal binding defective mutants (D62A and D62A/H86A) of EhVps29. Our results suggest that the metal positions are highly conserved and can be occupied with water in the absence of metal. Based on our results, we propose that the metal atoms or the bound water molecules in the metal binding site are important for maintaining the structural integrity of the protein. Further functional studies in the amoebic trophozoites showed that unlike in mammalian homolog, the mutations in the metal binding site of EhVps29, neither affected its sub-cellular localization nor the retromer function. However, the reduction of intracellular cysteine protease activity upon overexpression of wild type EhVps29 indicates that it plays a crucial role in secretion of the proteases.

**Keywords:** Vps29, D62A, D62A/H86A of EhVps29

**EFFECT OF TEMPERATURE AND RELATIVE HUMIDITY ON THE  
DEVELOPMENT OF BLUE MOULD ROT (*PENICILLIUM ISLANDICUM*  
SOPP.) ON INDIAN GOOSEBERRY (*EMBLICA OFFICINALIS* GOERTH.)**

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To study the effect of weather parameters i.e. temperature and relative humidity on the development of blue mould rot (*Penicillium islandicum* Sopp.) on Indian gooseberry *in vitro* experiment were carried out at Post graduate laboratory, Department of Plant pathology, Chaudhary Charan Singh Haryana Agricultural University, Hisar. An interaction of three temperatures i.e. 10, 20 and 30°C with relative humidity of 40, 60, 80 and 100 % was carried out at five and ten days after inoculation (DAI). Temperature of 30 °C along with cent per cent relative humidity resulted in maximum disease incidence of 87 and 100% in both 5 and 10 DAI, respectively. Minimum disease intensity (15 and 22%) was recorded at 10 °C temperature and 40 per cent relative humidity at 5 and 10 days after inoculation. However, with further increase in temperature and relative humidity, the per cent disease intensity was also increased and it also increased during the period of time (5 and 10 days after inoculation). Thus from the present study, it can be clearly elucidated that low temperature (10 °C) with low relative humidity (40%) is ideal for the post harvest storage of Indian gooseberry.

**Keywords:** *Penicillium islandicum*, Indian gooseberry, Temperature, Relative humidity, Blue mould rot.



## EVALUATION OF ELECTROCHEMICAL SENSOR BASED DIAGNOSIS FOR INITIAL STAGES OF KIDNEY DISEASE

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Chronic kidney disease (CKD) is characterized by progressive damage of the renal parenchyma and the loss of functional nephrons, which finally lead to progressive renal failure. It is estimated that it effects 1 in every 10 adults in India. The diagnosis of CKD depends on serum creatinine level and glomerular filtration rate which is detectable only when functionality reduces by 50%; hence leading to mandatory dialysis or kidney transplantation. Currently available methods are either time consuming or expensive and require trained manpower. A rapid, precise and cost-effective method for an early stage detection may enable improved quality of life for the patients prone to CKD. Designing an electrochemical biosensor was found to be an appropriate solution for the current hurdle in kidney degeneration prognosis.

We aimed to design a nanosensor based on electrochemical detection using a specific biomarker for the CKD. The designed sensor was compared to the diagnostic kits available in the market to evaluate its potential.

Capture molecule was immobilized using covalent modification and tested electrochemically for functionality. The sensitivity of the designed platform was tested for the efficacy with available kits.

Developed sensor is more sensitive compare to the current assay available in market like PENIA: Particle enhanced nephelometric assay, PETIA: Particle enhanced turbidimetric assay. The detection time also less (10 min) compare to current methods.

It is a first simple, rapid, accurate and economical and handy option for small-scale laboratory-based detection of initial stages (stage 1 & stage 2) of CKD, with high specificity, low detection limit and less detection time. Presently no such type of biosensor is available for the early stage diagnosis of CKD.

**Keywords:** Chronic kidney disease (CKD), Particle enhanced nephelometric assay,

## **CURRENT STATUS AND CHALLENGES OF CARDIOVASCULAR TISSUE ENGINEERING**

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Cardiovascular diseases are a leading cause of morbidity and mortality in every part of the world. Tissue engineering of heart has enormous potential to treat cardiovascular diseases. Recent advances in stem cell isolation protocols and its culture in bioreactors have given new hopes to this emerging field of medical sciences. Cell transplantation and myocardial tissue engineering are the commonly used approaches for engineering cardiac tissue. This review discusses the present status and challenges of cardiovascular tissue engineering with special emphasis on whole organ creation by decellularization and recellularization of three dimensional scaffolds, best cell source and optimal conditions for therapy.

**Keywords:** Tissue Engineering, Cardiovascular, Stem cells, Scaffolds, Decellularization

## ESTIMATION OF REDOX STATUS: RELATIONSHIP WITH THE SEVERITY OF SEPSIS

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Sepsis is a condition caused by infection followed by unregulated inflammatory response which may lead to the organ dysfunction. During such condition, over-production of oxidants is one of the factors which contribute cellular toxicity and ultimately organ failure and mortality. Antioxidants having free radicals scavenging activity exert protective role in various diseases. The present study has been designed to evaluate the levels of oxidative and anti-oxidative activity in sepsis patients and their correlation with the severity of the sepsis. A total of 100 sepsis patients and 50 healthy controls subjects were enrolled in this study from the period October 2016 to June 2017. The investigation included measurements of oxidative enzyme, myeloperoxidase (MPO), antioxidant enzymes including superoxide dismutase activity (SOD) and catalase activity (CAT). Furthermore, the level of these activities was correlated with severity of sepsis. Augmented levels of oxidants were found in sepsis as demonstrated by DMPO nitron adduct formation and plasma MPO level activity ( $1.37 \pm 0.51$  in sepsis vs  $0.405 \pm 0.16$  in control subjects). However, plasma SOD and CAT activities were significantly attenuated ( $p < 0.001$ ) in the sepsis patients compared with controls subjects. Moreover, inverse relation between antioxidant enzymes (SOD and CAT) and organ failure assessment (SOFA), physiological score (APACHE II), organ toxicity specific markers have been observed as demonstrated by Pearson's correlation coefficient. This study suggests that imbalance between oxidant and antioxidant play key role in the severity of sepsis.

**Keywords:** Catalase; Inflammation; MPO; ROS; Sepsis; SOD

## **CURRENT SEROTYPES OF DENGUE IN WESTERN UTTAR**

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Dengue fever is a mosquito-borne tropical disease caused by the dengue virus. There are four antigenetically related but distinct serotypes of the dengue virus: DENV-1, DENV-2, DENV-3 and DENV-4. Our study was undertaken with the aim to detection of circulating dengue serotype by Real Time Reverse Transcriptase PCR (polymerase chain reaction).

It's a cross sectional study conducted at Viral Research & Diagnostic Laboratory, Department of Microbiology, UPUMS Saifai, Etawah. Clinically suspected dengue cases attending different OPDs or admitted to different wards of this hospital between June 2016 to February 2017, were tested for NS1 Antigen ELISA and IgM Antibody ELISA. Out of 579 suspected cases, 104 were positive either by NS1 ELISA or IgM ELISA or both. All these 104 positive samples were subjected to Real Time Reverse Transcriptase PCR.

Among these 104 cases, 66 (63.46%) were male and 38 (36.54%) were female with ratio of 1.73:1. Most common age group affected was 0-18 yrs, out of which 23 were male and 9 were female. Of these 104 samples, NS1 antigen ELISA was positive in 39 samples alone, NS1 and IgM ELISA both were positive in 40 samples and IgM ELISA alone was positive in 25 samples. Of all these 104 samples, Real Time Reverse Transcriptase PCR detected serotypes in 76 samples only. The most common prevalent serotypes detected were DENV-2, 41(53.94%) and DENV-3, 23(30.26%) followed by DENV-1, 6(7.89%) and DENV-4, 6(7.89%).

Thus this study concludes that all dengue serotype are circulating in this region of the state with the most prevalent serotypes being DENV-2 and DENV-3 followed by DENV-1 and DENV-4.

**Keywords:** Dengue fever, DENV-1, DENV-2, DENV-3 and DENV-4

## BIOPHYSICAL SCREENING AND *IN-SILICO* STUDIES OF SORTASE A FROM *ENTEROCOCCUS FAECALIS*

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*Enterococcus faecalis* (Ef) is a Gram positive multidrug resistant (MDR) bacterium which contributes about 70% of total enterococcal infections. Ef is resistant to most of the commonly used antibiotics mostly due to its ability to form biofilms. In Ef, a membrane anchored transpeptidase enzyme Sortase A (SrtA) plays a major role in formation of biofilms. Therefore, SrtA has been recognized as an ideal drug target against Ef. In this regard to identify the potential inhibitor of Ef Sortase A (EfSrtA), we have cloned expressed and purified EfSrtA. We have also done the in-silico docking studies to identify lead molecules interacting with EfSrtA. Furthermore, the binding studies of these identified lead molecules were performed with EfSrtA using fluorescence spectroscopic studies. In addition to this, we also identified the interaction partner of EfSrtA with the STRING. Furthermore, we performed the in-silico protein-protein docking studies. Docking experiment revealed that cephaloglycin, benzylpenicillin, cefotaxime, pantoprazole and valsartan were bound to same site on the protein with similar interactions. Binding studies using fluorescence spectroscopic studies also confirmed the binding of cephaloglycin, benzylpenicillin, cefotaxime, pantoprazole and valsartan to EfSrtA at very low concentrations. This is the first report which revealed the binding of five lead molecules to EfSrtA which was further confirmed by fluorescence spectroscopic studies. Sequence based interaction studies identified that EfSrtA $\Delta$ 59 interact with the Ef\_1091, Ef\_1093 and Ef\_2658 proteins. A homology model of Ef\_1091 and Ef\_1093 was then complexed with modeled EfSrtA $\Delta$ 59 and protein-protein interactions are also discussed.

**Keywords:** *Enterococcus faecalis*, X-ray crystallography, rational structural based drug design

## BIOSYNTHESIS & CHARACTERIZATION OF GOLD NANOPARTICLE MEDIATED DELIVERY OF MCP I OF *CARICA PAPAYA* SEEDS AS A MALE CONTRACEPTIVE IN ALBINO RATS

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In the present study, gold nanoparticles (GNPs) based delivery system is being developed to enhance efficacy of MCP I of methanol sub-fraction of benzene chromatographic fraction of chloroform extract of *Carica papaya* seeds. MCP I tagged GNP was synthesized via wet chemistry process by adding MCP I to 1 mM of aqueous tetrachloroaurate (III) solution under vigorously stirring and boiling at 70°C and characterized using UV-Visible Spectroscopy, Fourier Transform Infrared Spectroscopy, Dynamic Light Scattering, Transmission Electron Microscopy and Energy-Dispersive X-Ray Spectroscopy. Thirty six adult male albino rats were divided equally into four groups viz., Group I- vehicle control; Group II- MCP I @10 mg/animal/day oral; Group III- MCP I tagged GNP @40 µg/animal/day oral (nanoparticle size ~20 nm; spherical/monodisperse) and group IV- MCP I tagged GNP @80 µg/animal/day oral (nanoparticle size ~50 nm; polydisperse). Three animals from each group were sacrificed followed 30, 60 and 90 days of treatment. Body weight, hematology, the absolute weight of reproductive and vital organs weight did not show appreciable changes following 90 days of treatment. The cauda epididymal sperm count significantly declined in group II ( $4.80 \pm 1.80$ ; mil/ml), group III ( $7.50 \pm 1.10$ ; mil/ml), group IV ( $17.01 \pm 0.30$ ; mil/ml) when compared with group I ( $24.10 \pm 1.50$ ; mil/ml) following 90 days of treatment. Sperm motility was significantly altered in group II ( $4.24 \pm 1.68$ ; %), group III ( $16.63 \pm 1.64$ ; %) and IV ( $15.40 \pm 3.40$ ; %). Whereas sperm abnormality was significantly enhanced in group II ( $49.49 \pm 4.93$ ; %), group III ( $57.42 \pm 1.69$ ; %) and IV ( $47.31 \pm 0.98$ ; %) when compared with group I ( $26.58 \pm 0.75$ ; %). Fertility of groups III and IV showed markedly declined after 15 days while fertility of group II gradually declined after 30 days. Complete sterility was achieved after 30 days of treatment in group III while 60 and 90 days in groups II and IV, respectively. Histopathological studies of testes exhibited vacuolization in Sertoli cells, disorganization of germinal epithelium and eruption of germ cells in all treated groups which indicate cessation of spermatogenesis at the level of primary spermatocytes. Findings suggest instant fertility impairment in groups III and IV due to efficient delivery of MCP I by particular size of GNPs. Therefore, GNPs mediated delivery of MCP I may be used as an innovative approach for male contraception.

**Keywords:** Gold nanoparticles (GNPs), *Carica papaya*, Energy-Dispersive X-Ray Spectroscopy

**ALLELOPATHIC EFFECT OF *TEPHROSIA PURPUREA*  
ON *PARTHENIUM HYSTEROPHORUS* L.**

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One of the main threats to biodiversity in the world is the destruction of habitats by natural and human interference. Natural and semi natural destruction is mainly caused by invasion of alien organisms which has been recognized as one of the serious and inestimable problem because existing aliens do not disappear and sometimes continue to spread. So, they are called as pervasive threat and it is important driver of global change. *Parthenium hysterophorus* L. is found to be the second most densely populated deadly and aggressive weed with allelopathic properties. This research study have been reported with common naturally occurring weeds as controlling agents for *Parthenium hysterophorus*, because use of some other allelopathic weeds and plants to suppress the weed infestation is the most cost effective and environment friendly method for weed control. The current study was conducted to test the inhibitory potential of aqueous extracts of root, stem and leaves of weed species *Tephrosia purpurea* on seed germination and seedling growth of *Parthenium hysterophorus* L. under laboratory conditions. The leaves are most effective part of plant. The radicle was more inhibited than the plumule in petri dishes. Inhibitory effect increases with increasing aqueous extract concentration. Therefore, further investigations will be required under green house and field conditions for pragmatic recommendation of species selection in the frame of weed species mediated ecological management of *Parthenium hysterophorus* L.

**Keywords:** *Parthenium hysterophorus* L., *Tephrosia purpurea*,

## MORPHOLOGICAL AND PHYSIOLOGICAL RESPONSE OF THE PLANTS TOWARDS DIFFERENT SOUND STIMULATIONS

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Plant growth is effected inevitably by different of external stimulations and these stimulations then influence the crop's yield attributes, yield and quality. Some scientists are of the opinion that plants are devoid of a nervous system and therefore are unable to understand music or respond to music. Sir Jagdish Chandra Bose was one of the pioneers to study the behavior of plants in response to various stimuli. Music is a harmonious and coherent blend of various frequencies and vibrations and has many different forms, qualities, and pitches. Different sound waves of *Gyatri mantra* and rock music produce different stimulation to plants that can effects the plant growth in different way. An experiment was conducted to study the impact of different musical sounds on plant growth. The influence of acoustic frequencies including soft and hard music on the growth pattern of different plants was recorded. Germination of wheat variety PBW 343 was recorded on 6<sup>th</sup> day of sowing on exposure to music followed by control (No music) on 8<sup>th</sup> day. Plant height recorded at every 10 days interval after CRI (25 Days), reported that plant height and number of tillers were higher with Gyatri Mantra followed by rock music and least in control. Plant growth and number of flowers were higher recorded in *Dahlia pinnata* (Single), *Dahlia pinnata* (Double), *Dianthus chinensis* and *Dimorphotheca fruticosa* with *Gyatri mantra* followed by rock music and least in control conditions up to 90 days of sowing. Environmental condition, fertilizer, irrigation and other agronomic practices were common for all the treatments. Positive response of plants with *Gyatri mantra*, may be due to that these sounds facilitate better physiological processes like absorption of nutrients, photosynthesis, protein synthesis, etc. for the plant and this is observable in terms of increased height, higher number of leaves and overall more developed and healthier plants.

**Key words:** Growth, stimulation, music



## **RISUG<sup>®</sup> INDUCED INTRATUBULAR CONTRACEPTION AND ITS REVERSAL IN FEMALE ALBINO RATS**

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RISUG<sup>®</sup> is a copolymer of styrene and maleic anhydride (SMA) arising as one of the most promising male contraceptive device than conventional vasectomy and other vas based male contraceptives. The contraceptive efficacy of intratubular injection of RISUG<sup>®</sup> and its reversal with DMSO and NaHCO<sub>3</sub> has been assessed in female rats. Animals were divided into four groups containing 10 animals each, viz., sham operated control (Group I), tubal occlusion with RISUG<sup>®</sup> for 90 days (Group II), tubal occlusion with RISUG<sup>®</sup> for 90 days and reversal with DMSO (Group III) and tubal occlusion with RISUG<sup>®</sup> for 90 days and reversal with 5% NaHCO<sub>3</sub> (Group IV). The body weight was taken fortnightly, estrous cycle monitored daily and fertility was recorded monthly. Reproductive and vital organs weight, histology, tissue biochemistry, teratology and hematology were evaluated at sacrifice schedule. The animals of group II indicated positive mating but no pregnancy was observed confirming zero percent fertility. However, after reversal, group III animals exhibited gradual increase in fertility (50% at 45 days, 80% at 105 days and 100% at 150 days) following reversal with DMSO and in group IV animals, fertility restored to 70% at 45 days, 70% at 105 days and 100% at 150 days following reversal with NaHCO<sub>3</sub>. Histo-architecture showed normal cellular configuration of ovary and uterus, however, RISUG<sup>®</sup> implanted isthmic region showed shedded epithelium with blunt and low villi in group II animals, with lumen filled with eosinated RISUG<sup>®</sup> implant. In groups III and IV animals, isthmic part of fallopian tube was thick, surrounded by muscular layers with narrow lumen and short mucosal folds. No significant alterations were observed in other parameters, viz., body weight, reproductive and vital organs weight, estrous cyclicity, tissue biochemistry, teratology and hematology. Thus, the above findings suggest that RISUG<sup>®</sup> induces intratubular contraception and the procedure is reversible and safe.

**Keywords:** Styrene maleic anhydride (SMA), teratology hematology

## GENETIC VARIABILITY IN THE ISOLATES OF *BIPOLARIS MAYDIS* CAUSING MAYDIS LEAF BLIGHT OF MAIZE

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Maize is one of the most important cereal crops in the world and also known as queen of cereals. Among various diseases of maize, maydis leaf blight incited by the fungus *Bipolaris maydis* has attained the status of the economically important disease. Six isolates of *Bipolaris maydis* (viz., Jind, Karnal, Yamunanagar, Panchkula, Sonipat and Kaithal) were collected from different locations of Haryana and their genetic variability was studied by using random amplified polymorphic DNA (RAPD) and internal transcribed spacer (ITS). Data generated from 18 RAPD and 2 ITS polymorphic primers from six *B. maydis* isolates was analysed with UPGMA by using NTSYS and dendrogram was constructed. The cluster analysis of *B. maydis* isolates using combined data of RAPD and ITS primers depicted wide range of genetic relatedness, which ranged from 0.30 to 0.57, i.e., 30 to 57 per cent among the isolates of *B. maydis*. All primers showed 100% polymorphism with fragment size varying from 0.25-3 kb. The UPGMA analysis differentiated the six *B. maydis* isolates into three groups i.e. group A, group B and group C, at similarity coefficient of 0.42. The group A consisted of two isolates of *B. maydis*, in this isolates Jind and Sonipat showed 57 per cent genetic similarity and both of them showed 41 per cent genetic similarity with group B. On the other hand group B consisted of two isolates of *B. maydis*, in this isolates of Yamunanagar and Kaithal showed 45 per cent genetic similarity. Group C consisted of only one isolate (Karnal) of *B. maydis*, isolate from Karnal showed 31 per cent genetic similarity with group A and group B. But isolate Panchkula did not fall in to any group at the similarity coefficient of 0.42, Panchkula isolate was wide distance pair showing 29 per cent similarity with other isolates of *B. maydis*, whereas maximum closeness (57%) was observed between Jind and Sonipat isolates. Analysis of *B. maydis* isolates from maize by phylogenetic tree revealed distinct clusters showing genetic variation.

**Keywords:** *Bipolaris maydis*, RAPD, UPGMA.

## **AZADIRACHTA INDICA A. JUSS (NEEM): A HIGHLY IMPORTANT MEDICINAL PLANT**

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*Azadirachta indica* A. Juss (Neem, Family: Meliaceae) has been aptly referred to as the “Sarva Roga Nivarini” in the (Charaka Sanhita) from as early as the Vedic times. It attracted the interest of phytochemists all over the world for its rich source of alkaloids and terpenoids. It was only during the past half-a-century that this tree has come to prominence, since isolation of azadirachtin-A (Aza-A) by Morgan from its seed-kernels. Aza-A is a tetra-nortriterpinoid, widely used in empirical Ayurvedic medicine. Neem tree grows naturally in the Indian subcontinent. Neem has gained tremendous multipurpose significance, worldwide, due to its therapeutic and bioactive properties. There is long history use of neem in India, and its medicinal properties are also enshrined in ancient Indian scriptures. Most of the plant parts such as fruits, seeds, leaves, bark and roots contain compounds with proven antiseptic, antiviral, antipyretic, anti-inflammatory, antiulcer and antifungal uses. It has great potential in the field environment protection and medicine. The Chemical constituents of Neem contain many bioactive compounds including alkaloids, flavonoids, triterpenoids, phenolic compounds, carotenoids, steroids and ketones. Methanolic extract fraction of neem leaves when tried against Cocksackie B group viruses, produced *in vitro* show highly effective on antiviral and virucidal strain.

