

INVITED LECTURES

IL-01: ENDEMIC GOITRE AND EMERGENCE OF AUTOIMMUNE THYROID DISEASES IN POST SALT IODIZATION SCENARIO

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Goitre means the enlargement of thyroid gland. If the thyroid gland has difficulty in synthesizing thyroid hormones, it may enlarge to compensate for this inadequate hormone production. Endemic goitre thus found prevalent in iodine deficient areas and it is one of the major clinical manifestations of iodine deficiency disorders (IDDs).

Universal salt iodization programme has increased the intake of iodine of the overall population and has reduced the rate of goitre prevalence however endemic goitre still persists and the possible causes might be the consumption of goitrogenic food or intake of iodine more than recommended level for improper monitoring of iodized salt or for the supplementation of iodine in the regions where there is no environmental iodine deficiency or inherited disposition for long standing iodine deficiency in the environment. Then what is the consequence of residual goitre?

The emergence of autoimmune thyroid diseases has been increased in post salt iodization scenario. The major thyroid autoimmune diseases are Grave's disease and Hashimoto's thyroiditis. In Grave's disease the antibody of TSH receptors in serum is increased resulting more thyroid hormone synthesis while in Hashimoto's thyroiditis, for the production of thyroid peroxidase antibody (Anti TPO), thyroid hormone synthesis is reduced.

In post salt iodization phase the goitrous children of Manipur in north east India having the background of inherited disposition to autoimmunity are exposed to additional environmental factors (dietary goitrogens) that trigger the risk for the development of autoimmune thyroid disorders in their later stages of life. The histomorphological and biochemical analysis of large goitres belonging to iodine replete Gangetic plains of West Bengal mimic Grave's disease that developed for the consumption of dietary goitrogens including excess iodine for universal salt iodization programme.

In this context the pathophysiology of goitrous thyroid that persists even after the

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intake of adequate iodine in post salt iodization scenario and the emergence of autoimmune diseases will be discussed.

Key words: Excess iodine, Goitre, Grave's disease. Hashimotos thyroiditis, USI

IL-02: GLOBAL PROMOTION OF HERBAL MEDICINE: INDIA'S OPPORTUNITY

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Herbal medicine has been used in India for thousands of years and is increasingly being used worldwide during the last few decades as evidenced by rapidly growing global and national markets of herbal drugs.. According to WHO estimates, the present demand for medicinal plants is ~US \$14 billion a year and by the year 2050 it would be ~US \$5 trillion. Due to high prices and harmful side effects of synthetic drugs, people rely more on herbal drugs and this trend is growing, not only in developing countries but in developed countries too. India has 2.4% of world's area with 8% of global biodiversity. The forests of India are estimated to harbour 90% of India's medicinal plants diversity in the wide range of forest types that occur. In India, around 25,000 effective plant-based formulations are used in traditional and folk medicine. However, India share in herbal medicine in global herbal market is not appreciable. There may be various reasons for such problems, poor quality of herbal medicines due to insufficient attention being paid to the quality assurance and control of these products.

It is a fact that the role of ethno-botanist is crucial in the search for new drugs and this role has become so much more significant in the second half of the 20th century. The study of ethnobotany has gained in importance and the 'Western' use of such information has come under increasing scrutiny. National and indigenous rights on these resources have become acknowledged by both academic and industrial researchers. It is also recognized that the need for basic scientific investigations of plants used in indigenous medical systems is becoming ever more relevant. The relevance of such data coupled with the ever-increasing rights expected from

communities on their data along with the battle for conservation, have re-shaped the entire approach towards bioprospecting. . Looking in to different acts of biopiracy exploiting indigenous knowledge on herbal products without recognition of the owner country, there is need for bioprospection of Indian flora for novel formulations to be used in pharma sector.