**Key words:** Bioactive compounds , Anti-inflammatory, Tetra-nortriterpinoid.

## STUDIES ON EFFECT OF ABIOTIC STRESS ON BIOCHEMICAL PROFILING IN *VIGNA UNGUICULATA*.

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The present research plant *Vigna unguiculata* is an annual herbaceous legume found cosmopolitan. It is found normally in erratic rainfall with high humidity as it is an important economic crop in arid zones of Asia and Africa . It has tremendous nitrogen fixing capability, as the plants root nodules are able to fix atmospheric nitrogen, making it a valuable crop for storehouse of farmers who are economically weak and well-suited to intercropping with other crops. Cadmium pollution from industries can affect soils in farmlands there by playing destruction with health of humans and livestock. The present study was undertaken to study the effect of Cadmium salts on seed germination percentage, seedling growth and fresh weight including various biochemical parameters of *Sorghum bicolor*. Seeds were treated with different concentrations (10, 50, 100, 200, 500 and 1000 ppm) of cadmium sulphate along with control for 10 days. On the 10th day results were noted for above parameters. Seed germination percentage was recorded maximum at 10 ppm followed by 50 ppm. Maximum shoot length was observed at 500 ppm (7cm) and root length showed maximum growth at 10 ppm (5.6cm). Fresh weight of seedlings was observed better than control for 10 ppm dose level and decreased further with increase in dose level. Further maximum amount of proteins and total soluble sugars were observed at 200ppm (16.1mg/gdw and 1.75mg/gdw respectively) and while starch was found to be maximum at 500 ppm (3.5mg/gdw) and total phenols were found to be maximum at 200ppm dose level (3.35mg/gdw). However, in lipids there was no variation in content at various doses as compared to control. Total chlorophyll was found to be maximum in control and minimum at 1000ppm dose level (0.022 and 0.007 mg/gdw) and maximum amount of carotenoids was found to be maximum at 1000 ppm. These results can be further developed as markers for field testing of cadmium polluted plants for phytoremediation.

**Keywords:** *Vigna unguiculata*, herbaceous legume, phytoremediation

## ISOLATION AND CHARACTERIZATION OF PHYTOSTEROLS FROM *ALHAGI MARORUM*

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In these decades, drastic attention in the natural products especially mentioned Ayurvedas and other conventional systems of medicines has been observed. Drugs obtained from plant have been measured much safer and possess at remendous utility in the treatment of various diseases. Medicinal plants are called molecular factory, as they have ability to produce vast range of compounds derived from them thus termed as "*Bioactive compounds*". The plants bears different phytochemicals known to early civilizations for various curative properties. Researches in these areas are assisting in depth knowledge about the mechanisms, their role and formation of secondary metabolites and nutraceuticals of importance. *Alhagi marorum* is significant medicinal plant having several medicinal values like antimicrobial, antioxidant and anticancer agents. It is an important arid zone flora normally consumed as herbal drugs for treatment in pain and inflammation, including other metabolic disorders such as diabetes and obesity. During present investigations, phytosterols was characterized and quantified from *A.marorum*. Chromatographic and spectral studies were used to confirm Phytosterols in which  $\beta$ -sitosterol, campesterol and stigmasterol were confirmed through TLC, IR and GC-MS. GC-MS profiling showed presence of 48 compounds. It was observed that maximum area was occupied by 2Propen1one, 1(4methylphenyl) 3phenyl, oxime having area of 6.45%. Thus this plant can be used in future therapeutic endeavors.

**Keywords:-** *Alhagi marorum*; Phytosterols; TLC; IR; GC-MS.

## SYNTHESIS AND CHARACTERIZATION OF CARBON/SILVER COMPOSITE USING DIMERIC GALLATES: STUDY OF THEIR ANTIMICROBIAL POTENTIAL

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The gallic acid is a potent antioxidant and is copiously available plant phenolic compound. In the present study, a dimeric analogue of gallic acid (DGA) was synthesized which was then employed to yield stable carbon/silver nanocomposites of ~50 nm size. Reduction and subsequent stabilization of nanocomposites was achieved using different concentration of DGA. No signs of aggregation were observed and was confirmed with surface plasmon resonance.

The antimicrobial potential of such composites was evaluated in four different bacterial and fungal strains. The nanocomposites showed efficacious bactericidal activity (~ 5 µg/ml) and fungicidal (~10 µg/ml) activity against all the strains. The activity was also substantiated by means of optical and transmission electron microscopic studies. The significant antioxidant and antiplatelet activity of the nanocomposites represent them as suitable and versatile antimicrobial agents. The DGA could be an effective experimental candidate which would play an important role for the pertinent issue of scaling-up with low volume. Concisely, these DGA stabilized carbon/silver nanocomposites could serve as promising antimicrobial agents for effective outcomes.

**Keywords:** gallic acid, DGA

## **EFFECT OF NANOMATERIALS ON GROWTH AND PHYSIOLOGY OF MILLETS**

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Millets are small seeded cereals that are grown as staple foods in the third world countries. In the present era of industrial advancement, nanomaterials (NMs) are continuously produced and commercially used on a large scale. These NMs deteriorate the soil quality when released as industrial effluents, directly effecting the agricultural produce and end up in the food chain. The present study was aimed to analyses the effect of NMs on food crops by taking millets as model plants. Seeds were grown under different NMs with varied concentrations in the MS medium. After 15 days, the plantlets were excised and their antioxidant potential was measured by studying different reactive oxygen species (ROS) scavenging enzyme activities like Peroxidase (POX) etc. The enzyme activities were found to be increasing with the rise in the NM concentration indicating the stress enhancement. It was concluded that NMs lead to deterioration in the growth of the plants.

**Keywords:** Nanomaterials, Peroxidase

## GREEN SYNTHESIS OF AGNPS USING POLLEN-PRODUCING REPRODUCTIVE ORGAN OF *CALENDULA OFFICINALIS*

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In recent science Nanobiotechnology is a impassioned field for the researchers. Nanobiotechnology deals with the Nanoparticles having a size of 1 - 100 nm in one dimension used significantly concerning medical chemistry, atomic physics, and all other known fields. NPs are used immensely due to its small size, orientation, physical properties, which are reportedly shown to change the performance of any other material which is in contact with these tiny particles. These particles can be prepared easily by different chemical, physical, and biological approaches. But the biological approach is the most emerging approach of preparation, because, this method is easier than the other methods, ecofriendly and less time consuming. The Green synthesis was done by using the aqueous solution of stamens of *Calendula officinalis* extract and AgNO<sub>3</sub>. A fixed ratio of plant extract to metal ion was prepared and the color change was observed which proved the formation of nanoparticles. The nanoparticles were characterized by UV - vis Spectrophotometer, FTIR, XRD, TEM and SEM. The nanoparticles were found have the size ranges from 160 - 180 nm.

**Key Words:** Nanobiotechnology, Nanoparticles, Green Synthesis



## **PROTEOMICS: CHALLENGES AND OPPORTUNITIES IN DRUG DISCOVERY AND DEVELOPMENT PROCESS**

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Proteomics is the emerging technology leading to high-throughput identification and understanding of proteins. Proteomics is the protein equivalent of genomics and has captured the imagination of biomolecular scientists, worldwide. Because proteome reveals more accurately the dynamic state of a cell, tissue, or organism, much is expected from proteomics to indicate better disease markers for diagnosis and therapy monitoring. Proteomics is expected to play a major role in biomedical research, and it will have a significant impact on the development of diagnostics and therapeutics for cancer, heart ailments and infectious diseases, in future. Proteomics research leads to the identification of new protein markers for diagnostic purposes and novel molecular targets for drug discovery. Though the potential is great, many challenges and issues remain to be solved, such as gene expression, peptides, and generation of low abundant proteins, analytical tools, drug target discovery and cost. A systematic and efficient analysis of vast genomic and proteomic data sets is a major challenge for researchers, today. Nevertheless, proteomics is the groundwork for constructing and extracting useful comprehension to biomedical research. This poster presentation covers some opportunities and challenges offered by proteomics in drug discovery and development process.

**Keywords:** Proteomics, peptides, biomedical research

## A PROTECTIVE EFFECT OF ETHANOLIC LEAF EXTRACT OF *ANNONA SQUAMOSA* ALLOXAN INDUCED NEPHROTOXICITY IN RATS

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Medicinal plants are capable to producing active constituents that can be used to treat several types of diseases and hence medicinal plants achieving an important role in global health. Diabetes mellitus (DM) is metabolic disorder characterised by chronic hyperglycaemia with disturbances of carbohydrate, protein and fat metabolism resulting to decrease insulin secretion, or completely stop insulin formation or both.

The principle objective of this investigation is to find out antidiabetic activity of ethanolic extract of *Annona squamosa* Linn. In the present study alloxan induced diabetic rat model were used. Diabetes was induced in Wister rat by alloxan of dose (150 mg/kg b.w.). It has been shown to damage pancreatic beta-cell and produce hyperglycemia in rats. After induction of diabetes, caused significant reduction in blood serum glucose, lipid profiles like serum cholesterol and triglycerides but significant increase in HDL and body weight. The ethanolic extract of *Annona squamosa* Linn leaves of (200 and 400 mg/kg) were administered orally to alloxan induced diabetic Wister rat model for 28 days. To know the role of *Annona squamosa* Linn in blood serum glucose, kidney function test such as urea, uric acid creatinine, bilirubin protein and albumin.

After the treatment significant reduction showed in blood glucose level, urea, uric acid, creatinine and bilirubin while increases the level of protein and albumin in diabetic model in comparison to control. The anti-diabetic activity of extract is found more effective in (400 mg/kg b.w.) comparison to (200 mg/kg b.w.). Thus, leaves of *Annona squamosa* Linn can be used as potential anti-diabetic drug.

Ethanolic extract of *Annona squamosa* Linn leaves possesses significant anti-diabetic characteristics.

**Keywords:** *Annona squamosa*, Diabetes mellitus, Antidiabetic.

## EFFECTS OF TIN (IV) COMPOUND ON REPRODUCTIVE FUNCTIONS IN THE MALE RATS

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To investigate the effects of Tin (IV) compound on male reproductive functions and study the mechanisms underlying these effects, Tin (IV) compound were administered orally to a group of male rats at 4 mg/kg b.wt. for 60 days. Group I served as control and received the treatment vehicle, distilled water. Treatment caused a significant decrease in the testicular weight at 4 mg ( $P \leq 0.01$ ) in male rats which might be a product of both its potent antioxidant properties and androgenic activities. The density of sperms in the testes was decreased significantly ( $P \leq 0.01$ ) at 4 mg dose level. The serum testosterone, FSH and LH level was decreased significantly ( $P \leq 0.01$ ) at 4mg dose level when compared with that of control group. The level of glutathione in testis was decreased significantly ( $P \leq 0.01$ ) in the 4 mg treatment group.. The results indicated that Tin (IV) compound have anti-fertility effect in the male rats.

**Key Words:**, TIN (IV) compound, Testosterone, Male reproductive functions, antioxidant properties.

**ABSTRACT FOR POSTER PRESENTATION AT GYAN  
VIHAR UNIVERSITY**

**PRODUCTION OF POLY HYDROXY BUTYRATE FROM INDUSTRIAL  
WASTE AND ITS APPLICATION AS BIOPLASTIC**

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Poly  $\beta$  - hydroxybutyrate (PHB) is a heavy, molecular-weight polymer with monomer units of (R) 3 hydroxyl butyric acid (HBA) which is deposited as a storage component in many groups of microbes, and is an eco-friendly thermoplastic. Distillery spent wash (DSW) is an industrial waste which has elevated chemical oxygen demand (COD) levels but consists of valuable minerals that can be used for PHB production. *Azotobacter vinelandii* (ATCC® 12837™ and ATCC 13705™) was used to develop *A. vinelandii* UWD, which is a hyper PHB-producing mutant, by using N-methyl-N'-nitro- N-nitrosoguanidine (NTG) mutagenesis. This strain was grown in a fed-batch bioreactor containing diluted DSW at (1–7%) with 5% glucose as the carbon source, and ammonium acetate as the nitrogen source. The transformation efficiency for rifampicin (Rif)-positive colonies was  $9 \times 10^{-5}$  which was good enough to select the hyper PHB-producing mutants after five days of incubation. The amount of PHB produced in different dilutions of spent wash was highest (40 g/L, 92% w/w) with 4% spent wash. The glucose consumption was 89% w/w at 4% DSW, and the dry cell weight was  $> 23.4$  g/L. In addition, elevated COD levels (1100 mg/L) of DSW were decreased to 200 mg/L after fermentation was completed. The spent wash, which is considered to be a production waste and ecological pollutant, can be consequently used for bioplastic production.

**Keywords:** Poly  $\beta$  - hydroxybutyrate (PHB), 3 hydroxyl butyric acid (HBA),

## EFFICACY OF FUNGICIDES AGAINST LEAF SPOT OF PEARL MILLET CAUSED BY *DRECHSLERA SETARIAE* UNDER FIELD CONDITIONS

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Pearl millet (*Pennisetum glaucum*) locally known as bajra, combo, sajja, bari, ganti or kambam, is an allogamous crop having protogynous nature. India is the largest producer of pearl millet, Rajasthan occupies first position in area and production in india. Among the various diseases of pearl millet, leaf spot caused by the fungus *Drechslera setariae* has attained the status of the economically important disease. Among the seven fungicides evaluated against leaf spot of Pearl millet under field conditions during *Kharif* 2015, minimum disease intensity was recorded with Propiconazole (9.62%) followed by tebuconazole (14.07%), carbendazim + mancozeb (16.29%), difenconazole (23.71%), hexaconazole (42.96%), mancozeb (47.40%) and chlorothalonil (50.38%) at 0.2 per cent concentration. However, propiconazole was highly effective, significantly superior and recorded maximum disease control (88.99%) followed by tebuconazole (83.90%) and carbendazim + mancozeb (81.36%), difenconazole (72.87%), hexaconazole (50.85%), mancozeb (45.77%) and Chlorothalonil was least effective fungicide which gave minimum disease control (32.45%) at 0.2 per cent concentration. Two sprays of propiconazole 25 EC @ 0.2% at fifteen days interval found to be highly effective against leaf spot of pearl millet and gave minimum disease intensity (9.62 %), maximum grain yield (22.10 q/ha), maximum spike length (23.33 cm) and maximum plant height (179.10 cm) followed by tebuconazole 25 EC @ 0.2% and carbendazim 12 WP + mancozeb 63 WP @ 0.2%. Propiconazole 25 EC @ 0.2% has highest avoidable loss in grain yield. This treatment also increases the grain yield, length of spike, plant height with highest disease control efficacy.

**Keywords:** *Pennisetum glaucum*, tebuconazole, difenconazole, hexaconazole

## **MOLECULAR BACTERIA-FUNGI INTERACTIONS: EFFECTS ON ENVIRONMENT, FOOD, AND MEDICINE**

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The discovery of penicillin is one of the first documented observations of an interaction between bacteria and fungi mediated by small molecules. Historically molecular intergeneric interactions were regarded mainly as growth-inhibiting interactions; however, modern research revealed that microbial cross talk forms an integral part of our environment and covers various aspects beyond simple antibiosis. There are instances in which natural products alter phenotypes and developmental processes, such as sporulation or biofilm formation, and serve as virulence factors in symbiotic and pathogenic associations involving additional partners. Specialized mutualistic relationships have evolved in which a host organism harbors a symbiont to make use of its chemical synthesis capabilities to combat competitors or to maintain a certain lifestyle. The growing number of studies published in the past few years that report discoveries in this field points to an exciting emerging area of research. Our increasing understanding of the complex networks in microbial ecology will not only help us understand fundamental biological processes but also lead to the discovery of new virulence factors and drug candidates. This topic highlights recent contributions to the understanding of bacteria-fungi interactions mediated by secondary metabolites that occur in the environment and affect medicine and biotechnology.

**Keywords:** Penicillin, biofilm, sporulation

## **AUTOMATED IRRIGATION SYSTEM**

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In today's busy world most of us likes gardening and many households are keeping small nurseries but we don't have enough time to monitor and maintain the watering regularly because of which we end up losing our plants to heat and dryness. Technologies can be used to overcome these issues. Many people do not have the capital resources to invest in expensive monitoring systems so the aim is to make simple monitoring systems which should also focus on avoiding wastage of water. In order to automatically water the plants, our system utilises software that allows the microcontroller (connected to moisture sensor and water pump), to detect the soil moisture and accordingly start or stop the water flow till desired soil moisture level is attained. Furthermore, RTC module, temperature and humidity sensor and photoresistor etc. can also be connected to monitor the plant's growing environment. The readings from these sensors can be seen instantly when the microcontroller is connected to a computer, WiFi and Bluetooth module can also be connected to get alerts about critical sensor readings in our smartphone by SMS or email. The WiFi module can also be used to switch on and off the motor from anywhere. Wastage of water and unnecessary irrigation is controlled in this system and it helps to irrigate plants with only the necessary amount of water. This system is more applicable in greenhouse and home gardening. Small farmers and people who are willing to do home gardening or nursery will be very much benefited with this system and many people will be motivated to start home gardening.

**Keywords:** microcontroller, WiFi, Bluetooth

## **INSECT RESISTANCE MANAGEMENT FOR Bt CROPS**

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Integrated Plant Disease Management (IPDM) and Insect Resistance Management (IRM) are scientific approach to prevent pest evolution and its negative impact on agriculture, public health and veterinary issues. This management system was first utilized in USA by Monsanto. A variety of studies are coming to light where pests have now started to show resistance to the Genetically Modified crops. Since their introduction, a variety of Bt crops have come in the market where the manufacturer are informing about the benefits without having any information as to how quickly these plants will again become susceptible to the pathogens. Identification of early signs of resistance and utilization of strategies to delay these losses will not only be beneficial to the farmers, but also to the scientific community. IRM practices have been helping farmers fight off this inevitable end result till now. IRM practices are developed to decrease the chances of insect becoming resistant to Bt traits by planting a Bt variety with a non Bt variety at the same time. We focus on some of these techniques and inform about how these practices can be further modified. Utilizing Remote Sensing technology and IPDM systems proper training can be provided through Universities to future generation of farmers.

**Key Word:** IPDM, IRM, Bt crops, Bt traits, management practices.



## RECENT PERCEPTION ON PTC MEDIA

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Plant tissue culture (PTC) is used to maintain and grow plant cells, tissues and plant organs under sterile condition on a nutrient culture medium. Variations in plant tissue culture media are one of the most important aspects in plant biology. Since any part of any plant can be grown on these PTC media, there has to be variations in their content according to the requirement of the plant. First attempt was done by Germany to isolate the plant cells in vitro on artificial medium. In early days natural media was used in which, composition was not specific the results were not appropriate; the media composition can be both general and species specific. Also, the content of the media is tissue specific, i.e. the growth is from cells. When developing a suitable media for a particular plant culture system, initiation of studies generally start with a known medium (eg. B5 or MS Medium) and then modifications are done according to required characteristics. The technique is not without problems. For example, in spite of significant advances, there is still difficulty in regeneration of shoot organogenesis and somatic embryogenesis of Indian sandalwood. In this review we inform about the timeline of these PTC media, their development, patents and current problems associated.

**Key words:** PTC, MS medium, B5 medium, organogenesis, embryogenesis.

## **A STUDY TO ENHANCE THE FERTILISER POTENTIAL OF BIO-GAS PLANT SLURRY WASTE THROUGH ADDITION OF NITROGEN FIXING BACTERIA.**

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Biogas plants are the renewable and sustainable source of energy that converts the Bio waste into Biogas. In society it is very relevant. However, some crucial problems are being faced by the existing Biogas facilities. One of the major problem faced is the insufficient production of fertiliser in the Biogas Plants. This problem can be solved by the inoculation with efficient nitrogen fixing bacteria that has been cultured from a better source. Nitrogen is generally considered as one of the major limiting nutrients in plant growth. *Azospirillum*, *Azotobacter*, *Rhizobium* species are isolated, cultured and inoculated under various experimental setups with selected culture medium. These species can thereby be added to the slurry from the biogas and a mass cultivation can be carried out. It is a replicable and viable model. The most attractive aspect of this project is that the technology involved is quite simple. The use of this technique can help reduce the dependence on chemical fertilizers and reduce the problems fertilizer residue in food.

**Keywords:** *Azospirillum*, *Azotobacter*, *Rhizobium*

## **DARK SIDE OF GM CROPS**

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GM crops are mainly agricultural crop. The DNA of those crops has been modified using genetic method to increase the yield & pest resistance ability. Genetically modified crops are not without controversies. Even before their first approval for sale in USA these GM crops have been a matter of debate. There are many researches which informs about the possible harm of these plants to both animals and surrounding biodiversity. Prolonged consumptions of GM crops have shown to be harmful to the rats and reports of allergies to humans on skin and fetus have been reported. In countries like India & China where a large land area grows Bt cotton to kill to bollworm pest, the toxic Bt protein has started to affect the arthropods & the natural predictors of bollworm like ladybirds & spiders damaging the nearby biodiversity. Due to these reasons European Union requires labels to be put on all GMO food products whereas some countries like Norway , Russia , South Africa has banned GM crops altogether. In India the only GM crop allowed is Bt cotton and other GM food crops are totally band whereas in USA “95% of sugar beets, 88% of corn, & 94% of soybeans” are under GM crops. In this review we inform about the issues that are being studied by scientists to confirm about the safety of these GM crops.

**Key Words:** GM crops, affects, bands, hopes.

## NANOCELLULOSE BASED WATER PURIFICATION

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In the current scenario, the availability of safe and clean drinking water is decreasing day by day. To overcome this difficulty, Nanotechnology has been undertaken to explore various efficient ways for treatment of waste water in a more precise and accurate way with the support of various nanomaterials. Nanoparticles (NPs) have huge potential that enables them to participate in waste water treatment and/or water purification technologies. As nanoparticles are non-renewable so have a limited application in water treatment, to overcome this limitation Nanocellulose were preferred; Nanocellulose is an inexhaustible material that combines a high surface area with high quality, inertness, and surface properties. The methodologies basically carbon nanocellulose for the removal of impurities like polymers and organic pollutants are highlighted. Nanocellulose and its surface altered renditions influences the adsorption properties of imperative water pollutants, e.g., substantial metal species, dyes, microorganisms, and natural particles (organic molecules). This is due to the fictionalization of nanocellulose by different linkers. The technique of water purification is done by nanocellulose -based membranes, filters and channels. Organic pollutant contains organic dyes (Methylene Blue, Congo Red) will be experimentally removed by CNC and quantification is done by SEM studies, while polymers (urea) is done with the same methodology as that of organic pollutants. Adsorption isotherm for various dose of adsorbent is also studied. Adsorption capacity of differently functionalized Nanocellulose is observed.

**Keywords:** cellulose nanofibers, cellulose nanocrystals, membranes, water purification, adsorption

## **BIOFUEL - A BLESSING IN DISGUISE**

**Pooja**

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The ill effects of changing climatic conditions and over exploitation of available conventional sources of energy, food scarcity and depleting economic conditions have lead researchers to look for an alternative way that could solve the global crises being faced these days.

Keeping in mind the concept of sustainable development and ecofriendly ways, microalgae can prove out to be the most relevant source for bio fuel production.

Since algae can perform photosynthesis and can produce large amount of organic matter like fat, lipids, carbohydrate in short span of time which can be further processed into biofuels like bioethanol, biohydrogen and much more. Microalgae can be cultured easily and cost effectively besides it has an enormous potential that make it one of the best approach towards achieving sustainability. Modifying cynobacteria can open new gates to the scientific world .Now a days biofuel are one of the main area of researchers. Sustainable biofuels produces food and fuel with the raising environmental standards and increased productivity in farming around the world. ... They cut the use of fossil fuels associated with greenhouse gas emissions and biofuels can from even cleaner feedstocks that offer greater benefits. although algae are not produced at a very large scale for mass application but increasing technology can certainly develop opportunities for this process.

**Keywords-** Microalgae, biomass, biofuel, bioethanol, sustainable development

## ANALYSIS OF ALPHA<sub>1</sub>-ANTITRYPSIN DEFICIENCY IN LUNG CANCER

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Alpha-1-antitrypsin ( $\alpha_1$  AT) is a 52-kDa secretory glycoprotein predominantly derived from the liver which inhibits the activity of proteolytic enzymes in the body.  $\alpha_1$  AT deficiency is the major risk factor and individuals with susceptible genotypes remain at risk for severe and early onset of lung diseases. The study investigated the association of genetic polymorphism of the  $\alpha_1$  AT gene with lung diseases. The frequency of PIM3 allele in lung cancer patients was found to be significantly higher than the controls ( $p < 0.0001$ ). In the same samples five SNPs were observed near the junction of exon-intron I. The occurrence of these SNPs didn't show any association with lung cancer. However, the PIM3 allele of  $\alpha_1$  AT gene was found to be associated with lung cancer. It may be concluded from the results of current study that PIM3 allele of  $\alpha_1$  AT gene has association with the pathogenesis of lung cancer in the Indian population.

**Keywords:** Alpha-1-antitrypsin ( $\alpha_1$  AT), PIM3 allele, lung cancer

## **BIOSYNTHESIS OF ZINC AND COPPER NANOPARTICLE USING BUTEA MONOSPERMA FLOWER EXTRACT**

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Butea monosperma is a species of butea native to tropical and sub tropical parts of the Indian subcontinent and Southeast Asia, ranging across India, Nepal, Sri Lanka, Myanmar, Thailand, etc. Common names include flame of the forest and bastard teak (kingdom: plantae, unranked, angiosperm, eudicots, residues, (order: fabales) (family: fabaceae) (genus: butea).

We discussed on the synthesis and characterization of zinc nanoparticle by green synthesis method. It was attempted to synthesize zinc and copper nanoparticles using a medicinal plant butea (family: fabaceae). Zinc and copper were used to synthesize both nanoparticles by using flower extract of butea monosperma. The structural characterization of synthesized nanoparticles was carried out using XRD, EDAX, and SEM. The optical characterization was carried out using UV-Vis and FT-IR analysis. The synthesized zinc and copper nanoparticles can be used for various applications due to their eco-friendly, non-toxic and compatibility for pharmaceutical and other applications.

**Keywords:** Zinc nanoparticle, Copper nanoparticle, Butea Monosperma, Characterization, Antimicrobial activity.

## ROLE OF *CARICA PAPAYA* IN HUMAN HEALTH

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The study focused on the secret behind the papaya seed . Well known for its nutritional value. But can also treat cancer, the leaves of papaya having a unique character because they have a milky sap which contain actogenesis, which are essential for preventing and killing the growth of cancer cells. Actogenesis are a group of natural phytochemical that have anti-tumor activities. Especially cancer of the lungs, liver, breast cancer and cervix. Also rich in enzyme papain which is effective against cancer. As it breaks down of fibrin cancer cell and protein into amino acids form. Isothiocynate is one of the form of cancer cells. These enzymes capable of inhibiting both formation and development of cancer. The antioxidants in papaya fruit and seeds and their high fiber content also help in the detox process. As detoxifying and benefits in the treatment of cancer it also contains chemical integrates such as lycopene and others. Study investigated the effect of papaya seeds on prostate cancer using PC-3 cell line. This review summarizes the results of extract based or specific compound based investigation and emphasizes the aspects that warrant future research to explore the bioactivities in Carica papaya for their anticancer activities.

**Keywords:** Carica, Actogenesis etc.



## PHYTOREMEDIATION - GREEN SOLUTION

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Phytoremediation technology is a cost effective and environmentally and ecologically friendly as it utilizes plants natural ability to suck the pollutant present in the soil. There are many plants having this natural ability to up take the heavy metals and organic pollutants from air, soil and water. There are different subsets of phytoremediation; the most effectively used ones are (a) phytofiltration (b) phytoextraction (c) phytostabilization (d) phytovolatilization. In the present review, current knowledge about the phytoremediation and its techniques are discussed. The objective of this review is to discuss the different phytoremediation mechanisms and their potentials as remediation techniques that utilize the age long inherent abilities of living plants to remove pollutants from the environment but which are yet to become a commercially available technology in many parts of the world especially the developing countries.

**Keywords:** Environment, explosive, heavy metal, mechanism, oil pesticide, phytoremediation, pollution.

**PROBLEM DUE TO MINING ACTIVITIES WITH SPECIAL REFERENCE  
SURFACE AND GROUND WATER ENVIRONMENT, NIMBAHERA  
VILLAGE, DISTRICT CHITTORGARH**

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Mining is an important economic activity in many countries all over the world. Water is said to be polluted when it is changed in its quality and composition directly or indirectly due to man's activity so that it becomes less suitable for drinking, domestic, agriculture or any other purpose. The major source of surface and ground water pollution is injudicious discharge of untreated industrial effluents directly into the surface water bodies resulting in serious surface and ground water pollution. Pollution load increases due to the adding of slurry leading to decline of the overall quality of the water. One of the major impacts of mining processes is the contamination of water bodies through mine water drainage, leakage of water exposed to minerals, water from soil heaps, and mine water rebound. This loss of water quality is causing health hazards and death of human beings, livestock and death of aquatic lives, crop failure and loss of aesthetics. It is also seen that polluted water leads to a number of diseases like cholera, typhoid, dysentery and other viral diseases. So mining activity disturbs the original water catchments area and creates water logging problems which ultimately affects the ground water recharge. It is also seen that due to mining activity water level has gone very low. The purpose of this study therefore, is to present the effect of mining on water quality of some parts of the Nimbahera also attempt to examine some precautions and remedies to the effects.

**Keywords:** Mining, Pollution, Slurry, water quality, Contamination

## **FABRICATION OF A NON INVASIVE ELECTROCHEMICAL BIOSENSOR FOR ORAL CANCER DETECTION**

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Oral cancer (OC) is presently one of the most prevalent cancers known till date, and it occurs more often in men than women. OC occurs as a sore in the mouth that does not easily heal. OC detection and monitoring is time consuming, expensive and labor-intensive, to overcome this problem a smart approach of non-invasive biosensors is introduced. In this article we have done a comparative study of the biosensors specific to oral cancer detection using Non Invasive approach Nanomaterial such as Zirconia ( $ZrO_2$ ) and Hafnia ( $HfO_2$ ) were synthesized and further utilized used for fabrication of two electrodes BSA/antiCYFRA21-1/APTES/ $ZrO_2$ /ITO and BSA/antiCYFRA21-1/APTES/ $HfO_2$ /ITO respectively. Nanoparticles have been synthesized via the hydrothermal method and thin films of ITO electrode have been fabricated via electrophoretic deposition and followed by immobilization of antibodies. We had studied the development of simple, noninvasive antiCYFRA-21-1 based electrochemical biosensor based on nanostructure as transducer surface for Oral cancer detection. The CYFRA-21-1 antigen has been used as a biomarker for the detection of oral cancer. After the fabrication of electrode, characterization techniques are performed to study the morphology of nanomaterial and fabricated electrode. Spectroscopic studies of the fabricated electrodes were obtained to ensure the functional group bonding. Electrochemical studies like DPV, CV and EIS are conducted to investigate interfacial properties. Further ELISA is performed to check the accuracy of fabricated biosensor (Real sample studies). This study concluded that nanostructured material based biosensor could detect CYFRA-21-1 in the linear range 2-18 ng/ml, high sensitivity, and lower detection limit. This label free, non-invasive immunosensor has been used for detection of oral cancer in clinical.

**Keywords:** Oral cancer, CYFRA-21-1, BSA/antiCYFRA21-1/APTES/ $HfO_2$ /ITO

## DRUG DEVELOPMENT IN TUBERCULOSIS

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Mycobacterium tuberculosis is the world's most successful pathogen, having survived over 70,000 years and currently infecting nearly 2 billion people worldwide. With around 9 million new cases of tuberculosis (TB) each year, almost one third of the population is at risk for developing active disease. In 2012 alone, an estimated 3,500 people per day died of TB and, in fact, human immunodeficiency virus (HIV) is the only other infectious disease responsible for more deaths each year than M. tuberculosis. Because of these deadly statistics, the World Health Organization (WHO), the Centers for Disease Control (CDC), and the Bill and Melinda Gates foundation, among many others, have committed to eradicating M. tuberculosis by the year 2050. A combined strategy of drug treatment, better diagnostics, and prevention (i.e. vaccine development) is the only way to reach this goal. While finding a cure and treating the disease is an essential aspect of medicine, of equal importance are prevention measures to stop contracting the disease in the first place. Because extreme and totally drug resistant strains of M. tuberculosis are appearing with increasing frequency, it is essential that we block the spread of this pathogen by developing a vaccine that provides protection against infection.

**Key words:** Mycobacterium, Tuberculosis. Drug resistance, Vaccine.

## FORMULATION, IN-VITRO AND EX-VIVO EVALUATION OF TRETINOIN LOADED CUBOSOMAL GEL FOR TREATMENT OF ACNE

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The current work was attempted to formulate and evaluate the topical sustained release delivery systems potential of bicontinuous cubic monoglyceride –water phases – ‘cubosomes’ containing Tretinoin with an opinion to sustain the release of drug in the acne treatment.

Tretinoin loaded cubosomes were prepared by bottom-up technique, by varying the concentration of lipid and surfactant and keeping the drug concentration constant, made a total of nine formulations of tretinoin as TCF. These preparations were evaluated for its surface charge, particle size, particle morphology, encapsulation efficiency, in-vivo and in-vitro release studies of gel enriched with cubosome dispersion. Finally, the stability studies of cubosomal gel were performed on the optimized formulations.

Significant result was obtained with tretinoin formulation as the drug is lipophilic so it gives more depot effect on the epidermis and good retention property. The data obtained from the formulations showed that formulation TCF-5 was the optimized formulations which exhibited better drug release and entrapment efficiency.

At the end, it can be concluded that cubosomes offer benefits of quick onset as well as the maximal release of drug with fewer side effects. Thus, cubosomes represents a capable transporter having the property of sustained release of the drug, potential to localize the drug in the skin with a possible clinical application for acne vulgaris treatment due to cubosome depot effect on the epidermis.

**Keywords:** Cubosome, Tretinoin, Topical, Monoglyceride, Poloxamer-407



## BIOTECHNOLOGY FOR IMPROVEMENT OF FODDER CROPS- AN OVERVIEW

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India is the largest producer of milk in the world with over 150 million tonnes of production. The livestock population is also maximum in the country. However, the productivity of ruminants is low in the country as compared to many developed countries. Forages represent up to 80% of the daily ration of ruminant: dairy cows, heifers, beef cattle, bulls, cull cows, sheep, and goats. Deficiency in the fodder availability is major factor for this situation. Furthermore, the available fodder is not of good quality, in terms of nutritional composition. The improvement of forage crops through biotechnological approach has started in late eighties but at global level it has made remarkable progress. Biotechnological approach offers opportunities for creation of novel variations in forages which as such not possible through conventional methods. The various means of creating variation in forage grasses and achievement are somaclonal variation, somatic hybridization, genetic transformation etc. Embryo rescue has well been exploited to develop interspecific hybrids in *Trifolium* as well as *Lolium/ Dactylis*. Regeneration of the plantlets from reproductive parts such as anther results in haploid plant production. Artificial introduction of some foreign gene in the plant genome is genetic transformation. Insertions of genes may be by chemical, electrical, physical or micro-projectile transfer. In grasses it has been only limited success so far. There are several molecular techniques viz., RFLP, AFLP, RAPD and isozymes that may be used from time to time for characterization of germplasm, cultivar identification, detection of hybrids and genetic mapping and gene tagging. Efforts have been made for characterizing the varieties based on RAPD, RFLP markers and discrimination between the varieties can be based on gene frequencies. Identification of genes controlling apomixis is an area that can pay good dividends in grass breeding. Identification and cloning of these genes can be used in transferring in other cross pollinated crops for fixing heterosis and thus save on the account of producing hybrid seeds every year. Although, this aspect is receiving global attention, success has been little till date. Another aspect on these lines is identification of sexual lines in grasses. There is need to develop reliable molecular technique for screening of the grass species for existence of sexuality as it would accelerate the breeding process in such grasses as many of these plants could be used in crossing. The plants with better agronomic traits and apomixis can be selected and advanced for developing varieties. Nutritional improvement of forage crops have been possible using Biotechnological tools. Genetic transformation have been used to enhance digestibility by lowering lignin content in plants. Recently, use of microRNAs, the metabolic pathways have been successfully engineered to produce specific secondary products as well as enhancement of growth and survival of plants. In this presentation, these new developments will be discussed in details.

**Keywords:** RFLP, AFLP, RAPD, microRNAs

## **Petroleum Hydrocarbon Degradation by Bacteria isolated from Badopal salt lake (Pilibanga) and cost effective methods to enhance the rate of Biodegradation at the effected sites**

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Large amount of diverse pollutants enter the environment *via* industrial discharges and other anthropogenic sources. Of ubiquitous concern are petroleum hydrocarbons. Petroleum continues to be used as principal source of energy and plays an important role in global environmental pollution. On the other hand it will remain as a major source of energy for few more decades because it has yet not been substituted by a reliable alternative energy source. The fate of Bioremediation of hydrocarbons largely depends upon the salinity of the area concern. The problem of salinity escalation, in and around the globe, is expanding logarithmically and western Rajasthan (India) is no exception to this. Therefore, in the present study an attempt has been made to achieve the biodegradation of the petroleum hydrocarbons by the halophilic and halotolerant bacteria. They were isolated from Badopal salt lake which is situated at Pilibanga (district Hanumangarh). This lake is largely unexplored as far as the microbial studies are concerned. Five Bacteria isolated from this lake (at more than 10% salinity) exhibited the petroleum hydrocarbon degrading potential.

The physico-chemical parameters of the hydrocarbon contaminated soils (which are important for the growth and dwelling of hydrocarbon degrading microbial population), were found to be deviated from the optimal values. Hence, efforts were made in the form of some innovative soil engineering techniques (addition of soluble carbonates, NPK fertilizers and mustard khal) to restore the normal values for these parameters and hence to enhance the population of indigenous hydrocarbon degrading microbes.

**Key words:** Biological activity, halophilic bacteria, petroleum hydrocarbons, salinity, soil respiration.



## **Extremophiles: A potential source for industrially important biotransformations**

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Extremophiles are the microorganisms which are found in most severe environments on earth, including hydrothermal vents, hypersaline lakes and pools, alkaline soda lakes, dry deserts, cold oceans, and volcanic areas. From the last two decades, extremophiles have found to produce potential novel enzymes for industrially important biotransformations. Enzymes which are produced by extremophilic microorganisms are called extremozymes and these enzymes have been investigated for tolerance to harsh conditions i.e high or low temperature, high or low pH, high salinity, high metal concentrations, high radiation, high pressure etc. These enzymes are found to exhibit unique catalytic property for various industrial applications. Various enzymes, i.e. protease, lipase, phosphatase, cellulase, xylanase, pectinase, amylase, glucoamylases, DNA polymerases, dehydrogenases etc. have been reported from extremophiles for the production of fine chemicals and pharmaceutical compounds to fulfil the demands of process economics, product specification and to reduce the involved steps.

**Keywords:** Extremophiles, Enzymes, Biotransformation, Protease, Lipase.

## **Extremophiles: A potential source of industrially important enzymes**

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Extremophiles are the microorganisms which are found in most severe environments on earth, including hydrothermal vents, hypersaline lakes and pools, alkaline soda lakes, dry deserts, cold oceans, and volcanic areas. From the last two decades, extremophiles have found to produce potential novel enzymes for industrially important biotransformations. Enzymes which are produced by extremophilic microorganisms are called extremozymes and these enzymes have been investigated for tolerance to harsh conditions i.e high or low temperature, high or low pH, high salinity, high metal concentrations, high radiation, high pressure etc. These enzymes are found to exhibit unique catalytic property for various industrial applications. Various enzymes, i.e. protease, lipase, phosphatase, cellulase, xylanase, pectinase, amylase, glucoamylases, DNA polymerases, dehydrogenases etc. have been reported from extremophiles for the production of fine chemicals and pharmaceutical compounds to fulfil the demands of process economics, product specification and to reduce the involved steps.

**Keywords:** Extremophiles, Enzymes, Biotransformation, Protease, Lipase.

## DEVELOPMENT OF TRANSDERMAL DRUG DELIVERY PATCH FOR ANTI-ATHEROSCLEROTIC ACTIVITY

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Transdermal drug delivery systems (TDDS) are extracorporeal polymeric device containing dissolved or dispersed drugs that demonstrate sufficient drug flux in an ex vivo and/or in vivo model at a constant rate. Present study carried out on Matrix type transdermal patches containing “Simvastatin” were prepared by solvent casting method employing a mercury substrate by using the combinations of HPMC and Eudragit RL-100 in different proportions. The transdermal patches were evaluated for their physicochemical properties like thickness, % flatness, weight variation, moisture uptake, moisture content, folding endurance, elongation and drug content values, in vitro permeation and skin irritation studies. The permeability of Simvastatin was enhanced with increase in HPMC content. In vitro cumulative amounts of the permeated drug were observed 57.53, 67.46, 86.26 and 99.88% in 48 hrs from the four formulations. The release profile of the optimized formulation S-4;  $r^2 = 0.984$  (Higuchi) showed that permeation of the drug controlled by a diffusion mechanism. The cumulative amount of the permeated drug after 48hrs from S-4 was 344.99 mcg/cm<sup>2</sup>. Permeability coefficient was calculated 7.18 mcg/cm<sup>2</sup>/hr. The patches were found to be free of any skin irritation. Based on the above observations, it can be reliably concluded that HPMC and Eudragit RL-100 polymers may be suited for the development of transdermal patches of Simvastatin for Anti-atherosclerotic activity.

**Keywords :** Transdermal, patch, Anti-atherosclerotic

## ECO-STATUS, MORPHOLOGY AND DISTRIBUTION OF AFRO ASIAN SAND SNAKE (*PSAMMOPHIS SCHOKARI*, FORSKAL: 1775) FROM INDIA

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In India, the genus *Psammophis* of family Lamprophiidae is represented by four species in which *Psammophis schokari* (Forskal, 1775) is distributed in narrow and restricted areas of arid habitats of northern western part in Thar Desert of Rajasthan.