**IL-03: PERIPHERAL BIOMARKERS AND INTELLECTUAL DISABILITY:
IS THERE ANY ASSOCIATION?
AN INVESTIGATION ON INMATES OF A REHABILITATION HOME IN
KOLKATA, INDIA.**

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Background: Intellectual disability (ID) is manifestation of dysregulation of distinctive or multiple physiological components either innate or personalized after birth and during early life. There are certain issues of association between biomarkers of stress and intellectual disabilities which might prove beneficial for appropriate benefit of the individuals. The current effort was attempted to address these crucial aspects involving this secluded individuals. Materials and Methods: IQ scores, mental

ages (MAs) and social ages (SAs) of disabled subjects were analyzed using standard psychometric tests. Oxidative stress (OS) biomarkers from PBMC and RBC membrane, serum neurotransmitters, RBC morphology, RBC membrane -actin, GLUT-1 and serum TNF-, IL-6, LDH-A, BDNF expressions were analyzed along with the structural changes in the brain associated with ID. Psychosocial parameters were measured after giving special training to the subjects for two years. One-way ANOVA was performed followed by post-hoc Bonferroni. Results were represented as mean±SEM using SPSS 20.0. Linear regression was performed keeping all the biological parameters as dependent variables, raw IQ scores and age as independent variables.

Results: Subjects were classified as mild, moderate and severe on the basis of their IQ scores. Their MAs and the SAs were lowered in severe retarded subjects. LPO of PBMC and RBC membranes, levels of serum glutamate and serotonin were increased significantly with increasing severity of ID. Morphological alterations in RBC structure was more in severely retarded children. -actin, GLUT-1, BDNF expression levels declined and TNF-, IL-6, LDH-A were elevated along with increasing severity of disability and structural changes found in some brain regions.

Conclusion: OS remained a crucial factor with the order of severity of disability in ID children. We developed an insight how the metabolic footprints were manifested with the degrees of severity of disability. The special training imparted improvement on psycho-social aspects of ID individuals.

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Keywords: Mental retardation, oxidative stress, neurotransmitter, RBC morphology, inflammation.

IL-04: EATING DISORDERS AMONG YOUNG WOMEN : A PANORAMIC VIEW

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Expression of Eating disorders of different varieties like Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorders etc entail a state of profound malnutrition associated with some psychological problems. specially intense anxiety. The disorders though usually affect the young women who are over conscious about their body image, young males or transgenders may also be the victims of the disease. A few risk factors have been found to be associated with the disease, like Personality / Psychological factors, family influence, genetic factor, visual media, subcultures existing within the society. Victims are often found to have different brain anatomical structure, specially at the orbitofrontal cortex. Of various kinds of Eating disorders, Anorexia Nervosa has been studied extensively and the outcome of this disease if sustained results in serious imbalances in physiological functions ranging from decreased cardiac function to poor reproductive performances, skeletal dis-integrity and disturbed neuro endocrinological homeostasis. Chronic starvation, the central problem of the disorders invite all these neuro-endocrinological complications. This review stresses on changes in secretion of some major hormones in Hypothalamo-Pituitary- Growth hormone (HPGH) axis, growth hormone-Insulin like Growth factor1, Hypothalamo-Pituitary Adrenal (HPA) axis and also adaptive role of different appetite regulating neuropeptide hormones like Ghrelin, Leptin, Peptide YY etc. Among multitude of neuropeptides and neurotransmitters which regulate food intake, leptin is the most important anorexigenic hormone and Ghrelin being the orexigenic one. Leptin controls both HPA axis and HPGH axis in a subtle way. Some researchers have put more stress on serotonin and cortisol. The disease can be reverted with proper health care program involving cognitive behavior therapy and programmed nutritional support. Future research is essential to probe into the aetiology of the disease, the complicated endocrinopathies involved and to identify the most effective therapeutic method.

Key words: Eating Disorders, Anorexia Nervosa, starvation, neuropeptides, Endocrinopathies.

**IL-05: ROLE OF IL-27 AND IL-28B IN AMELIORATION OF LUNG
CANCER AND ASSOCIATED INFLAMMATION IN BENZO(A)PYRENE
INDUCED LUNG TUMOR BEARING SWISS ALBINO MICE.**

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Lung cancer is the second most common form of cancer in both men and women. Among various polycyclic aromatic hydrocarbons (PAH) responsible for lung cancer benzo(a)pyrene [B(a)P] is the first discovered carcinogen in cigarette smoke and is most potent polycyclic aromatic hydrocarbons responsible for lung carcinogenesis. Various anti-inflammatory drugs are used for lung cancer treatment but all are having various severe side effects. Interleukins are indigenous proteins secreted by immune cells. IL-27 and IL-28B is known to have anti-inflammatory role and they can stimulate the anti-tumor immune response. In our study we tried to evaluate the protective role of IL-27 along with IL-28B in amelioration of lung carcinogenesis associated inflammation in B(a)P induced lung cancer in swiss albino mice model. To evaluate the anti-inflammatory role of IL-27 and IL-28B, the expression of some pro-inflammatory cytokines in lung including COX-2, iNOS was studied in protein and mRNA level through western blot and real time PCR. The anti-tumor immune response by CTL was assayed by observing the expression of Perforin and Granzyme B in different groups of treated and untreated mice. We found that CTL isolated from interleukin treated showed a better cytotoxic activity compared untreated counterpart. The expressions of inflammatory markers in lung were also reduced after interleukin treatment. This study indicates that IL-27 and IL-28B can reduce lung carcinogenesis associated inflammation and they can also induce anti-tumor immune response in B(a)P induced lung cancer.

Keywords: lung cancer, IL-27, IL-28B, inflammation

IL-06: MANGROVE REDUCED SILVER NANOPARTICLES: A BETTER CHOICE OF ANTIMICROBIALS AGAINST UROPATHOGENS

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Since matters at nanoscale level exhibit different and unique properties from their macro counterparts, study of nanotechnology is gaining importance every day. Silver nanoparticles (AgNP) are reported to be nontoxic to human but can efficiently combat human pathogens. Mangroves plants are exposed to several abiotic stresses and are known to consist of a wide variety of phytochemicals with their respective bioactivities. This unique property of the mangroves was employed in this study to reduce silver nitrate to silver nanoparticles.

Leaves of four selected mangrove plants, -*Sonneretia apetala*, *Avecennia alba*, *Avecennia marina* and *Bruguiera cylindrica* were selected for green synthesizing AgNP. The characterization of the AgNP by UV–vis spectrophotometer, Fourier Transformed Infra Red Spectroscopy (FTIR), X-Ray Diffraction analysis (XRD), transmission electron microscope (TEM) and Scanning Electron microscope (SEM) were done. Their application as antimicrobial agents were also explored against epidemiologically studied two most prevalent uropathogens of eastern India, *E. coli* and *Klebsiella pneumoniae*.

UV–vis spectroscopy showed signature peaks of AgNP. Homogeneous nanoparticles were formed by using *A. alba* leaf extracts were shown and confirmed by TEM and SEM images. The FTIR analysis shows peaks corresponding to presence of amines. XRD analysis also showed significant results confirming face centered cubic crystals of the synthesized nanoparticles. The antibacterial activity of the nanoparticles showed significant and varying amount of antibacterial potentialities. *E. coli* being most susceptible towards AgNP produced by *A. alba*.

The study throws light on the formulation of alternative medicines as resistance in pathogens are a major challenge in drug designing and empirical treatment.

Keywords: Green synthesized nanoparticles, antimicrobial activity, nanoparticle characterizations, uropathogens.

**IL-07: EFFECTS OF OCCUPATIONAL HEAT EXPOSURE ON BRICK
FIELD WORKERS: IMPLICATION FOR A CLIMATE CHANGE FUTURE**

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The manual brick making sectors of India employs a large number of workers on the basis of daily wages. These workers are exposed to extreme environmental factors such as seasonal heat, humidity, etc. that causes some occupational health problems among them. In addition to this, the above mentioned environmental stressor also lead to reduction in productivity among them. Climate change will make the situation more venerable. In order to ameliorate the problems faced by them due to exposure of excess heat in the workplace a design for low-cost ergonomic intervention, i.e., a low-cost cloth made hat have been suggested. That low-cost hat will be of their benefit to work against occupational heat exposure and will be successful in maintaining productivity without hampering their daily earnings.