The snake is known as diurnal species. It is found in dry habitat like sandy desert with scant vegetation. It is mildly venomous in nature and bite can cause pain, swelling and bleeding in human. The ecological habitat matches there is somewhat desert with scant vegetation. It was observed during daytime under bushes mainly of *Lasiurus indicus*, *Leptadenia pyrotechnica*, *Citrullus colocynthis*, *Caparis deciduas* etc. The maximum activity of this snake is noted at relative humidity of  $21 \pm 3$  % and relative temperature of  $31 \pm 3^{\circ}\text{C}$ . The snake occurrence observed in barren sand dunes, stabilised sand dunes and grassland habitats.

It has long, slender body, large eyes has round body, long tail. Strip line at both sides, dark brown mark on head. Lip scale white with black dots. Diagnosis shows smooth dorsal scale rows, in most specimens 18:17:13; or 17:16: 13 or 16:17:12, ventrals  $172 \pm 7$ , anal divided. Maximum SVL recorded as 530mm. Polymorphism also observed in this species of the snake.

This species was restricted to desert habitats of Rajasthan specifically in Jaisalmer district. 17 individuals recorded in different localities of Jaisalmer district, among them 8 are adults, 3 are sub-adults and 6 are juveniles. Previous it was reported in Jodhpur, Shahgarh, Mohangarh area but in this study we have added new localities as Sam, Sudasari, Khurdi, Myajlar of Desert National Park, Pokaran and Mohangarh region of Jaisalmer district.

**Key Words:** Thar desert, Afro Asian Sand Snake, Distribution, Jaisalmer.

**CAESALPINIA PULCHERRIMA SWARTZ.: PHYTOCHEMICAL  
ANALYSIS AND EVALUATION OF ANTIOXIDANT CAPACITY OF  
ITS METHANOLIC EXTRACT**

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Oxidative stress is resultant of imbalance between pro-oxidants and antioxidants in a biological system, and number of disorders are linked to it. Natural sources, especially, medicinal plants serves as potential source of antioxidants. In the present study, morphological and phytochemical analysis of the methanolic extracts of aerial parts, namely, leaves, seeds and flowers of *Caesalpinia pulcherrima* Swartz. were done using standard methods. So as to ensure quality of the plant material, as it is important to ensure its safety, efficacy, quality assurance, stability of finished product and effective clinical as well as industrial employment. Antioxidant capacities of aerial parts were also measured by employing DPPH and TEAC assays. It was observed that out of the studied aerial parts of *C. pulcherrima*, leaves possessed maximum antioxidant capacity. Also, strong correlation between antioxidant capacity and polyphenolic content was observed.

**Keywords:** *Caesalpinia pulcherrima*, Oxidative stress, TEAC assays

## MICRORNAS AS POTENTIAL MEDIATORS OF VIRAL EVASION OF THE HOST DEFENSE

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MicroRNAs (miRNA) are a family of small, non-coding RNAs that regulate gene expression in a sequence-specific manner. MiRNAs have emerged as key players in the regulation of several pathways including developmental timing, haematopoiesis, organogenesis, apoptosis, cell proliferation, tumorigenesis and host-viral interactions. Recent studies suggest that viruses encode miRNAs to manipulate their host gene expression to ensure their effective proliferation. Insect viruses have hardly been the subjects of miRNA investigations. We have identified four *Bombyx mori* nucleopolyhedrosis virus (BmNPV)-encoded miRNAs and also functionally characterized two BmNPV-miRNAs (*bmnpv-miR-1* and *bmnpv-miR-3*) using a combination of *in silico* and experimental methods. We demonstrate the sequence-dependent interaction of *bmnpv-miR-1* with Ran mRNA using cell culture and *in vivo* assays, including RNA interference (RNAi) of Ran. Our results clearly show that *bmnpv-miR-1* represses Ran, leading to reduction in the host miRNA population, and consequently, the BmNPV load increases in the infected larvae. Blocking of *bmnpv-miR-1* resulted in higher expression levels of Ran and a decrease in BmNPV proliferation. Whereas, *bmnpv-miR-3* is employed by BmNPV, in titrating out its own genes, to avoid host immune response. Our miRNA overexpression and inhibition results showed that *bmnpv-miR-3* expresses during early stage of infection, and negatively regulates the expression of DNA binding protein (P6.9) and other late genes. These findings provide an insight into the evasion strategies used by the virus to counter the host defense for its effective proliferation and have relevance to the development of insect virus control strategies.

**Keywords:** MiRNA, host-viral interaction, *Bombyx mori*, Silkworm and BmNPV

## Hypoglycemic and Hepatoprotective Effects of Processed *Dillenia indica* in a rat (*Rattus narvegicus*) Model of Alloxan Induced Diabetes Mellitus

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Diabetes mellitus is metabolic disorder which is growing day by day and it is too concern for human being. To evaluate the antidiabetic activity of *Dillenia indica* and hepatoprotective effect.

In this study, alloxan (150 mg/kg b.w) was used to make a diabetic model after making diabetic model the ethanolic leaf extract of *Dillenia indica* at the dose of 200 & 400 mg /kg b.w were administrated to diabetic induced groups for a period of 28 days. The effect of ethanolic leaf extract of *Dillenia indica* leaf extract on serum blood glucose, as well as liver function test [SGOT, SGPT, Billirubin, ALP] were measured in the alloxan induced diabetic rats. **Results:** In the acute toxicity study, ethanolic leaf extract of *Dillenia indica* leaf was non-toxic at 2000 mg/kg in rats. The significantly increased level of blood glucose and liver function test were observed in alloxan induced diabetic rats , after administration of extract , these increased level were significantly decreased on the both doses of ethanol extract of *Dillenia indica* leaf. In Histopathological study were revealed toward normal.

thanolic extract of *Dillenia indica* leaf possesses significant anti-diabetic and rejuvenating capability of tissues.

**Keyword:** Alloxan , liver , *Dillenia indica* liver function test

## **A NOVEL APPROACH TO STUDY BIOCIDAL EFFICACY OF SOME ENVIRONMENTALLY SAFE TRANSITION METAL COMPLEXES DERIVED FROM NITROGEN DONOR LIGANDS**

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In biochemistry and co-ordination chemistry, the role of transition metal complexes with heterocyclic ligands cannot be underestimated. They show moderate anti-microbial activity against gram positive bacteria and fungi. Transition metal complexes with nitrogen donor ligands have often been studied recently because of their technical applications and applications in enhancement of drug action. Copper displays noticeable biochemical action as a constituent of various exogenously administered compounds in human. The co-ordination chemistry of nitrogen donor ligands is an active area of research. The interaction of these nitrogen donor ligands with copper soap gives complexes, which are potentially more biologically active. They play remarkable role as antifungal, antibacterial, antidiabetic, antiviral, anti-inflammatory, antimalarial and anticancer agents. These organometallic complexes show magnificent chromogenic properties. Thus it is worthwhile to construct some copper soap complexes with nitrogen donor ligands. Purity of all the synthesized ligands and complexes were checked by TLC. Biological screening has been done against candida species to produce fruitful results.

**Keywords:** TLC, Candida species, Nitrogen donor ligands, Antifungal, Anti-inflammatory.



## INTERVENTION OF BIOTECHNOLOGICAL TOOLS FOR IMPROVEMENT OF GUAVA (*PSIDIUM GUAJAVA* L.)

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Guava (*Psidium guajava* L.) is considered as poor man's apple in India. Guava fruits are in demand as fresh fruit as well as in processing industry. However, some of the long-standing problems such as lack of soft seeded, coloured variety and wilt of guava require urgent attention of researchers. There is a need to produce guava variety resistant to guava wilt disease with delayed ripening quality. Conventional breeding has been of not much help so far. Biotechnological interventions may fetch in desired traits in commercial guava varieties like Allahabad Safeda, Sardar, Lalit and Pant Prabhat. Marker-aided breeding and recombinant DNA technology could help in development of desired trait in guava cultivars. There is a need to develop genetic map of guava. There is a need to engineer genes controlling ethylene biosynthesis and ethylene sensitivity in guava for better shelf life. Work on transforming guava with cold hardiness gene (CBF1, CBF2 & CBF3) is going on. Insertion of genes encoding hydrolytic enzymes (which can degrade fungal cell wall) such as glucanase and chitinase could also be useful for controlling diseases in guava. Many groups have reported in vitro regeneration protocol in guava using somatic embryogenesis and organogenesis pathway. For clonal multiplication, shoot bud culture is the most preferred pathway. Guava is a recalcitrant species and in vitro oxidative browning, in born contamination, low in vitro shoot proliferation and poor survival of micro propagated plants during acclimatization are some of the problems which makes micro propagation protocols of guava commercially unviable. There is a need to devise a more efficient and economic system of micro propagation of guava.

**Key words:** *Psidium guajava* L., Biotechnology, glucanase and chitinase

## **THE METHOD TO IMPROVE PRE-PROCESSING OF MAMMOGRAPHY IMAGE FOR EARLY DETECTION OF BREAST CANCER**

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The breast cancer occurs when some breast cells begin to grow abnormally. The suspicious breast cancers appear as white spots in mammograms, indicating small clusters of micro-calcifications. The cells in cancer divide more rapidly than healthy cells do and continue to accumulate, forming a lump or mass. The new cells form when the body doesn't need them, and old or damaged cells don't die as they should. The extra cells may form a mass of tissue called a lump or tumor. Cancer that forms in the tissues of breast, usually in the ducts (tubes that carry milk to the nipple) and in the lobules (glands that make milk) is the breast cancer. The early detection helps to save the life of the women. Two major factors which affect mammographic screening are the radiologist's level of expertise and the high volume of cases examined in a screening programme. Double reading on screening data could improve accuracy, but manpower limitations and a high level of intra-observer variability restrict its deployment. Computerized mammographic image analysis can improve both speed and accuracy apart from avoiding intra-observer discrepancies. Mammography is the basic screening test for breast cancer. It consists many artifacts, which negatively influence the detection of the breast cancer. The accuracy of the computer-aided systems decreases due to some factors like density of the breast, presence of labels, artifacts or even pectoral muscle in the mammogram image. Image pre-processing techniques are necessary, in order to find the orientation of the mammogram therefore, removing artifacts and enhancing the quality of image is required in Computer Aided Diagnosis (CAD) for better results and early detection of cancer. Before any image-processing algorithm can be applied on mammogram. The preprocessing steps are very important in order to limit the search for abnormalities without undue influence from background of the mammogram. Digital mammograms are medical images that are difficult to be interpreted, thus the preprocessing in mammography can improve the image quality and make the segmentation results more accurate. The objective is to improve the quality of the image to make it ready to further processing by removing the unrelated and surplus parts in the background of the mammogram. Breast border extraction and pectoral muscle suppression is also a part of preprocessing. The types of noise observed in mammogram are high intensity rectangular label, low intensity label, tape artifacts. The types of noises present in mammogram can be removed with the help of Adaptive Median Filter /Mean Filter and thus results for finding the cancer through CAD can be improved.

**Keyword: CAD, Median Filter, Artifacts, Preprocessing**

## ADVANCES STATISTICAL TECHNIQUES FOR DETECTION OF GLOBAL TREND IN ENVIRONMENTAL POLLUTION

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Environment pollution is increasing day by day due to the advancement of technology and urbanization. Environmental pollution is a complex topic as so many factors are responsible for the poor quality of our environment. Identification of factors which affect environment at constant rate or vary over a period of time and detection of trend (change over the time period) are important for monitoring environment pollution and planning environment control policy for better future. Time series data for the environment pollution may suffer some problems such as autocorrelation, heteroscedasticity, non-normality *etc.* so, conventional methods *i.e.* simple linear regression and non linear regression can't give efficient result to detect the trend of environment pollution over the time. Advances statistical methods *i.e.* Box-Jenkin time series model *i.e.* ARIMA (Autoregressive Integrated Moving average), ARCH/GARCH (Auto regressive conditional Heteroscedasticity/ Generalized Auto regressive conditional Heteroscedasticity) and Mann Kendal test for detecting for monotonic trend in single or multiple situation are advisable in this situation. Base on the problems in environment related information or data, appropriate model should be selected from the available models. For autocorrelation problem ARIMA model, for Heteroscedasticity problem ARCH/GARCH model should be useful for detection of environment pollution trend. If the residual from the fitted regression model can't fulfill the assumption of normality, Mann Kendal test should be used for detection of trend. In general these advance statistical methods are inexpensive and efficient in estimation of environment trend.

**Keywords:** Environment pollution, ARIMA, ARCH/GARCH (Auto regressive conditional Heteroscedasticity Generalized Auto regressive conditional Heteroscedasticity)

**Effect of temperature, salt stress and pH on seed germination of  
*Stevia rebaudiana* Bertoni**

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Poor germination of seeds of *Stevia rebaudiana* Bertoni is a phenomenon with unknown reason and the research are still in progress for the further improvement. The present study aims at the evaluation of impact of temperature, salt stress and pH on seed germination of *Stevia rebaudiana*. Mature seeds were isolated at post-flowering stage. The *in vitro* seed germination tests were carried out in the dark in Petri dishes using an aqueous media. The influence of temperature, salt stress and pH was evaluated by following the evolution of germination over time. The results showed a maximum germination percentage of 81% in the seeds which were placed in open at room temperature for 3 days and then placed at 20 °C in continuous light with a maximal an optimum pH equal to 6.8 with 71% as a maximal germination percentage and a negative correlation between NaCl concentration and seed germination. The seed germination was poor with a germination percentage of 35 % at high temperature (28-30 °C) and was null at high NaCl concentration (>7.5 g/l) as well as at acid pH (pH <3.5).

**Key words:** *Stevia rebaudiana*, germination, temperature, salt and pH.

## CANCER STEM CELL (CSCs) EXPRESSION PROFILING USING ADVANCE TECHNIQUES

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Cancer stem cells (CSCs) have been suggested as central drivers of tumor initiation, progression, recurrence, and therapeutic resistance. Thus, identifying stem-like cells within cancers and understanding their properties is important for the development of efficacious anticancer therapies. Lysed cancer stem cells can be analyzed at genome, transcriptome, and proteome level from a single biological sample can provide better understanding. Cancer biomarker based genome analysis can provide cancer diagnosis, prognostic, pharmacodynamics. Microarray based transcriptome profiling can provide better understanding at RNA level and also post transcription modifications, that are responsible for cancer. Proteomics techniques include gel-free and gel-based methods. Gel free method include isotope coded affinity tagging (ICAT) is upgraded and better technique for Chemical proteomic, a combination of isotope coded affinity tagging (ICAT) and mass spectrometry, have proposed as powerful tools for identifying drug targets and explaining complex latent mechanisms of drug action against CSCs. Extracted protein can be analyzed by liquid chromatography (LC) coupled to MS/MS. This detection method permits for high resolution separation, thereby precisely revealing differential protein expression profiles. Gel-based methods employ, Two-dimensional difference in gel electrophoresis (2D-DIGE) is a method in which protein samples labeled by different fluorescent dyes are mixed with identical concentrations. A comparison generated 2D-DIGE fluorescence images allows for quantification of each spot. Hence, 2D-DIGE can reduce gel-to-gel variation by allowing simultaneous separation and comparison of several samples on one gel. Molecularly targeted drug delivery by Immunoliposomes, in which molecular targeting of cancer cells via liposomes conjugated with antibody or other ligand.

**Keywords:** Cancer stem cell, Drug designing, Molecular targeting and Immunoliposome

## **SAFETY EVALUATION OF RISUG<sup>®</sup> INDUCED CONTRACEPTION AND ITS REVERSAL THROUGH GENOTOXICITY AND APOPTOTIC MARKERS IN MALE RABBITS**

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RISUG induced contraception has been proven as a novel approach with a single intervention that provides non-invasive, long lasting and reversible male contraceptive method. The present work focussed on the evaluation of toxicity in male rabbits following vas occlusion with RISUG and its reversal with DMSO and NaHCO<sub>3</sub> using genotoxicity tests and apoptotic marker assays. Animals were divided into seven groups, viz., sham operated control, vas occlusion with RISUG for 3 & 12 months, reversal with DMSO and NaHCO<sub>3</sub> after 3 & 12 months, respectively. The samples (bone marrow, cauda epididymal spermatozoa, blood sample, testis and cauda epididymis) were evaluated for genotoxicity through micronucleus, chromosomal aberration and *in vitro* DNA damage tests and apoptosis through caspase 3, TUNEL, comet and annexin V assays. Results observed in bone marrow marked with minimum incidences of micronuclei in erythrocytes and frequency of aberrant chromosomes in all the studied groups, whereas, marked damage was observed in their respective positive control samples. Caspase-3 and TUNEL positive cells in testis and cauda epididymis were observed within control limits, i.e., 0.3% and 10% with the primary localization in spermatogonial cells and spermatids of testis and principal and basal cells of cauda epididymis. Olive moment, comet length and %DNA through fluorescence images of both leukocytes and testicular cells of experimental groups recorded with negligible cell damage as compared with positive control. DNA damage in cauda epididymal spermatozoa was observed between 2-3% and annexin V assay indicated minimum number of positive cauda epididymal sperms. We, therefore, conclude that, RISUG is unlikely to produce any toxicity in either of the samples, both during its injection into the vas deferens under prescribed dose as well as during its reversal. Hence, RISUG is compelling interest in the nearby future to be beneficially adopted by men as a successful non-invasive reversible contraceptive approach.

**Keywords:** RISUG, DMSO and NaHCO<sub>3</sub>, TUNEL

## HYPOCHOLESTEROLEMIC AND ANTIATHEROSCLEROTIC POTENTIAL OF *PROSOPIS CINERARIA* POD IN DIET INDUCED HYPERCHOLESTEROLEMIC RABBITS

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Hypercholesterolemia plays a crucial role in the development and progression of atherosclerosis which can be ameliorate through various therapeutic strategies. The present study assigned to investigate the hypocholesterolemic and antiatherosclerotic potential of aqueous extract of *Prosopis cineraria* pod in diet-induced hypercholesterolemic rabbits. The healthy albino rabbits were used for experimental animal model and randomly divided in various experimental groups. Hypercholesterolemia was induced by oral administration of high fat diet and cholesterol powder supplementation (500mg/kg body weight/day for 15 days). The treatment of aqueous extract of *Prosopis cineraria* pod caused significant

( $PP \leq 0.001$ ) alterations in lipid profile i.e. total cholesterol, LDL cholesterol, VLDL cholesterol and triglyceride at the end of completion of the course of 45days of experiment. Consequently, the significant ( $PP \leq 0.001$ ) reductions were shown in arterial wall thickness and atherosclerotic plaque. Rabbits were then administered with Aqueous extract of *Prosopis cineraria* pod for 45 days. Whereas, the renal function, hepatic function and hematology parameters were remained under normal ranges after the completion of experiment. Supportively, LPO (Lipid peroxidation) and antioxidant parameters were also revealing free radical scavenging potential without shown any adverse effects. Based on the result it can be concluded that finding of this investigation suggest that *Prosopis cineraria* extract have some particular kinds of bioactive compounds which may lead to deposition of hypercholesterolemia and atherosclerosis which could be considered as a potential lead in developing therapeutics.

**Key words:** Hypercholesterolemia, Atherosclerosis, lipid profile, Atherosclerotic plaque, *Prosopis cineraria* pod.

## ANTIHYPERLIPIDEMIC AND ANTIOXIDATIVE ACTION OF WHEAT GERM OIL IN RABBITS

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Hyperlipidemia is a metabolic dysregulation characterized by elevated serum level of cholesterol, triglycerides (TG) and low density lipoproteins (LDL) which are the major risk factors for the premature development of cardiovascular diseases like atherosclerosis. The aim of the study was to investigate the possible antihyperlipidemic and antioxidative effects of Wheat (*Triticum aestivum*) germ oil in diet induced hyperlipidemia in rabbits. Wheat germ oil was orally given to hyperlipidemic rabbits at the dose of 0.5 ml/kg body weight and the results were compared with the reference drug, that is, Atorvastatin (0.25 mg/kg body weight) and healthy control. Blood samples were collected via direct cardiac puncture after 60-day treatment and lipid profile, Catalase, Superoxide dismutase and Malondialdehyde estimations were done. The treatment resulted in significant improvement in serum lipid profile ( $P \leq 0.001$ ) when compared to the hyperlipidemic animals. It also significantly increased the activity of antioxidant enzymes, Catalase and Superoxide dismutase while decreased the malondialdehyde levels. Histomorphological studies of the thoracic aorta also revealed significant reductions in plaque area which correlated with the decreased cholesterol deposition. Our results showed that Wheatgerm oil has protective effect on diet-induced hyperlipidemia and can be used as a regular diet supplement to manage serum cholesterol levels.

**Keywords:** cholesterol, lipid profile, wheat germ oil, rabbits, atherosclerosis



## **WATER RESOURCE ACCESS IN SUB-SAHARAN AFRICA: CONTEMPORARY ISSUES AND PROSPECTS**

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Water resource is mans’ most vital resource in the world. Water is not equally distributed around the world. Africa is one of the continents with high scarcity of water resource. Conversely, poverty in Africa is epidemic which is often accelerated and pronounced with lack of access of water resource. The Saharan and Sub-Saharan Africa is suffering from severe water shortages. However, this continent is for long being suffering from political instability, ethnic conflict, drought, climate change, pollution, and other form of disaster. It is a norm in Africa especially in the Sub-Saharan and Saharan region to travel for in order to access clean and safe water for domestic and other purposes. This study was conducted in the Northern region of Nigeria. The study aimed to depict the diagnostic outlook of key issues related to surface fresh water resource through critically assessing contemporary surface water resource concerns, and identify prospective mechanisms that will enhance access to clean and safe water in the sub-Saharan Africa. The present study is qualitative in nature that depend on secondary data that were collected from peer reviewed literature, government reports and documents, non-governmental reports and charts, etc. The study found that there are well structured documented policies regarding the Nigeria’s surface water resource, this give people guarantee non restricted access to surface water resource. Though availability of surface water resource depend greatly on it seasonality and proximity to communities. However, there are obvious duplications and overlapping among different government institutions regarding water resource issues. Hence, there are reasonable effort by the government at all level in providing clean and portable water for the people, but this issue is far from over. With the current imminent and obvious effects of climate change in this region, there is need for declaration of state of emergency on water resource sector in this region. There is need for close collaboration between the government, non government, and private institutions in order to bulldoze this menace in this region.

**Keywords:** Water Access, Climate Change, Poverty, Nigeria, Sub-Sahara

## AVAILABILITY OF ANESTHETIC EXPERTS IN FUNAKAYE LOCAL GOVERNMENT, GOMBE STATE

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Anesthesia is a techniques commonly used in surgery to control pain during surgical procedure through administration of medicine called anesthetics. These drugs help in controlling patient blood pressure, breathing, body temperature, blood flow and heart rate bit as well as rhythm. Anesthesia can be local or genetic, and only administered by an expert physician called anesthetic. Administration of general anesthesia requires continuous monitoring of vital parameters of the body including body temperature by the anesthetic. Recently in most developing nations, surgical procedures were conducted without anesthetic experts, the anesthesia were administered by either a nurse or medical doctor. The prime aim of this study is to investigate the availability of anesthetic expert in hospitals in Funakaye Local Government in Gombe State, Nigeria. In order to get the diagnostic picture of the situation, a survey research design was adopted for the study using questionnaires with closed ended questions on the sample population. This study found that there is no certified anesthetic expert within the surveyed hospitals, though the respondents admit to be carrying out both minor and major surgical operation within these hospitals. This study recommends the utmost need for federal and state ministry of health as well as local government primary healthcare to make it mandatory to have at least an anesthetic expert in any hospital that is carrying out any surgical operation, and lastly there is need for collaborative monitoring of this issue to ensure strict compliance.

**Keyword:** Anesthesia, Anesthetic, Surgery, Gombe, Nigeria

## THE N-TERMINAL DOMAIN OF DnaB HELICASE (*HELICOBACTER PYLORI*) IS IMPORTANT FOR DNA BINDING MODULATION

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Replicative helicases are essential molecular machines that bind to DNA and utilize energy derived from NTP hydrolysis. It moves along double stranded DNA for its unwinding. The DNA binding properties of replicative helicases helps in loading onto a forked structure DNA at initiation or in translocation during elongation. Our earlier findings of DnaB hexameric helicase from *Helicobacter pylori* (HpDnaB) suggested that N-terminal domain is responsible for switching from weak DNA binding to strong DNA binding activity. Further, the DNA binding activity of HpDnaB is also modulated by loading factor i.e. Hp0897. In present study, we have tried to explore the important amino acid residue responsible for its enzymatic (DNA binding) modulation. On the basis of crystal structure of HpDnaB-N-terminal domain, we have identified few conserved residues which may have key role in switching the DNA binding activity by unmasking the DNA binding motif through inter or intra subunit interactions. Here, we have demonstrated that the substitutions at these conserved residues in HpDnaB enhanced the DNA binding activities several fold higher than wild type protein. We have also observed the increased ATPase activity in these mutants compared to wild type. An enhancement in DNA binding activities and ATPase activities, did not leads to increase in helicase activity which is required while translocation of helicase. Interestingly, inspite of being present on the interface of HpDnaB helicase and HpDnaG primase, these conserved amino acid residues of HpDnaB NTD, have no defect in DnaG primase mediated enzymatic activities of HpDnaB helicase.

**Keywords:** *Helicobacter pylori*, HpDnaB helicases and HpDnaG primase, ORF: Open Reading Frame

## APPLICATION OF SOIL BIOTECHNOLOGY IN ENHANCING THE QUALITY OF WASTE WATER

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Waste water treatment is the process in which the waste water having high pollutants can be converted into a water which can further be used as water with minimum environmental issues and can be used safely. In the present time many technologies have been developed. The soil biotechnology is a system of treatment by using cultural media for micro and macro organisms to process the water. The soil biotechnology along with the cultural media for microorganisms also uses sand, silt, gravel and coal. The macro and micro organisms used in soil biotechnology are *bacillus*, *pseudomonas*, *azatobacter*, *actinomycetes*, earthworms and some plant species. Analysis is done for various parameters such as temperature (°C) , pH, conductivity (micro S/cm), DO (mg/l), turbidity (NTU), COD (mg/L), BOD, ammonia (mg/L), phosphate-P (mg/L), SS(mg/l), alkalinity(mg/L), fecal coliform(cfu/100ml), nitrate N (mg/L). This process has various advantages and applicability such as it can be used in small and large scale, has no running costs excepts pumps, no smell, no sludge and has natural aeration. The computational fluid dynamics model is used to analyse the hydrodynamics as well as other parameters. For different configuration of the bioreactors simulation are being performed and the results are compared with the field and lab data. The computational fluid dynamics models gives us the best results. Thus the soil biotechnology is the modern technology which is ecofriendly, and least costly.

**Keywords:** Waste water, soil technology micro and macro- organisms.

## ROLE OF *CARICA PAPAYA* IN HUMAN HEALTH

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The study focused on the secret behind the papaya seed. Well known for its nutritional value. But can also treat cancer, the leaves of papaya having a unique character because they have a milky sap which contain actogenesis, which are essential for preventing and killing the growth of cancer cells. Actogenesis are a group of natural phytochemical that have anti-tumor activities. Especially cancer of the lungs, liver, breast cancer and cervix. Also rich in enzyme papain which is effective against cancer. As it breaks down of fibrin cancer cell and protein into amino acids form. Isothiocyanate is one of the form of cancer cells. These enzymes capable of inhibiting both formation and development of cancer. The antioxidants in papaya fruit and seeds and their high fiber content also help in the detox process. As detoxifying and benefits in the treatment of cancer it also contains chemical integrates such as lycopene and others. Study investigated the effect of papaya seeds on prostate cancer using PC-3 cell line. This review summarizes the results of extract based or specific compound based investigation and emphasizes the aspects that warrant future research to explore the bioactivities in Carica papaya for their anticancer activities.

**Keywords:** Carica, Actogenesis etc.

## **CLIMATE CHANGE IS THE BIGGEST THREAT IN PRESENT CENTURY**

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Climate change is the biggest challenge for the society in the 21<sup>st</sup> century. It is not a problem of any single specific country or continent but it is a global problem. Present world is continuously speeding towards a catastrophe. Our foot is stuck on the accelerator and we are heading towards an abyss. It has far reaching effects, consequences and implication for entire globe in general and developing countries in particular. If sincere efforts are not made on war footing, then the life would become hell on this planet. Now-a-days, seasons are changing, temperature is rising of both earth and seawater and there is no end to it. The globe is entering in era wherein the environment would get intertwined in a spiral of decline and degradation affecting the availability and access to water, food, and energy in a big way. Studies reflects, world over people would consume 10 per cent more water per year than nature could replenish. Increase in global warming has been melting glaciers and receding snowlines. Accordingly, seventy rivers have stopped flowing into the sea and as a result, aquifers are depleting. It has far reaching effects, consequences and implication for entire globe in general and developing countries in particular. Hence, it is high time that globe as a whole must come forward to formulate a collective strategy for meeting or facing the biggest challenge of 21<sup>st</sup> century. Both developed and developing nations are sailing in the same boat. Hence, it is high time that globe as a whole must come forward to formulate a collective strategy for meeting or facing the biggest challenge of 21<sup>st</sup> century.

**Keywords:** Climate, Catastrophe, Energy, Glaciers, Globe

## **ROLE OF AGROFORESTRY IN MITIGATING ENVIRONMENT POLLUTION**

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The integration of trees, agricultural crops, and/or animals into an agroforestry system has the potential to enhance soil fertility, reduce erosion, improve water quality, enhance biodiversity, increase aesthetics, and sequester carbon. It has been well recognized that these services and benefits provided by agroforestry practices occur over a range of spatial and temporal scales. Many of these environmental externalities derived at the farm scale or landscape scale are enjoyed by society at larger regional or global scales. Although recent interest in the clean development mechanism (CDM) under the Kyoto Protocol offers promise for economic returns for carbon sequestration benefits of agroforestry systems, society's willingness to pay for other ecosystem services is yet to be fully explored. Agroforestry helps to conserve and protect natural resources by, for example, mitigating non-point source pollution (e.g. dust), controlling soil erosion and creating wildlife habitat. It facilitates flexible responses to rapid shifts in ecological conditions, while at the same time maintaining or restoring soil and water resources.

Microclimatic improvement through agroforestry has a major impact on crop performance as trees can buffer climatic extremes that affect crop growth. In particular, the shading effects of agroforestry trees can buffer temperature and atmospheric saturation deficit — reducing exposure to supra-optimal temperatures, under which physiological and developmental processes and yield become increasingly vulnerable.

**Keywords:** Agroforestry, agricultural crops, clean development mechanism (CDM)

## INFERENCE OF METAL BINDING TO EHVPS29 IN THE FUNCTION OF RETROMER COMPLEX

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Vps29 is the smallest subunit of retromer complex with metallo-phosphatase fold. Although the role of metal in Vps29 is in quest, its metal binding mutants has been reported to affect the localization of the retromer complex in human cells. In this study, we report the structural and thermodynamic consequences of these mutations in Vps29 from the protozoan parasite, *Entamoeba histolytica* (EhVps29). EhVps29 is a zinc binding protein as revealed by X-ray crystallography and isothermal titration calorimetry. The metal binding pocket of EhVps29 exhibits marked differences in its 3-dimensional architecture and metal coordination in comparison to its human homologs and other metallophosphatases. Alanine substitutions of the metal-coordinating residues showed significant alteration in the binding affinity of EhVps29 for zinc. We also determined the crystal structures of metal binding defective mutants (D62A and D62A/H86A) of EhVps29. Our results suggest that the metal positions are highly conserved and can be occupied with water in the absence of metal. Based on our results, we propose that the metal atoms or the bound water molecules in the metal binding site are important for maintaining the structural integrity of the protein. Further functional studies in the amoebic trophozoites showed that unlike in mammalian homolog, the mutations in the metal binding site of EhVps29, neither affected its sub-cellular localization nor the retromer function. However, the reduction of intracellular cysteine protease activity upon overexpression of wild type EhVps29 indicates that it plays a crucial role in secretion of the proteases.

**Keywords:** Vps29, D62A, D62A/H86A of EhVps29



**EFFECT OF TEMPERATURE AND RELATIVE HUMIDITY ON THE  
DEVELOPMENT OF BLUE MOULD ROT (*PENICILLIUM ISLANDICUM*  
SOPP.) ON INDIAN GOOSEBERRY (*EMBLICA OFFICINALIS* GOERTH.)**

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To study the effect of weather parameters i.e. temperature and relative humidity on the development of blue mould rot (*Penicillium islandicum* Sopp.) on Indian gooseberry *in vitro* experiment were carried out at Post graduate laboratory, Department of Plant pathology, Chaudhary Charan Singh Haryana Agricultural University, Hisar. An interaction of three temperatures i.e. 10, 20 and 30°C with relative humidity of 40, 60, 80 and 100 % was carried out at five and ten days after inoculation (DAI). Temperature of 30 °C along with cent per cent relative humidity resulted in maximum disease incidence of 87 and 100% in both 5 and 10 DAI, respectively. Minimum disease intensity (15 and 22%) was recorded at 10 °C temperature and 40 per cent relative humidity at 5 and 10 days after inoculation. However, with further increase in temperature and relative humidity, the per cent disease intensity was also increased and it also increased during the period of time (5 and 10 days after inoculation). Thus from the present study, it can be clearly elucidated that low temperature (10 °C) with low relative humidity (40%) is ideal for the post harvest storage of Indian gooseberry.

**Keywords:** *Penicillium islandicum*, Indian gooseberry, Temperature, Relative humidity, Blue mould rot.

## EVALUATION OF ELECTROCHEMICAL SENSOR BASED DIAGNOSIS FOR INITIAL STAGES OF KIDNEY DISEASE

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Chronic kidney disease (CKD) is characterized by progressive damage of the renal parenchyma and the loss of functional nephrons, which finally lead to progressive renal failure. It is estimated that it effects 1 in every 10 adults in India. The diagnosis of CKD depends on serum creatinine level and glomerular filtration rate which is detectable only when functionality reduces by 50%; hence leading to mandatory dialysis or kidney transplantation. Currently available methods are either time consuming or expensive and require trained manpower. A rapid, precise and cost-effective method for an early stage detection may enable improved quality of life for the patients prone to CKD. Designing an electrochemical biosensor was found to be an appropriate solution for the current hurdle in kidney degeneration prognosis.

We aimed to design a nanosensor based on electrochemical detection using a specific biomarker for the CKD. The designed sensor was compared to the diagnostic kits available in the market to evaluate its potential.

Capture molecule was immobilized using covalent modification and tested electrochemically for functionality. The sensitivity of the designed platform was tested for the efficacy with available kits.

Developed sensor is more sensitive compare to the current assay available in market like PENIA: Particle enhanced nephelometric assay, PETIA: Particle enhanced turbidimetric assay. The detection time also less (10 min) compare to current methods.

It is a first simple, rapid, accurate and economical and handy option for small-scale laboratory-based detection of initial stages (stage 1 & stage 2) of CKD, with high specificity, low detection limit and less detection time. Presently no such type of biosensor is available for the early stage diagnosis of CKD.

**Keywords:** Chronic kidney disease (CKD), Particle enhanced nephelometric assay,

## CURRENT STATUS AND CHALLENGES OF CARDIOVASCULAR TISSUE ENGINEERING

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Cardiovascular diseases are a leading cause of morbidity and mortality in every part of the world. Tissue engineering of heart has enormous potential to treat cardiovascular diseases. Recent advances in stem cell isolation protocols and its culture in bioreactors have given new hopes to this emerging field of medical sciences. Cell transplantation and myocardial tissue engineering are the commonly used approaches for engineering cardiac tissue. This review discusses the present status and challenges of cardiovascular tissue engineering with special emphasis on whole organ creation by decellularization and recellularization of three dimensional scaffolds, best cell source and optimal conditions for therapy.

**Keywords:** Tissue Engineering, Cardiovascular, Stem cells, Scaffolds, Decellularization

## ESTIMATION OF REDOX STATUS: RELATIONSHIP WITH THE SEVERITY OF SEPSIS

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Sepsis is a condition caused by infection followed by unregulated inflammatory response which may lead to the organ dysfunction. During such condition, over-production of oxidants is one of the factors which contribute cellular toxicity and ultimately organ failure and mortality. Antioxidants having free radicals scavenging activity exert protective role in various diseases. The present study has been designed to evaluate the levels of oxidative and anti-oxidative activity in sepsis patients and their correlation with the severity of the sepsis. A total of 100 sepsis patients and 50 healthy controls subjects were enrolled in this study from the period October 2016 to June 2017. The investigation included measurements of oxidative enzyme, myeloperoxidase (MPO), antioxidant enzymes including superoxide dismutase activity (SOD) and catalase activity (CAT). Furthermore, the level of these activities was correlated with severity of sepsis. Augmented levels of oxidants were found in sepsis as demonstrated by DMPO nitron adduct formation and plasma MPO level activity ( $1.37 \pm 0.51$  in sepsis vs  $0.405 \pm 0.16$  in control subjects). However, plasma SOD and CAT activities were significantly attenuated ( $p < 0.001$ ) in the sepsis patients compared with controls subjects. Moreover, inverse relation between antioxidant enzymes (SOD and CAT) and organ failure assessment (SOFA), physiological score (APACHE II), organ toxicity specific markers have been observed as demonstrated by Pearson's correlation coefficient. This study suggests that imbalance between oxidant and antioxidant play key role in the severity of sepsis.

**Keywords:** Catalase; Inflammation; MPO; ROS; Sepsis; SOD

## **CURRENT SEROTYPES OF DENGUE IN WESTERN UTTAR**

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Dengue fever is a mosquito-borne tropical disease caused by the dengue virus. There are four antigenetically related but distinct serotypes of the dengue virus: DENV-1, DENV-2, DENV-3 and DENV-4. Our study was undertaken with the aim to detection of circulating dengue serotype by Real Time Reverse Transcriptase PCR (polymerase chain reaction).

It's a cross sectional study conducted at Viral Research & Diagnostic Laboratory, Department of Microbiology, UPUMS Saifai, Etawah. Clinically suspected dengue cases attending different OPDs or admitted to different wards of this hospital between June 2016 to February 2017, were tested for NS1 Antigen ELISA and IgM Antibody ELISA. Out of 579 suspected cases, 104 were positive either by NS1 ELISA or IgM ELISA or both. All these 104 positive samples were subjected to Real Time Reverse Transcriptase PCR.

Among these 104 cases, 66 (63.46%) were male and 38 (36.54%) were female with ratio of 1.73:1. Most common age group affected was 0-18 yrs, out of which 23 were male and 9 were female. Of these 104 samples, NS1 antigen ELISA was positive in 39 samples alone, NS1 and IgM ELISA both were positive in 40 samples and IgM ELISA alone was positive in 25 samples. Of all these 104 samples, Real Time Reverse Transcriptase PCR detected serotypes in 76 samples only. The most common prevalent serotypes detected were DENV-2, 41(53.94%) and DENV-3, 23(30.26%) followed by DENV-1, 6(7.89%) and DENV-4, 6(7.89%).

Thus this study concludes that all dengue serotype are circulating in this region of the state with the most prevalent serotypes being DENV-2 and DENV-3 followed by DENV-1 and DENV-4.

**Keywords:** Dengue fever, DENV-1, DENV-2, DENV-3 and DENV-4

## BIOPHYSICAL SCREENING AND *IN-SILICO* STUDIES OF SORTASE A FROM *ENTEROCOCCUS FAECALIS*

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*Enterococcus faecalis* (Ef) is a Gram positive multidrug resistant (MDR) bacterium which contributes about 70% of total enterococcal infections. Ef is resistant to most of the commonly used antibiotics mostly due to its ability to form biofilms. In Ef, a membrane anchored transpeptidase enzyme Sortase A (SrtA) plays a major role in formation of biofilms. Therefore, SrtA has been recognized as an ideal drug target against Ef. In this regard to identify the potential inhibitor of Ef Sortase A (EfSrtA), we have cloned expressed and purified EfSrtA. We have also done the in-silico docking studies to identify lead molecules interacting with EfSrtA. Furthermore, the binding studies of these identified lead molecules were performed with EfSrtA using fluorescence spectroscopic studies. In addition to this, we also identified the interaction partner of EfSrtA with the STRING. Furthermore, we performed the in-silico protein-protein docking studies. Docking experiment revealed that cephaloglycin, benzylpenicillin, cefotaxime, pantoprazole and valsartan were bound to same site on the protein with similar interactions. Binding studies using fluorescence spectroscopic studies also confirmed the binding of cephaloglycin, benzylpenicillin, cefotaxime, pantoprazole and valsartan to EfSrtA at very low concentrations. This is the first report which revealed the binding of five lead molecules to EfSrtA which was further confirmed by fluorescence spectroscopic studies. Sequence based interaction studies identified that EfSrtA $\Delta$ 59 interact with the Ef\_1091, Ef\_1093 and Ef\_2658 proteins. A homology model of Ef\_1091 and Ef\_1093 was then complexed with modeled EfSrtA $\Delta$ 59 and protein-protein interactions are also discussed.