Keywords: Occupational heat exposure, Climate change, brick field workers, low cost intervention

IL-08: HEXAVALENT CHROMIUM (CR VI) INDUCED ALTERATION IN METABOLIC HOMEOSTASIS IN MICE HEPATOCYTE

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Chromium is a well-known transition metal used in various purposes like tanning, wood preservation, alloying, as paints and pigments etc. Among various chromium compounds, hexavalent chromium is found to be lethal. Carbohydrate, protein and fat are the major bio-molecules concerned with energy supply for the purpose of physiological and metabolic functions. In this connection, the organs and the body systems function in a systemic fashion. The present study deals with the effect of hexavalent chromium on carbohydrate, protein and fat metabolism in liver to evaluate how and in which manner short-term chromium exposure alters its metabolic functions. The results depict that the efficacy of the metabolic interaction between carbohydrate and protein metabolism in the mentioned organ was critically affected in terms of alteration of TCA cycle enzymes, hampered mitochondrial bioenergetics and induced proteolysis through modulation of protease (cathepsin, pronase and trypsin) function. Alteration in transamination in those affected tissues significantly denotes degenerative measures in Cr(VI) toxicity. Moreover, over deposition of elemental chromium may be responsible for destruction of metabolic equilibrium in the exposed mice. Moreover, certain important lipid metabolic parameters were significantly changed after Cr(VI) exposure. Total cholesterol, LDL cholesterol, triglyceride level of serum sample and fatty acid synthase activity of hepatic tissue were increased in chromium treated mice, whereas HDL cholesterol was significantly decreased. Enhanced serum lipid profile and increased fatty acid synthase activity in liver are supposed to be involved in fatty infiltration in the hepatic tissue. Bioaccumulation and histo-pathological observation provides detail information about the elemental chromium deposition and histological alteration of tissue architecture after chromium intoxication among the experimental mice. Liver tissue shows steatosis with steatohepatitis and ischemic foci with enlarged central vein. These morphological changes of the affected tissue may be correlated with the metabolic abnormalities of the studied organs.

Key words: Hexavalent chromium, mitochondrial energy production, proteolysis, lipid profile, steatohepatitis

IL-09: CARBON CAPTURE AND CARBON REMOVAL VS. CLIMATE CHANGE

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The climate of the earth is critically dependent on the concentration of two most important greenhouse gases, the carbon dioxide (CO₂) and methane (CH₄) because they are naturally present in the atmosphere and play important role in the carbon cycle. There is no doubt that the climate of the earth is changing and global warming is an evitable phenomenon in our lives. It is worthy to mention that the global warming has a short history with a long future, because it is a great threat to humanity even in its existence. Simultaneously, there are some serious political rumblings on the issue of the climate change. Global climate change is usually credited with the first calculations of CO₂ made by Arrhenius (1896) responsible for rise of global temperatures. CO₂ has received the most scientific attention in discussions on the greenhouse effects since it does account for almost two-thirds of the current radiative forcing. CO₂ concentrations are now almost 30% higher than they were just before the Industrial Revolution. The first continuous, precise and direct measurements of atmospheric carbon dioxide began in 1957 at the South Pole, and 1958 at Mauna Loa, Hawaii. At that time, the concentration was around 315 ppm and growing at a little under 1 ppm per year.

Among the different forms of carbon brown and black carbons are contributing as the second largest agents in global warming. The black carbon enters in the ecosystem through aerosol and river deposition. According to current records the brown carbon is emitted from different sources in an amount of 7,200 TgC per year. On the other hand, deforestation and other man-made activities are solely responsible for a comparable amount of 20% emissions of greenhouse gases. At the beginning of the industrial era, in 1750, it was only 280 ppm that was raised up to 381 ppm in 2006 and this rate of enhancement was highest since 1959. IPCC (The Intergovernmental Panel on Climate Change) propose to limit the concentration between 445 and 490 ppm, otherwise it may increase the temperature to 2 – 2.4OC for staring the drastic effects of climate change. The rate of increase in the first half-decade of the twenty-first century rose to about 2.0 ppm annually. Scientists project that at present rate of emission of

atmospheric CO₂ levels will be doubled over the next century and will peak at 1,700 ppm in the year 2400 (over 5 times preindustrial levels). The future effects of greenhouse warming on climate is projected by using computers models of the atmosphere and oceans called Atmosphere-Ocean General Circulation Models (AOGCMs). But the present motto is to reduce the atmospheric carbon, it can be reduced in two ways: (i) by reducing the rate of emissions, or (ii) increasing the rate of absorption. The carbon intensity factors suggest that switching from coal to oil or natural gas will reduce emissions significantly atleast by about 40%. In the process of emergence of mean economy carbon capture and carbon storage occur through the natural system, the systems from forest to grasslands that would be the way to challenge the climate change.