**Keywords:** *Enterococcus faecalis*, X-ray crystallography, rational structural based drug design

## BIOSYNTHESIS & CHARACTERIZATION OF GOLD NANOPARTICLE MEDIATED DELIVERY OF MCP I OF *CARICA PAPAYA* SEEDS AS A MALE CONTRACEPTIVE IN ALBINO RATS

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In the present study, gold nanoparticles (GNPs) based delivery system is being developed to enhance efficacy of MCP I of methanol sub-fraction of benzene chromatographic fraction of chloroform extract of *Carica papaya* seeds. MCP I tagged GNP was synthesized via wet chemistry process by adding MCP I to 1 mM of aqueous tetrachloroaurate (III) solution under vigorously stirring and boiling at 70°C and characterized using UV-Visible Spectroscopy, Fourier Transform Infrared Spectroscopy, Dynamic Light Scattering, Transmission Electron Microscopy and Energy-Dispersive X-Ray Spectroscopy. Thirty six adult male albino rats were divided equally into four groups viz., Group I- vehicle control; Group II- MCP I @10 mg/animal/day oral; Group III- MCP I tagged GNP @40 µg/animal/day oral (nanoparticle size ~20 nm; spherical/monodisperse) and group IV- MCP I tagged GNP @80 µg/animal/day oral (nanoparticle size ~50 nm; polydisperse). Three animals from each group were sacrificed followed 30, 60 and 90 days of treatment. Body weight, hematology, the absolute weight of reproductive and vital organs weight did not show appreciable changes following 90 days of treatment. The cauda epididymal sperm count significantly declined in group II ( $4.80 \pm 1.80$ ; mil/ml), group III ( $7.50 \pm 1.10$ ; mil/ml), group IV ( $17.01 \pm 0.30$ ; mil/ml) when compared with group I ( $24.10 \pm 1.50$ ; mil/ml) following 90 days of treatment. Sperm motility was significantly altered in group II ( $4.24 \pm 1.68$ ; %), group III ( $16.63 \pm 1.64$ ; %) and IV ( $15.40 \pm 3.40$ ; %). Whereas sperm abnormality was significantly enhanced in group II ( $49.49 \pm 4.93$ ; %), group III ( $57.42 \pm 1.69$ ; %) and IV ( $47.31 \pm 0.98$ ; %) when compared with group I ( $26.58 \pm 0.75$ ; %). Fertility of groups III and IV showed markedly declined after 15 days while fertility of group II gradually declined after 30 days. Complete sterility was achieved after 30 days of treatment in group III while 60 and 90 days in groups II and IV, respectively. Histopathological studies of testes exhibited vacuolization in Sertoli cells, disorganization of germinal epithelium and eruption of germ cells in all treated groups which indicate cessation of spermatogenesis at the level of primary spermatocytes. Findings suggest instant fertility impairment in groups III and IV due to efficient delivery of MCP I by particular size of GNPs. Therefore, GNPs mediated delivery of MCP I may be used as an innovative approach for male contraception.

**Keywords:** Gold nanoparticles (GNPs), *Carica papaya*, Energy-Dispersive X-Ray Spectroscopy

**ALLELOPATHIC EFFECT OF *TEPHROSIA PURPUREA*  
ON *PARTHENIUM HYSTEROPHORUS* L.**

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One of the main threats to biodiversity in the world is the destruction of habitats by natural and human interference. Natural and semi natural destruction is mainly caused by invasion of alien organisms which has been recognized as one of the serious and inestimable problem because existing aliens do not disappear and sometimes continue to spread. So, they are called as pervasive threat and it is important driver of global change. *Parthenium hysterophorus* L. is found to be the second most densely populated deadly and aggressive weed with allelopathic properties. This research study have been reported with common naturally occurring weeds as controlling agents for *Parthenium hysterophorus*, because use of some other allelopathic weeds and plants to suppress the weed infestation is the most cost effective and environment friendly method for weed control. The current study was conducted to test the inhibitory potential of aqueous extracts of root, stem and leaves of weed species *Tephrosia purpurea* on seed germination and seedling growth of *Parthenium hysterophorus* L. under laboratory conditions. The leaves are most effective part of plant. The radicle was more inhibited than the plumule in petri dishes. Inhibitory effect increases with increasing aqueous extract concentration. Therefore, further investigations will be required under green house and field conditions for pragmatic recommendation of species selection in the frame of weed species mediated ecological management of *Parthenium hysterophorus* L.

**Keywords:** *Parthenium hysterophorus* L., *Tephrosia purpurea*,



## MORPHOLOGICAL AND PHYSIOLOGICAL RESPONSE OF THE PLANTS TOWARDS DIFFERENT SOUND STIMULATIONS

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Plant growth is effected inevitably by different of external stimulations and these stimulations then influence the crop's yield attributes, yield and quality. Some scientists are of the opinion that plants are devoid of a nervous system and therefore are unable to understand music or respond to music. Sir Jagdish Chandra Bose was one of the pioneers to study the behavior of plants in response to various stimuli. Music is a harmonious and coherent blend of various frequencies and vibrations and has many different forms, qualities, and pitches. Different sound waves of *Gyatri mantra* and rock music produce different stimulation to plants that can effects the plant growth in different way. An experiment was conducted to study the impact of different musical sounds on plant growth. The influence of acoustic frequencies including soft and hard music on the growth pattern of different plants was recorded. Germination of wheat variety PBW 343 was recorded on 6<sup>th</sup> day of sowing on exposure to music followed by control (No music) on 8<sup>th</sup> day. Plant height recorded at every 10 days interval after CRI (25 Days), reported that plant height and number of tillers were higher with Gyatri Mantra followed by rock music and least in control. Plant growth and number of flowers were higher recorded in *Dahlia pinnata* (Single), *Dahlia pinnata* (Double), *Dianthus chinensis* and *Dimorphotheca fruticosa* with *Gyatri mantra* followed by rock music and least in control conditions up to 90 days of sowing. Environmental condition, fertilizer, irrigation and other agronomic practices were common for all the treatments. Positive response of plants with *Gyatri mantra*, may be due to that these sounds facilitate better physiological processes like absorption of nutrients, photosynthesis, protein synthesis, etc. for the plant and this is observable in terms of increased height, higher number of leaves and overall more developed and healthier plants.

**Key words:** Growth, stimulation, music

## **RISUG<sup>®</sup> INDUCED INTRATUBULAR CONTRACEPTION AND ITS REVERSAL IN FEMALE ALBINO RATS**

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RISUG<sup>®</sup> is a copolymer of styrene and maleic anhydride (SMA) arising as one of the most promising male contraceptive device than conventional vasectomy and other vas based male contraceptives. The contraceptive efficacy of intratubular injection of RISUG<sup>®</sup> and its reversal with DMSO and NaHCO<sub>3</sub> has been assessed in female rats. Animals were divided into four groups containing 10 animals each, viz., sham operated control (Group I), tubal occlusion with RISUG<sup>®</sup> for 90 days (Group II), tubal occlusion with RISUG<sup>®</sup> for 90 days and reversal with DMSO (Group III) and tubal occlusion with RISUG<sup>®</sup> for 90 days and reversal with 5% NaHCO<sub>3</sub> (Group IV). The body weight was taken fortnightly, estrous cycle monitored daily and fertility was recorded monthly. Reproductive and vital organs weight, histology, tissue biochemistry, teratology and hematology were evaluated at sacrifice schedule. The animals of group II indicated positive mating but no pregnancy was observed confirming zero percent fertility. However, after reversal, group III animals exhibited gradual increase in fertility (50% at 45 days, 80% at 105 days and 100% at 150 days) following reversal with DMSO and in group IV animals, fertility restored to 70% at 45 days, 70% at 105 days and 100% at 150 days following reversal with NaHCO<sub>3</sub>. Histo-architecture showed normal cellular configuration of ovary and uterus, however, RISUG<sup>®</sup> implanted isthmic region showed shedded epithelium with blunt and low villi in group II animals, with lumen filled with eosinated RISUG<sup>®</sup> implant. In groups III and IV animals, isthmic part of fallopian tube was thick, surrounded by muscular layers with narrow lumen and short mucosal folds. No significant alterations were observed in other parameters, viz., body weight, reproductive and vital organs weight, estrous cyclicity, tissue biochemistry, teratology and hematology. Thus, the above findings suggest that RISUG<sup>®</sup> induces intratubular contraception and the procedure is reversible and safe.

**Keywords:** Styrene maleic anhydride (SMA), teratology hematology

## GENETIC VARIABILITY IN THE ISOLATES OF *BIPOLARIS MAYDIS* CAUSING MAYDIS LEAF BLIGHT OF MAIZE

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Maize is one of the most important cereal crops in the world and also known as queen of cereals. Among various diseases of maize, maydis leaf blight incited by the fungus *Bipolaris maydis* has attained the status of the economically important disease. Six isolates of *Bipolaris maydis* (viz., Jind, Karnal, Yamunanagar, Panchkula, Sonipat and Kaithal) were collected from different locations of Haryana and their genetic variability was studied by using random amplified polymorphic DNA (RAPD) and internal transcribed spacer (ITS). Data generated from 18 RAPD and 2 ITS polymorphic primers from six *B. maydis* isolates was analysed with UPGMA by using NTSYS and dendrogram was constructed. The cluster analysis of *B. maydis* isolates using combined data of RAPD and ITS primers depicted wide range of genetic relatedness, which ranged from 0.30 to 0.57, i.e., 30 to 57 per cent among the isolates of *B. maydis*. All primers showed 100% polymorphism with fragment size varying from 0.25-3 kb. The UPGMA analysis differentiated the six *B. maydis* isolates into three groups i.e. group A, group B and group C, at similarity coefficient of 0.42. The group A consisted of two isolates of *B. maydis*, in this isolates Jind and Sonipat showed 57 per cent genetic similarity and both of them showed 41 per cent genetic similarity with group B. On the other hand group B consisted of two isolates of *B. maydis*, in this isolates of Yamunanagar and Kaithal showed 45 per cent genetic similarity. Group C consisted of only one isolate (Karnal) of *B. maydis*, isolate from Karnal showed 31 per cent genetic similarity with group A and group B. But isolate Panchkula did not fall in to any group at the similarity coefficient of 0.42, Panchkula isolate was wide distance pair showing 29 per cent similarity with other isolates of *B. maydis*, whereas maximum closeness (57%) was observed between Jind and Sonipat isolates. Analysis of *B. maydis* isolates from maize by phylogenetic tree revealed distinct clusters showing genetic variation.

**Keywords:** *Bipolaris maydis*, RAPD, UPGMA.

## **AZADIRACHTA INDICA A. JUSS (NEEM): A HIGHLY IMPORTANT MEDICINAL PLANT**

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*Azadirachta indica* A. Juss (Neem, Family: Meliaceae) has been aptly referred to as the “Sarva Roga Nivarini” in the (Charaka Sanhita) from as early as the Vedic times. It attracted the interest of phytochemists all over the world for its rich source of alkaloids and terpenoids. It was only during the past half-a-century that this tree has come to prominence, since isolation of azadirachtin-A (Aza-A) by Morgan from its seed-kernels. Aza-A is a tetra-nortriterpinoid, widely used in empirical Ayurvedic medicine. Neem tree grows naturally in the Indian subcontinent. Neem has gained tremendous multipurpose significance, worldwide, due to its therapeutic and bioactive properties. There is long history use of neem in India, and its medicinal properties are also enshrined in ancient Indian scriptures. Most of the plant parts such as fruits, seeds, leaves, bark and roots contain compounds with proven antiseptic, antiviral, antipyretic, anti-inflammatory, antiulcer and antifungal uses. It has great potential in the field environment protection and medicine. The Chemical constituents of Neem contain many bioactive compounds including alkaloids, flavonoids, triterpenoids, phenolic compounds, carotenoids, steroids and ketones. Methanolic extract fraction of neem leaves when tried against Cocksackie B group viruses, produced *in vitro* show highly effective on antiviral and virucidal strain.

**Key words:** Bioactive compounds , Anti-inflammatory, Tetra-nortriterpinoid.

## STUDIES ON EFFECT OF ABIOTIC STRESS ON BIOCHEMICAL PROFILING IN *VIGNA UNGUICULATA*.

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The present research plant *Vigna unguiculata* is an annual herbaceous legume found cosmopolitan. It is found normally in erratic rainfall with high humidity as it is an important economic crop in arid zones of Asia and Africa . It has tremendous nitrogen fixing capability, as the plants root nodules are able to fix atmospheric nitrogen, making it a valuable crop for storehouse of farmers who are economically weak and well-suited to intercropping with other crops. Cadmium pollution from industries can affect soils in farmlands there by playing destruction with health of humans and livestock. The present study was undertaken to study the effect of Cadmium salts on seed germination percentage, seedling growth and fresh weight including various biochemical parameters of *Sorghum bicolor*. Seeds were treated with different concentrations (10, 50, 100, 200, 500 and 1000 ppm) of cadmium sulphate along with control for 10 days. On the 10th day results were noted for above parameters. Seed germination percentage was recorded maximum at 10 ppm followed by 50 ppm. Maximum shoot length was observed at 500 ppm (7cm) and root length showed maximum growth at 10 ppm (5.6cm). Fresh weight of seedlings was observed better than control for 10 ppm dose level and decreased further with increase in dose level. Further maximum amount of proteins and total soluble sugars were observed at 200ppm (16.1mg/gdw and 1.75mg/gdw respectively) and while starch was found to be maximum at 500 ppm (3.5mg/gdw) and total phenols were found to be maximum at 200ppm dose level (3.35mg/gdw). However, in lipids there was no variation in content at various doses as compared to control. Total chlorophyll was found to be maximum in control and minimum at 1000ppm dose level (0.022 and 0.007 mg/gdw) and maximum amount of carotenoids was found to be maximum at 1000 ppm. These results can be further developed as markers for field testing of cadmium polluted plants for phytoremediation.

**Keywords:** *Vigna unguiculata*, herbaceous legume, phytoremediation

## ISOLATION AND CHARACTERIZATION OF PHYTOSTEROLS FROM *ALHAGI MARORUM*

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In these decades, drastic attention in the natural products especially mentioned Ayurvedas and other conventional systems of medicines has been observed. Drugs obtained from plant have been measured much safer and possess at remendous utility in the treatment of various diseases. Medicinal plants are called molecular factory, as they have ability to produce vast range of compounds derived from them thus termed as "*Bioactive compounds*". The plants bears different phytochemicals known to early civilizations for various curative properties. Researches in these areas are assisting in depth knowledge about the mechanisms, their role and formation of secondary metabolites and nutraceuticals of importance. *Alhagi marorum* is significant medicinal plant having several medicinal values like antimicrobial, antioxidant and anticancer agents. It is an important arid zone flora normally consumed as herbal drugs for treatment in pain and inflammation, including other metabolic disorders such as diabetes and obesity. During present investigations, phytosterols was characterized and quantified from *A.marorum*. Chromatographic and spectral studies were used to confirm Phytosterols in which  $\beta$ -sitosterol, campesterol and stigmasterol were confirmed through TLC, IR and GC-MS. GC-MS profiling showed presence of 48 compounds. It was observed that maximum area was occupied by 2Propen1one, 1(4methylphenyl) 3phenyl, oxime having area of 6.45%. Thus this plant can be used in future therapeutic endeavors.

**Keywords:-** *Alhagi marorum*; Phytosterols; TLC; IR; GC-MS.

## SYNTHESIS AND CHARACTERIZATION OF CARBON/SILVER COMPOSITE USING DIMERIC GALLATES: STUDY OF THEIR ANTIMICROBIAL POTENTIAL

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The gallic acid is a potent antioxidant and is copiously available plant phenolic compound. In the present study, a dimeric analogue of gallic acid (DGA) was synthesized which was then employed to yield stable carbon/silver nanocomposites of ~50 nm size. Reduction and subsequent stabilization of nanocomposites was achieved using different concentration of DGA. No signs of aggregation were observed and was confirmed with surface plasmon resonance.

The antimicrobial potential of such composites was evaluated in four different bacterial and fungal strains. The nanocomposites showed efficacious bactericidal activity (~ 5 µg/ml) and fungicidal (~10 µg/ml) activity against all the strains. The activity was also substantiated by means of optical and transmission electron microscopic studies. The significant antioxidant and antiplatelet activity of the nanocomposites represent them as suitable and versatile antimicrobial agents. The DGA could be an effective experimental candidate which would play an important role for the pertinent issue of scaling-up with low volume. Concisely, these DGA stabilized carbon/silver nanocomposites could serve as promising antimicrobial agents for effective outcomes.

**Keywords:** gallic acid, DGA

## **EFFECT OF NANOMATERIALS ON GROWTH AND PHYSIOLOGY OF MILLETS**

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Millets are small seeded cereals that are grown as staple foods in the third world countries. In the present era of industrial advancement, nanomaterials (NMs) are continuously produced and commercially used on a large scale. These NMs deteriorate the soil quality when released as industrial effluents, directly effecting the agricultural produce and end up in the food chain. The present study was aimed to analyses the effect of NMs on food crops by taking millets as model plants. Seeds were grown under different NMs with varied concentrations in the MS medium. After 15 days, the plantlets were excised and their antioxidant potential was measured by studying different reactive oxygen species (ROS) scavenging enzyme activities like Peroxidase (POX) etc. The enzyme activities were found to be increasing with the rise in the NM concentration indicating the stress enhancement. It was concluded that NMs lead to deterioration in the growth of the plants.

**Keywords:** Nanomaterials, Peroxidase



## GREEN SYNTHESIS OF AGNPS USING POLLEN-PRODUCING REPRODUCTIVE ORGAN OF *CALENDULA OFFICINALIS*

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In recent science Nanobiotechnology is a impassioned field for the researchers. Nanobiotechnology deals with the Nanoparticles having a size of 1 - 100 nm in one dimension used significantly concerning medical chemistry, atomic physics, and all other known fields. NPs are used immensely due to its small size, orientation, physical properties, which are reportedly shown to change the performance of any other material which is in contact with these tiny particles. These particles can be prepared easily by different chemical, physical, and biological approaches. But the biological approach is the most emerging approach of preparation, because, this method is easier than the other methods, ecofriendly and less time consuming. The Green synthesis was done by using the aqueous solution of stamens of *Calendula officinalis* extract and AgNO<sub>3</sub>. A fixed ratio of plant extract to metal ion was prepared and the color change was observed which proved the formation of nanoparticles. The nanoparticles were characterized by UV - vis Spectrophotometer, FTIR, XRD, TEM and SEM. The nanoparticles were found have the size ranges from 160 - 180 nm.

**Key Words:** Nanobiotechnology, Nanoparticles, Green Synthesis

## **PROTEOMICS: CHALLENGES AND OPPORTUNITIES IN DRUG DISCOVERY AND DEVELOPMENT PROCESS**

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Proteomics is the emerging technology leading to high-throughput identification and understanding of proteins. Proteomics is the protein equivalent of genomics and has captured the imagination of biomolecular scientists, worldwide. Because proteome reveals more accurately the dynamic state of a cell, tissue, or organism, much is expected from proteomics to indicate better disease markers for diagnosis and therapy monitoring. Proteomics is expected to play a major role in biomedical research, and it will have a significant impact on the development of diagnostics and therapeutics for cancer, heart ailments and infectious diseases, in future. Proteomics research leads to the identification of new protein markers for diagnostic purposes and novel molecular targets for drug discovery. Though the potential is great, many challenges and issues remain to be solved, such as gene expression, peptides, and generation of low abundant proteins, analytical tools, drug target discovery and cost. A systematic and efficient analysis of vast genomic and proteomic data sets is a major challenge for researchers, today. Nevertheless, proteomics is the groundwork for constructing and extracting useful comprehension to biomedical research. This poster presentation covers some opportunities and challenges offered by proteomics in drug discovery and development process.

**Keywords:** Proteomics, peptides, biomedical research

## A PROTECTIVE EFFECT OF ETHANOLIC LEAF EXTRACT OF *ANNONA SQUAMOSA* ALLOXAN INDUCED NEPHROTOXICITY IN RATS

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Medicinal plants are capable to producing active constituents that can be used to treat several types of diseases and hence medicinal plants achieving an important role in global health. Diabetes mellitus (DM) is metabolic disorder characterised by chronic hyperglycaemia with disturbances of carbohydrate, protein and fat metabolism resulting to decrease insulin secretion, or completely stop insulin formation or both.

The principle objective of this investigation is to find out antidiabetic activity of ethanolic extract of *Annona squamosa* Linn. In the present study alloxan induced diabetic rat model were used. Diabetes was induced in Wister rat by alloxan of dose (150 mg/kg b.w.). It has been shown to damage pancreatic beta-cell and produce hyperglycemia in rats. After induction of diabetes, caused significant reduction in blood serum glucose, lipid profiles like serum cholesterol and triglycerides but significant increase in HDL and body weight. The ethanolic extract of *Annona squamosa* Linn leaves of (200 and 400 mg/kg) were administered orally to alloxan induced diabetic Wister rat model for 28 days. To know the role of *Annona squamosa* Linn in blood serum glucose, kidney function test such as urea, uric acid creatinine, bilirubin protein and albumin.

After the treatment significant reduction showed in blood glucose level, urea, uric acid, creatinine and bilirubin while increases the level of protein and albumin in diabetic model in comparison to control. The anti-diabetic activity of extract is found more effective in (400 mg/kg b.w.) comparison to (200 mg/kg b.w.). Thus, leaves of *Annona squamosa* Linn can be used as potential anti-diabetic drug.

Ethanolic extract of *Annona squamosa* Linn leaves possesses significant anti-diabetic characteristics.

**Keywords:** *Annona squamosa*, Diabetes mellitus, Antidiabetic.

## EFFECTS OF TIN (IV) COMPOUND ON REPRODUCTIVE FUNCTIONS IN THE MALE RATS

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To investigate the effects of Tin (IV) compound on male reproductive functions and study the mechanisms underlying these effects, Tin (IV) compound were administered orally to a group of male rats at 4 mg/kg b.wt. for 60 days. Group I served as control and received the treatment vehicle, distilled water. Treatment caused a significant decrease in the testicular weight at 4 mg ( $P \leq 0.01$ ) in male rats which might be a product of both its potent antioxidant properties and androgenic activities. The density of sperms in the testes was decreased significantly ( $P \leq 0.01$ ) at 4 mg dose level. The serum testosterone, FSH and LH level was decreased significantly ( $P \leq 0.01$ ) at 4mg dose level when compared with that of control group. The level of glutathione in testis was decreased significantly ( $P \leq 0.01$ ) in the 4 mg treatment group.. The results indicated that Tin (IV) compound have anti-fertility effect in the male rats.

**Key Words:**, TIN (IV) compound, Testosterone, Male reproductive functions, antioxidant properties.

**ABSTRACT FOR POSTER PRESENTATION AT GYAN  
VIHAR UNIVERSITY**

**PRODUCTION OF POLY HYDROXY BUTYRATE FROM INDUSTRIAL  
WASTE AND ITS APPLICATION AS BIOPLASTIC**

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Poly  $\beta$  - hydroxybutyrate (PHB) is a heavy, molecular-weight polymer with monomer units of (R) 3 hydroxyl butyric acid (HBA) which is deposited as a storage component in many groups of microbes, and is an eco-friendly thermoplastic. Distillery spent wash (DSW) is an industrial waste which has elevated chemical oxygen demand (COD) levels but consists of valuable minerals that can be used for PHB production. *Azotobacter vinelandii* (ATCC® 12837™ and ATCC 13705™) was used to develop *A. vinelandii* UWD, which is a hyper PHB-producing mutant, by using N-methyl-N'-nitro- N-nitrosoguanidine (NTG) mutagenesis. This strain was grown in a fed-batch bioreactor containing diluted DSW at (1–7%) with 5% glucose as the carbon source, and ammonium acetate as the nitrogen source. The transformation efficiency for rifampicin (Rif)-positive colonies was  $9 \times 10^{-5}$  which was good enough to select the hyper PHB-producing mutants after five days of incubation. The amount of PHB produced in different dilutions of spent wash was highest (40 g/L, 92% w/w) with 4% spent wash. The glucose consumption was 89% w/w at 4% DSW, and the dry cell weight was  $> 23.4$  g/L. In addition, elevated COD levels (1100 mg/L) of DSW were decreased to 200 mg/L after fermentation was completed. The spent wash, which is considered to be a production waste and ecological pollutant, can be consequently used for bioplastic production.

**Keywords:** Poly  $\beta$  - hydroxybutyrate (PHB), 3 hydroxyl butyric acid (HBA),

## EFFICACY OF FUNGICIDES AGAINST LEAF SPOT OF PEARL MILLET CAUSED BY *DRECHSLERA SETARIAE* UNDER FIELD CONDITIONS

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Pearl millet (*Pennisetum glaucum*) locally known as bajra, combo, sajja, bari, ganti or kambam, is an allogamous crop having protogynous nature. India is the largest producer of pearl millet, Rajasthan occupies first position in area and production in india. Among the various diseases of pearl millet, leaf spot caused by the fungus *Drechslera setariae* has attained the status of the economically important disease. Among the seven fungicides evaluated against leaf spot of Pearl millet under field conditions during *Kharif* 2015, minimum disease intensity was recorded with Propiconazole (9.62%) followed by tebuconazole (14.07%), carbendazim + mancozeb (16.29%), difenconazole (23.71%), hexaconazole (42.96%), mancozeb (47.40%) and chlorothalonil (50.38%) at 0.2 per cent concentration. However, propiconazole was highly effective, significantly superior and recorded maximum disease control (88.99%) followed by tebuconazole (83.90%) and carbendazim + mancozeb (81.36%), difenconazole (72.87%), hexaconazole (50.85%), mancozeb (45.77%) and Chlorothalonil was least effective fungicide which gave minimum disease control (32.45%) at 0.2 per cent concentration. Two sprays of propiconazole 25 EC @ 0.2% at fifteen days interval found to be highly effective against leaf spot of pearl millet and gave minimum disease intensity (9.62 %), maximum grain yield (22.10 q/ha), maximum spike length (23.33 cm) and maximum plant height (179.10 cm) followed by tebuconazole 25 EC @ 0.2% and carbendazim 12 WP + mancozeb 63 WP @ 0.2%. Propiconazole 25 EC @ 0.2% has highest avoidable loss in grain yield. This treatment also increases the grain yield, length of spike, plant height with highest disease control efficacy.

**Keywords:** *Pennisetum glaucum*, tebuconazole, difenconazole, hexaconazole

## **MOLECULAR BACTERIA-FUNGI INTERACTIONS: EFFECTS ON ENVIRONMENT, FOOD, AND MEDICINE**

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The discovery of penicillin is one of the first documented observations of an interaction between bacteria and fungi mediated by small molecules. Historically molecular intergeneric interactions were regarded mainly as growth-inhibiting interactions; however, modern research revealed that microbial cross talk forms an integral part of our environment and covers various aspects beyond simple antibiosis. There are instances in which natural products alter phenotypes and developmental processes, such as sporulation or biofilm formation, and serve as virulence factors in symbiotic and pathogenic associations involving additional partners. Specialized mutualistic relationships have evolved in which a host organism harbors a symbiont to make use of its chemical synthesis capabilities to combat competitors or to maintain a certain lifestyle. The growing number of studies published in the past few years that report discoveries in this field points to an exciting emerging area of research. Our increasing understanding of the complex networks in microbial ecology will not only help us understand fundamental biological processes but also lead to the discovery of new virulence factors and drug candidates. This topic highlights recent contributions to the understanding of bacteria-fungi interactions mediated by secondary metabolites that occur in the environment and affect medicine and biotechnology.

**Keywords:** Penicillin, biofilm, sporulation

## **AUTOMATED IRRIGATION SYSTEM**

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In today's busy world most of us likes gardening and many households are keeping small nurseries but we don't have enough time to monitor and maintain the watering regularly because of which we end up losing our plants to heat and dryness. Technologies can be used to overcome these issues. Many people do not have the capital resources to invest in expensive monitoring systems so the aim is to make simple monitoring systems which should also focus on avoiding wastage of water. In order to automatically water the plants, our system utilises software that allows the microcontroller (connected to moisture sensor and water pump), to detect the soil moisture and accordingly start or stop the water flow till desired soil moisture level is attained. Furthermore, RTC module, temperature and humidity sensor and photoresistor etc. can also be connected to monitor the plant's growing environment. The readings from these sensors can be seen instantly when the microcontroller is connected to a computer, WiFi and Bluetooth module can also be connected to get alerts about critical sensor readings in our smartphone by SMS or email. The WiFi module can also be used to switch on and off the motor from anywhere. Wastage of water and unnecessary irrigation is controlled in this system and it helps to irrigate plants with only the necessary amount of water. This system is more applicable in greenhouse and home gardening. Small farmers and people who are willing to do home gardening or nursery will be very much benefited with this system and many people will be motivated to start home gardening.

**Keywords:** microcontroller, WiFi, Bluetooth



## **INSECT RESISTANCE MANAGEMENT FOR Bt CROPS**

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Integrated Plant Disease Management (IPDM) and Insect Resistance Management (IRM) are scientific approach to prevent pest evolution and its negative impact on agriculture, public health and veterinary issues. This management system was first utilized in USA by Monsanto. A variety of studies are coming to light where pests have now started to show resistance to the Genetically Modified crops. Since their introduction, a variety of Bt crops have come in the market where the manufacturer are informing about the benefits without having any information as to how quickly these plants will again become susceptible to the pathogens. Identification of early signs of resistance and utilization of strategies to delay these losses will not only be beneficial to the farmers, but also to the scientific community. IRM practices have been helping farmers fight off this inevitable end result till now. IRM practices are developed to decrease the chances of insect becoming resistant to Bt traits by planting a Bt variety with a non Bt variety at the same time. We focus on some of these techniques and inform about how these practices can be further modified. Utilizing Remote Sensing technology and IPDM systems proper training can be provided through Universities to future generation of farmers.

**Key Word:** IPDM, IRM, Bt crops, Bt traits, management practices.

## RECENT PERCEPTION ON PTC MEDIA

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Plant tissue culture (PTC) is used to maintain and grow plant cells, tissues and plant organs under sterile condition on a nutrient culture medium. Variations in plant tissue culture media are one of the most important aspects in plant biology. Since any part of any plant can be grown on these PTC media, there has to be variations in their content according to the requirement of the plant. First attempt was done by Germany to isolate the plant cells in vitro on artificial medium. In early days natural media was used in which, composition was not specific the results were not appropriate; the media composition can be both general and species specific. Also, the content of the media is tissue specific, i.e. the growth is from cells. When developing a suitable media for a particular plant culture system, initiation of studies generally start with a known medium (eg. B5 or MS Medium) and then modifications are done according to required characteristics. The technique is not without problems. For example, in spite of significant advances, there is still difficulty in regeneration of shoot organogenesis and somatic embryogenesis of Indian sandalwood. In this review we inform about the timeline of these PTC media, their development, patents and current problems associated.

**Key words:** PTC, MS medium, B5 medium, organogenesis, embryogenesis.

## **A STUDY TO ENHANCE THE FERTILISER POTENTIAL OF BIO-GAS PLANT SLURRY WASTE THROUGH ADDITION OF NITROGEN FIXING BACTERIA.**

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Biogas plants are the renewable and sustainable source of energy that converts the Bio waste into Biogas. In society it is very relevant. However, some crucial problems are being faced by the existing Biogas facilities. One of the major problem faced is the insufficient production of fertiliser in the Biogas Plants. This problem can be solved by the inoculation with efficient nitrogen fixing bacteria that has been cultured from a better source. Nitrogen is generally considered as one of the major limiting nutrients in plant growth. *Azospirillum*, *Azotobacter*, *Rhizobium* species are isolated, cultured and inoculated under various experimental setups with selected culture medium. These species can thereby be added to the slurry from the biogas and a mass cultivation can be carried out. It is a replicable and viable model. The most attractive aspect of this project is that the technology involved is quite simple. The use of this technique can help reduce the dependence on chemical fertilizers and reduce the problems fertilizer residue in food.

**Keywords:** *Azospirillum*, *Azotobacter*, *Rhizobium*

## **DARK SIDE OF GM CROPS**

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GM crops are mainly agricultural crop. The DNA of those crops has been modified using genetic method to increase the yield & pest resistance ability. Genetically modified crops are not without controversies. Even before their first approval for sale in USA these GM crops have been a matter of debate. There are many researches which informs about the possible harm of these plants to both animals and surrounding biodiversity. Prolonged consumptions of GM crops have shown to be harmful to the rats and reports of allergies to humans on skin and fetus have been reported. In countries like India & China where a large land area grows Bt cotton to kill to bollworm pest, the toxic Bt protein has started to affect the arthropods & the natural predictors of bollworm like ladybirds & spiders damaging the nearby biodiversity. Due to these reasons European Union requires labels to be put on all GMO food products whereas some countries like Norway , Russia , South Africa has banned GM crops altogether. In India the only GM crop allowed is Bt cotton and other GM food crops are totally band whereas in USA “95% of sugar beets, 88% of corn, & 94% of soybeans” are under GM crops. In this review we inform about the issues that are being studied by scientists to confirm about the safety of these GM crops.

**Key Words:** GM crops, affects, bands, hopes.

## NANOCELLULOSE BASED WATER PURIFICATION

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In the current scenario, the availability of safe and clean drinking water is decreasing day by day. To overcome this difficulty, Nanotechnology has been undertaken to explore various efficient ways for treatment of waste water in a more precise and accurate way with the support of various nanomaterials. Nanoparticles (NPs) have huge potential that enables them to participate in waste water treatment and/or water purification technologies. As nanoparticles are non-renewable so have a limited application in water treatment, to overcome this limitation Nanocellulose were preferred; Nanocellulose is an inexhaustible material that combines a high surface area with high quality, inertness, and surface properties. The methodologies basically carbon nanocellulose for the removal of impurities like polymers and organic pollutants are highlighted. Nanocellulose and its surface altered renditions influences the adsorption properties of imperative water pollutants, e.g., substantial metal species, dyes, microorganisms, and natural particles (organic molecules). This is due to the fictionalization of nanocellulose by different linkers. The technique of water purification is done by nanocellulose -based membranes, filters and channels. Organic pollutant contains organic dyes (Methylene Blue, Congo Red) will be experimentally removed by CNC and quantification is done by SEM studies, while polymers (urea) is done with the same methodology as that of organic pollutants. Adsorption isotherm for various dose of adsorbent is also studied. Adsorption capacity of differently functionalized Nanocellulose is observed.

**Keywords:** cellulose nanofibers, cellulose nanocrystals, membranes, water purification, adsorption

## **BIOFUEL - A BLESSING IN DISGUISE**

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The ill effects of changing climatic conditions and over exploitation of available conventional sources of energy, food scarcity and depleting economic conditions have lead researchers to look for an alternative way that could solve the global crises being faced these days.

Keeping in mind the concept of sustainable development and ecofriendly ways, microalgae can prove out to be the most relevant source for bio fuel production.

Since algae can perform photosynthesis and can produce large amount of organic matter like fat, lipids, carbohydrate in short span of time which can be further processed into biofuels like bioethanol, biohydrogen and much more. Microalgae can be cultured easily and cost effectively besides it has an enormous potential that make it one of the best approach towards achieving sustainability. Modifying cynobacteria can open new gates to the scientific world .Now a days biofuel are one of the main area of researchers. Sustainable biofuels produces food and fuel with the raising environmental standards and increased productivity in farming around the world. ... They cut the use of fossil fuels associated with greenhouse gas emissions and biofuels can from even cleaner feedstocks that offer greater benefits. although algae are not produced at a very large scale for mass application but increasing technology can certainly develop opportunities for this process.

**Keywords-** Microalgae, biomass, biofuel, bioethanol, sustainable development

## ANALYSIS OF ALPHA<sub>1</sub>-ANTITRYPSIN DEFICIENCY IN LUNG CANCER

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Alpha-1-antitrypsin ( $\alpha_1$  AT) is a 52-kDa secretory glycoprotein predominantly derived from the liver which inhibits the activity of proteolytic enzymes in the body.  $\alpha_1$  AT deficiency is the major risk factor and individuals with susceptible genotypes remain at risk for severe and early onset of lung diseases. The study investigated the association of genetic polymorphism of the  $\alpha_1$  AT gene with lung diseases. The frequency of PIM3 allele in lung cancer patients was found to be significantly higher than the controls ( $p < 0.0001$ ). In the same samples five SNPs were observed near the junction of exon-intron I. The occurrence of these SNPs didn't show any association with lung cancer. However, the PIM3 allele of  $\alpha_1$  AT gene was found to be associated with lung cancer. It may be concluded from the results of current study that PIM3 allele of  $\alpha_1$  AT gene has association with the pathogenesis of lung cancer in the Indian population.

**Keywords:** Alpha-1-antitrypsin ( $\alpha_1$  AT), PIM3 allele, lung cancer

## **BIOSYNTHESIS OF ZINC AND COPPER NANOPARTICLE USING BUTEA MONOSPERMA FLOWER EXTRACT**

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Butea monosperma is a species of butea native to tropical and sub tropical parts of the Indian subcontinent and Southeast Asia, ranging across India, Nepal, Sri Lanka, Myanmar, Thailand, etc. Common names include flame of the forest and bastard teak (kingdom plantae, unranked, angiosperm, eudicots, residues, (order fabales) (family, fabaceae) (genus butea).

We discussed on the synthesis and characterization of zinc nanoparticle by green synthesis method. It was attempted to synthesize zinc and copper nanoparticles using a medicinal plant butea (family: fabaceae). Zinc and copper were used to synthesize both nanoparticles by using flower extract of butea monosperma. The structural characterization of synthesized nanoparticles was carried out using XRD, EDAX, and SEM. The optical characterization was carried out using UV-Vis and FT-IR analysis. The synthesized zinc and copper nanoparticles can be used for various applications due to their eco-friendly, non-toxic and compatibility for pharmaceutical and other applications.

**Keywords:** Zinc nanoparticle, Copper nanoparticle, Butea Monosperma, Characterization, Antimicrobial activity.



## ROLE OF *CARICA PAPAYA* IN HUMAN HEALTH

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The study focused on the secret behind the papaya seed . Well known for its nutritional value. But can also treat cancer, the leaves of papaya having a unique character because they have a milky sap which contain actogenesis, which are essential for preventing and killing the growth of cancer cells. Actogenesis are a group of natural phytochemical that have anti-tumor activities. Especially cancer of the lungs, liver, breast cancer and cervix. Also rich in enzyme papain which is effective against cancer. As it breaks down of fibrin cancer cell and protein into amino acids form. Isothiocynate is one of the form of cancer cells. These enzymes capable of inhibiting both formation and development of cancer. The antioxidants in papaya fruit and seeds and their high fiber content also help in the detox process. As detoxifying and benefits in the treatment of cancer it also contains chemical integrates such as lycopene and others. Study investigated the effect of papaya seeds on prostate cancer using PC-3 cell line. This review summarizes the results of extract based or specific compound based investigation and emphasizes the aspects that warrant future research to explore the bioactivities in Carica papaya for their anticancer activities.

**Keywords:** Carica, Actogenesis etc.

**PROBLEM DUE TO MINING ACTIVITIES WITH SPECIAL REFERENCE  
SURFACE AND GROUND WATER ENVIRONMENT, NIMBAHERA  
VILLAGE, DISTRICT CHITTORGARH**

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Mining is an important economic activity in many countries all over the world. Water is said to be polluted when it is changed in its quality and composition directly or indirectly due to man's activity so that it becomes less suitable for drinking, domestic, agriculture or any other purpose. The major source of surface and ground water pollution is injudicious discharge of untreated industrial effluents directly into the surface water bodies resulting in serious surface and ground water pollution. Pollution load increases due to the adding of slurry leading to decline of the overall quality of the water. One of the major impacts of mining processes is the contamination of water bodies through mine water drainage, leakage of water exposed to minerals, water from soil heaps, and mine water rebound. This loss of water quality is causing health hazards and death of human beings, livestock and death of aquatic lives, crop failure and loss of aesthetics. It is also seen that polluted water leads to a number of diseases like cholera, typhoid, dysentery and other viral diseases. So mining activity disturbs the original water catchments area and creates water logging problems which ultimately affects the ground water recharge. It is also seen that due to mining activity water level has gone very low. The purpose of this study therefore, is to present the effect of mining on water quality of some parts of the Nimbahera also attempt to examine some precautions and remedies to the effects.

**Keywords:** Mining, Pollution, Slurry, water quality, Contamination

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Oral cancer (OC) is presently one of the most prevalent cancers known till date, and it occurs more often in men than women. OC occurs as a sore in the mouth that does not easily heal. OC detection and monitoring is time consuming, expensive and labor-intensive, to overcome this problem a smart approach of non-invasive biosensors is introduced. In this article we have done a comparative study of the biosensors specific to oral cancer detection using Non Invasive approach Nanomaterial such as Zirconia ( $ZrO_2$ ) and Hafnia ( $HfO_2$ ) were synthesized and further utilized used for fabrication of two electrodes BSA/antiCYFRA21-1/APTES/ $ZrO_2$ /ITO and BSA/antiCYFRA21-1/APTES/ $HfO_2$ /ITO respectively. Nanoparticles have been synthesized via the hydrothermal method and thin films of ITO electrode have been fabricated via electrophoretic deposition and followed by immobilization of antibodies. We had studied the development of simple, noninvasive antiCYFRA-21-1 based electrochemical biosensor based on nanostructure as transducer surface for Oral cancer detection. The CYFRA-21-1 antigen has been used as a biomarker for the detection of oral cancer. After the fabrication of electrode, characterization techniques are performed to study the morphology of nanomaterial and fabricated electrode. Spectroscopic studies of the fabricated electrodes were obtained to ensure the functional group bonding. Electrochemical studies like DPV, CV and EIS are conducted to investigate interfacial properties. Further ELISA is performed to check the accuracy of fabricated biosensor (Real sample studies). This study concluded that nanostructured material based biosensor could detect CYFRA-21-1 in the linear range 2-18 ng/ml, high sensitivity, and lower detection limit. This label free, non-invasive immunosensor has been used for detection of oral cancer in clinical.

**Keywords:** Oral cancer, CYFRA-21-1, BSA/antiCYFRA21-1/APTES/ $HfO_2$ /ITO

## DRUG DEVELOPMENT IN TUBERCULOSIS

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Mycobacterium tuberculosis is the world's most successful pathogen, having survived over 70,000 years and currently infecting nearly 2 billion people worldwide. With around 9 million new cases of tuberculosis (TB) each year, almost one third of the population is at risk for developing active disease. In 2012 alone, an estimated 3,500 people per day died of TB and, in fact, human immunodeficiency virus (HIV) is the only other infectious disease responsible for more deaths each year than M. tuberculosis. Because of these deadly statistics, the World Health Organization (WHO), the Centers for Disease Control (CDC), and the Bill and Melinda Gates foundation, among many others, have committed to eradicating M. tuberculosis by the year 2050. A combined strategy of drug treatment, better diagnostics, and prevention (i.e. vaccine development) is the only way to reach this goal. While finding a cure and treating the disease is an essential aspect of medicine, of equal importance are prevention measures to stop contracting the disease in the first place. Because extreme and totally drug resistant strains of M. tuberculosis are appearing with increasing frequency, it is essential that we block the spread of this pathogen by developing a vaccine that provides protection against infection.

**Key words:** Mycobacterium, Tuberculosis. Drug resistance, Vaccine.

## FORMULATION, IN-VITRO AND EX-VIVO EVALUATION OF TRETINOIN LOADED CUBOSOMAL GEL FOR TREATMENT OF ACNE

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The current work was attempted to formulate and evaluate the topical sustained release delivery systems potential of bicontinuous cubic monoglyceride –water phases – ‘cubosomes’ containing Tretinoin with an opinion to sustain the release of drug in the acne treatment.

Tretinoin loaded cubosomes were prepared by bottom-up technique, by varying the concentration of lipid and surfactant and keeping the drug concentration constant, made a total of nine formulations of tretinoin as TCF. These preparations were evaluated for its surface charge, particle size, particle morphology, encapsulation efficiency, in-vivo and in-vitro release studies of gel enriched with cubosome dispersion. Finally, the stability studies of cubosomal gel were performed on the optimized formulations.

Significant result was obtained with tretinoin formulation as the drug is lipophilic so it gives more depot effect on the epidermis and good retention property. The data obtained from the formulations showed that formulation TCF-5 was the optimized formulations which exhibited better drug release and entrapment efficiency.

At the end, it can be concluded that cubosomes offer benefits of quick onset as well as the maximal release of drug with fewer side effects. Thus, cubosomes represents a capable transporter having the property of sustained release of the drug, potential to localize the drug in the skin with a possible clinical application for acne vulgaris treatment due to cubosome depot effect on the epidermis.

**Keywords:** Cubosome, Tretinoin, Topical, Monoglyceride, Poloxamer-407

## PHARMACOLOGICAL STUDY ON *CARDIOSPERMUM HALICACABUM*

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*Cardiospermum halicacabum* plant is as old as human civilization .The common name of this plant is balloon wine /love in puff / heartpea. In many regions it is harvested in backyards for both medicinal and food value.The whole plant and seeds are considered to be useful. It is a black brown colored seed with a white heart shaped spot.It contains polysterols,saponins,alkanoids,small amount of long chain fatty acids.Polysterols have anti –redness effect. It shows similar effects to corticosteroid .Cortisone creams contains similar and the active substance in a mother tincture . This natural cream is effective in treating Eczema ,burns,redness or rheumatic disease.They show anti-inflammatory ,antifilarial,anti-parasitic,anti-diarrhoeal,anti-hyperglycemic propertied .They have special attraction for use as a treatment of dermatitis. Seeds of this plant are tonic and good for arthritis.They are immensely used as analgesic,laxative,anti-phlogistic.The drug show vasodepresant activity which is considered to be transient in nature.The extract of Balloon wine is a good herbal treatment of cancer.It effects in inhibiting the immuno-suppressive action of drugs. The results could be useful in setting some diagnostic indices for the preparation of a monograph of the plant.

**Keywords:** Cardiospermum , Balloon wine, Rheumatic diseases.

## **FABRICATION ON NON-INVASIVE ELECTROCHEMICAL BIOSENSOR FOR ORAL CANCER DETECTION**

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Oral cancer (OC) is presently one of the most prevalent cancers known till date, and it occurs more often in men than women. OC occurs as a sore in the mouth that does not easily heal. OC detection and monitoring is time consuming, expensive and labor-intensive, to overcome this problem a smart approach of non-invasive biosensors is introduced. In this article we have done a comparative study of the biosensors specific to oral cancer detection using Non Invasive approach Nanomaterial such as Zirconia ( $\text{ZrO}_2$ ) and Hafnia ( $\text{HfO}_2$ ) were synthesized and further utilized used for fabrication of two electrodes BSA/antiCYFRA21-1/APTES/ $\text{ZrO}_2$ /ITO and BSA/antiCYFRA21-1/APTES/ $\text{HfO}_2$ /ITO respectively. Nanoparticles have been synthesized via the hydrothermal method and thin films of ITO electrode have been fabricated via electrophoretic deposition and followed by immobilization of antibodies. We had studied the development of simple, noninvasive antiCYFRA-21-1 based electrochemical biosensor based on nanostructure as transducer surface for Oral cancer detection. The CYFRA-21-1 antigen has been used as a biomarker for the detection of oral cancer. After the fabrication of electrode, characterization techniques are performed to study the morphology of nanomaterial and fabricated electrode. Spectroscopic studies of the fabricated electrodes were obtained to ensure the functional group bonding. Electrochemical studies like DPV, CV and EIS are conducted to investigate interfacial properties. Further ELISA is performed to check the accuracy of fabricated biosensor (Real sample studies). This study concluded that nanostructured material based biosensor could detect CYFRA-21-1 in the linear range 2-18 ng/ml, high sensitivity , and lower detection limit. This label free, non-invasive immunosensor has been used for detection of oral cancer in clinical.

**Keywords:** antiCYFRA-21-1, immunosensor, BSA/antiCYFRA21-1/APTES/ $\text{ZrO}_2$ /ITO and BSA/antiCYFRA21-1/APTES/ $\text{HfO}_2$ /ITO

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## GENOTYPING-BY-SEQUENCING (GBS): A PROMINENT TECHNIQUE FOR GENOMICS AND CROP IMPROVEMENT

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The high demand for low cost sequence data has resulted in the development of high-throughput sequencing (or next-generation sequencing) technologies that can produce 1000 or millions of sequences concurrently. With the discovery of NGS, whole-genome sequencing data and millions of genome-wide SNPs for high-throughput genotyping have become available for a variety of genetic studies and breeding programs which has opened new possibilities in plant breeding and plant genetics studies. But the high cost associated with it hinders the wider use of SNPs. Contrary to it, Genotype-by-sequencing (GBS), is a novel application of NGS protocols for discovering and genotyping SNPs in crop genomes and populations which offers cost-effective genome-wide scanning and multiplexed sequencing platforms. It is an ultimate MAS tool which accelerates plant breeding and leads to crop improvement. The GBS method uses restriction enzymes combined with DNA barcoded adapters to reduce complexity. After digestion, PCR is performed to increase fragments pool and then GBS libraries are sequenced using next generation sequencing technologies, usually resulting in about 100 bp single-end reads. Bioinformatic tools and softwares are required to analyze and interpret GBS datasets. It is relatively inexpensive and can simultaneously perform SNP discovery and genotyping with or without reference genome sequences. Thus, GBS can be applied to various approaches for plant breeding and plant genetics studies, including linkage maps, genome-wide association studies (GWAS), genomic selection, and genomic diversity studies. All these features make GBS an ideal tool for studies ranging from single-gene markers to whole-genome profiling.

**Keywords:** GWAS, GBS, genomic diversity



## TRANSGENIC CROPS: FUTURE PERSPECTIVE AND IMPLICATIONS OF THE TECHNOLOGY

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It is almost more than sixteen years since the first transgenic plant has been developed. During this time, there has been lot of advances in our understanding on both basic and applied aspects of plant science. Transgenic technology has been important in implementing new developments, from gene identification to an improved understanding of their regulation as well as genetic transformation. There are generally two types of methods for plant transformation, one is direct gene transfer technique where DNA is introduced into host by physical, electrical or chemical means and other is via *Agrobacterium*. The “Gene Gun” method has been most commonly used in the species like corn and rice. The “first generation” of transgenic crops was intended for improving traits involving single genes. Now, we are targeting multiple genes and exploring new steps in crop modification. Recently, plants are being exploited for the production of various novel compounds such as biodegradable plastics and new pharmaceuticals. However, the potential and future of transgenic research will depend on public acceptance. To ensure it, the biology of transgenics and transgene effect should be understood both at phenotypic and genotypic level. There is a need for diffusing this technology to tropical plants and adapt it to benefice the small farmer in the developing world. To meet out the increasing food demand biotechnology research should be integrated to national agricultural research activities and networking cooperation. Finally the implication of advancement in this technology should focus on various areas such as biosafety, production patterns, biodiversity, intellectual property rights and other critical factors.

**Keywords:** Transgenics, *Agrobacterium*, Biodiversity

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## SAFETY EVALUATION OF RISUG<sup>®</sup> INDUCED CONTRACEPTION AND ITS REVERSAL THROUGH GENOTOXICITY AND APOPTOTIC MARKERS IN MALE RABBITS

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RISUG induced contraception has been proven as a novel approach with a single intervention that provides non-invasive, long lasting and reversible male contraceptive method. The present work focussed on the evaluation of toxicity in male rabbits following vas occlusion with RISUG and its reversal with DMSO and NaHCO<sub>3</sub> using genotoxicity tests and apoptotic marker assays. Animals were divided into seven groups, viz., sham operated control, vas occlusion with RISUG for 3 & 12 months, reversal with DMSO and NaHCO<sub>3</sub> after 3 & 12 months, respectively. The samples (bone marrow, cauda epididymal spermatozoa, blood sample, testis and cauda epididymis) were evaluated for genotoxicity through micronucleus, chromosomal aberration and *in vitro* DNA damage tests and apoptosis through caspase 3, TUNEL, comet and annexin V assays. Results observed in bone marrow marked with minimum incidences of micronuclei in erythrocytes and frequency of aberrant chromosomes in all the studied groups, whereas, marked damage was observed in their respective positive control samples. Caspase-3 and TUNEL positive cells in testis and cauda epididymis were observed within control limits, i.e., 0.3% and 10% with the primary localization in spermatogonial cells and spermatids of testis and principal and basal cells of cauda epididymis. Olive moment, comet length and %DNA through fluorescence images of both leukocytes and testicular cells of experimental groups recorded with negligible cell damage as compared with positive control. DNA damage in cauda epididymal spermatozoa was observed between 2-3% and annexin V assay indicated minimum number of positive cauda epididymal sperms. We, therefore, conclude that, RISUG is unlikely to produce any toxicity in either of the samples, both during its injection into the vas deferens under prescribed dose as well as during its reversal. Hence, RISUG is compelling interest in the nearby future to be beneficially adopted by men as a successful non-invasive reversible contraceptive approach.

**Keywords:** TUNEL, epididymal, annexin.

## MOLECULAR APPROACHES IN WHEAT FOR YELLOW RUST RESISTANCE

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Wheat (*Triticum aestivum* L. em. Thell) is the dominant cereal crop particularly in a country like India where it is used for human food and livestock feed. Rust is one of the major biotic stress affecting foliar part of plants and results in considerable losses to worldwide wheat production. Three species of rust which infect wheat are stem rust (*Puccinia graminis*), leaf rust (*P. triticae* Eriks) and yellow rust (*P. striiformis*). In India, yellow rust appeared in severe forms in the plain areas of Jammu and Kashmir, foot hills of Punjab and Himachal Pradesh, parts of Haryana, *tarai* regions of Uttarakhand. In Punjab, especially in the districts of Ropar, Nawan, Shahar and Hoshiarpur and in Haryana, disease was severe in Yamuna belt. Use of fungicides to control yellow rust is expensive and potentially hazardous to human health and environment. So the development of rust resistant cultivars are considered to be the most effective and economic means for the society. Here we cross “DBW17”, a yellow rust susceptible and “WH1105”, a yellow rust resistant variety and BC<sub>1</sub>F<sub>2</sub> and BC<sub>2</sub>F<sub>2</sub> and F<sub>3</sub> populations were raised. Artificial inoculation of Pst- (*Puccinia striiformis*) isolate was sprayed under field condition. Data was recorded on disease reaction and morphological characters. In addition to this eighty molecular markers were screened in parents and 30 *Yr* gene specific markers showed polymorphism. Selected markers were used to check polymorphism in population and plants showing closer relationship with DBW17 recurrent parents were selected for further breeding program.

**Keywords:** *Puccinia striiformis*, DBW17, *Yr* gene

## MARKER ASSISTED SELECTION FOR SALT TOLERANT WHEAT GENOTYPES

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Increasing soil salinity has threatened the growth and production of wheat. To cope with salt stress efficiently, biotechnological tools such as molecular markers have been extensively used for screening in wheat improvement programmes. Here we used two wheat varieties, “WH1105” a high yielding variety in NWPZ and “Kharchia 65” having sodium exclusion genes *Nax1* and *Nax2* genes, a native salt tolerant variety of Kharchi Pali district of Rajasthan. Crossing of WH1105 and Kharchia 65 was done and BC<sub>1</sub>F<sub>2</sub> and F<sub>3</sub> generation seeds were obtained. Seeds were grown in trays supplemented with hoagland solution and chloride dominated salt treatment (EC<sub>e</sub> ~ 8ds/m). Germinated seeds were transplanted to pots under normal conditions and evaluated for various morpho-physiological traits. Marker assisted selection with *Nax1* and *Nax2* confirmed the presence of *Nax1* and *Nax2* loci in the Sixteen BC<sub>1</sub>F<sub>2</sub> plants six and F<sub>3</sub> plants. On the basis of phenotypic and genotypic variations superior plants were selected for genotyping using polymorphic SSR markers. Out of total 149 SSR markers screened, 24 polymorphic SSR markers were used to produce molecular diversity among selected plants. Cluster tree analysis showed more inclination of six BC<sub>1</sub>F<sub>2</sub> and seven F<sub>3</sub> plants toward recurrent parent WH1105. So these selected plants, representing higher similarity with WH1105 can be further used in breeding program.

**Keywords:** SSR markers, *Nax1* and *Nax2*

**POLLUTION AND TROPHIC INDICATOR SPECIES OF BICHERLI POND,  
BEAWAR (RAJ.)**

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Biological monitoring of aquatic ecosystem is an integral part for the management of the total ecological health of the water body. To evaluate the pollution indicator and trophic status of Bhicherli pond (Beawar, Rajasthan,) phytoplankton and zooplankton were studied from February 1999 to January 2001. Phytoplankton was composed of four major group namely Cyanophyceae, Chlorophyceae, Bacillariophyceae and Euglenophyceae . Data showed the occurrences of total 62 species of phytoplankton with Cyanophyceae, the dominant group at all sampling sites. *Microcystis sp*, *Ankistrodesmus sp*, *Chlorella sp*, *Scenedesmus sp*, *spirulina sp* and *Navicula sp* were abundantly found in Bicherli pond which are indicator of pollution and trophic status. Zooplankton population consists of 23 species under 19 genera. Zooplankton population composed of five major groups namely Protozoa, Rotifera, Cladocera, Copepoda and Ostracoda. *Brachionus*, *Moina* and *Cyclops* were abundantly found in Bicherli pond which imparts a eutrophic status to the pond. Therefore, it is unfit for drinking and irrigation purposes. Richness of nitrates and phosphates were favourable for the growth of phytoplanktons. So dumping of garbage and entry of sewage water should be restricted and for preventive measures, physical sediment removal, biological interaction and proper filtration treatment should be applied for the coservation or restoration of the pond to increase its aesthetic values, making it suitable for aquacultural purposes.

**Keywords:** Phytoplankton, Zooplankon, Polution indicator and Trophic status.

## NANOPARTICLE-MEDIATED DELIVERY OF ANTIOXIDANTS: AN EFFECTIVE STRATEGY TO TREAT COPD

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Excessive bidi/ cigarette smoking results in excessive oxidant production and high inflammation which are major cause of cancer, especially of the lung, larynx, oral cavity, pharynx and esophagus, as well as of cardiovascular diseases and COPD. Pregnant women who smoke are more likely to have low birth weight babies or still-births. The increased oxidative stress in patients with COPD is the result of an increased burden of inhaled oxidants, as well as increased amounts of reactive oxygen species (ROS) generated by various inflammatory, immune and epithelial cells of the airways. Hence, targeting systemic and local oxidative stress with redox modulating agents can be expected to be useful in the treatment of COPD. Current antioxidant enzyme therapy for COPD lacks adequate specificity and efficacy, insufficient delivery which provides an impetus to develop targeted therapies to achieve greater efficacy with fewer side effects. Nanoparticle (NP) mediated drug delivery is gaining importance now-a-days because of highly specificity and selectivity. Hence, targeted delivery could be achieved by the nanoparticles conjugated redox modulating agents in the treatment of COPD.

**Keywords:** Antioxidant; COPD; Nanoparticles

## ANALYSIS OF HEAVY METAL CONTAMINATION IN INDUSTRIAL REGIONS OF JAIPUR

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Jaipur is located in the central part of Rajasthan and is undergoing rapid urbanization and industrialization. A large number of industrial areas i.e. Vishwakarma, Sudershanpura, Bais Godown, Jhotwara, Malviya, Mansarover, Sanganer, Sitapura industrial areas, etc. have been established during last two decades which play a major role in contaminating environment. Heavy metals are major contaminants in environment because of their non biodegradable nature and persistence. This work contributes to the monitoring of industrial regions pollution by assessing the degree of heavy metals contamination in the excreta samples of blue rock pigeon. Concentrations of six heavy metals (Cr, Cu, Cd, Ni, Zn and Pb) were measured atomic absorption spectrophotometer. Results show that heavy metal contents in excreta from industrial regions were significantly higher than those collected from nearby village area. The average abundance order of heavy metal levels are Zn>Cu> Pb>Cr>Ni>Cd. All studied heavy metals showed a gradient of contamination in Jaipur industrial regions. Considering the high level of heavy metals in samples, we can say that there is still a threat for biota.

**Keywords:** heavy metals, contaminants, excreta

## ***CHENOPODIUM QUINOA* AS A POTENTIAL HEALTH BENEFICIAL CROP: A REVIEW**

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Quinoa (*Chenopodium quinoa* W.) is a stress tolerant pseudocereal grain, rich in macronutrient and micronutrient with outstanding balance of essential amino acid. It has high content of phytochemicals, polyunsaturated fatty acids, vitamins, minerals and fibres. Numerous foods, nutraceuticals products and processes have been developed. Several clinical studies have also showed its immunoregulator, anti-oxidant, anti-diabetic, anti-inflammatory, anti-celiac and anti-cancer properties. Despite all these health benefits, quinoa is not widely consumed due to several reasons, such as high import costs of the grain and lack of knowledge regarding its benefits among consumers. The further research is needed to provide more information on the plant with strong scientific evidence. Hence, an attempt is made to review the available information for its compound and potential health effects.

**Key words:** Pseudocereal, Stress tolerant, Nutraceutical products, Immunoregulator, etc.



## INTRINSICALLY PHOTOSENSITIVE RETINAL GANGLION CELLS (ipRGCs)

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For more than 150 years, only two photoreceptors- rods and cones which are responsible for image forming (IF) pathway, were known to be present in the retina of mammals. But during 2002, a third photoreceptor called intrinsically photosensitive retinal ganglion cells (ipRGCs) was discovered first in mice then in primates and then in humans in 2005. These cells are responsible for non image-forming (NIF) functions such as circadian photoentrainment, pineal melatonin production, pupillary constriction and neuroendocrine regulation. Five subtypes of ipRGCs- M1, M2, M3, M4 and M5 are known which have different morphological and physiological characteristics. ipRGCs contain a unique protein, called melanopsin. It is not present in rods and cones, so the functions of ipRGCs are different from the classical photoreceptors. Being ganglion cells, ipRGCs are directly connected to the brain areas such as suprachiasmatic nucleus (SCN), intergeniculate leaflet (IGL) and olivary pretectal nucleus (OPN) and thus regulating circadian photoentrainment and pupillary light reflex. Since these cells are the first cells which receive light and start a cascade to regulate the non image-forming processes like circadian rhythm, so these attract the attention of the readers interested in circadian rhythm of the body. ipRGCs are very important cells to study the behavioural disorders related to circadian rhythm. These cells are important for the normal biological and physiological processes. These are also used for the treatment of many degenerative eye diseases and also to regulate sleep/wake patterns.

**Keywords:** ipRGCs, Circadian rhythm, Melanopsin, Light, SCN

## **TARDIGRADES: THE IMMORTAL CREATURE**

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Tardigrades has named as the world's most indestructible species and the only creature that will survive until the sun dies. Traditionally cockroaches are seen as earth's most resilient species, these eight legged micro beasts are actually way hardier and continue to thrive for around 10 billion years. Tardigrades are able to survive for up to 30 years without food or water and endure temperature extremes of up to 150 degrees Celsius, the deep sea and the frozen vacuum of space. These creatures look like the hookah-smoking caterpillar from "Alice in Wonderland." They can range from 0.05 millimetres to 1.2 mm (0.002 to 0.05 inches) long, but they usually don't get any bigger than 1 mm (0.04 inches) long. Researchers from Oxford and Harvard University, found that their astonishing abilities would protect them from calamities which would wipe out all life on Earth. In fact the only forces capable of harming tardigrades, such as a gigantic asteroid, an exploding star or a deadly gamma ray burst will not happen before our own Sun dies. Destructive explosions of electromagnetic energy known as gamma-ray bursts which are thought to be caused by neutron stars colliding or the formation of black holes could also be a threat to the little creatures, but again non could occur close enough to wipe out the species. Most microscopic animals need water to survive — otherwise, they can evaporate away if taken out of the water. But not tardigrades. When removed from water and dried out, tardigrades can transform into a cellular fortress, tucking in their legs and head, forming a compact pill shape called a “tun.” In this tun state, the tardigrades produce glycerol (antifreeze), and also secrete trehalose, a simple sugar with remarkable preservation properties. “Trehalose is viewed as a cocoon that traps the biomolecule inside a glassy matrix, like amber-encasing insects. When the trehalose crystalizes, the tardigrade becomes mummified in a glass suit of Armor. This process is called vitrification, and scientists have been trying to replicate it for use in protecting other delicate cellular tissues like sperm and egg.

**Keywords:** Tardigrades, Calamities, Gigantic asteroid, Gamma ray, Electromagnetic, Microscopic, Evaporate, glycerol.