There are three natural systems, viz. oil, forests, peat land and agriculture act as a safeguard and restoration of carbon; grasslands and coastal ones such as mangroves are also playing too. Plantations cover approximate 4% of the global forests and can sequester a significant amount of carbon, so, may be considered as a great sink for carbon. The oceans cover 70% of the earth's surface and they contain over 97% of the earth's water and play an important role in CO₂ sink. They store 50 times as much carbon as the atmosphere and they exchange CO₂ back and forth across the oceans significantly affect and are affected by climate change. Out of all the biological carbon (or green carbon) captured in the world, over half (55%) is captured by marine living organisms. The ocean's vegetated habitats, in particular mangroves, salt marshes and sea grasses cover only 0.5% of the sea bed. They comprise only 0.05% of the plant biomass and land, but sink more than 50% perhaps as much as 71% of all carbon storage in ocean sediments. There is a net removal, however, of about 10 GtC per year (nearly twice the carbon emission rate from the combustion of fossil fuels) from the surface waters. Marine algae and animals sink into the intermediate and deep ocean significantly take part in this removal process is known as the "biological pump".

It has been argued that solutions to global climate change problems may be too expensive to implement. The cost of removing carbon from the air ranges from about \$100 per tonne for removal at the point of origin. Hence, controlling carbon dioxide emissions would add from 10 to 30% to the price of fossil fuel energy. Finally, successful techniques of removal of CO₂ from air must endorse a successful process design, combined with any of the different methods of CO₂ disposal to solve the problem of greenhouse gases and to establish the net zero carbon economy. Most promising endeavour through Microbial Fuel Cells (MFC) may be the future for production of bioremediation and production of bioelectricity. The concept of zero

carbonization following the Kyoto Protocol is very far from its destination of reduction of CO₂ concentration, but to decrease the emission of CO₂ from source points not to rise the global temperature of 20C by 2025 is a fallacious resolution. But it is true that only man and his scientific endeavour can ameliorate the global warming or climate change.

**IL-10: PERSISTENCE OF GOITER AND HASHIMOTO'S THYROIDITIS
IN CERTAIN POPULATION OF MANIPUR DURING POST-SALT
IODIZATION PERIOD**

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Background and objectives: During post-salt iodization period, people are suffering from endemic goiter and other thyroid disorders like Hashimoto's thyroiditis. Therefore, it is necessary to assess the iodine nutritional status of the population.

Materials and Methods: A total population of 4160 were examined for goiter. Urinary iodine and iodine in salt were measured. Thyroid function tests and FNAC were done among goitrous population.

Results: Total goiter prevalence rate was 14.59%, median urinary iodine level was 166 µg/l. All the salt samples tested had sufficient iodine. Certain population had abnormal thyroid functions and Hashimoto's thyroiditis.

Conclusion: The present investigation shows that the studied region is clinically goiter endemic without biochemical iodine deficiency and there is persistence of Hashimoto's thyroiditis.

Key words: Endemic goiter, urinary iodine, iodine in salt, thyroid hormone, thyroid autoantibodies, FNAC.

IL-11: GLUCOSE HOMEOSTASIS CONFLICT, GLUCOSE TOXICITY AND PATHOLOGICAL CONSEQUENCES

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Diabetes has become a major health issue in the 21st century and has received serious attention. Chronic exposure of glucose rich environment turns out a number physiological and pathophysiological change. Hyperglycemia intensifies its toxicity on cells, tissues and organ systems in the course of several signaling and metabolic pathways. Prolonged hyperglycemic condition leads to severe diabetic condition by damaging the pancreatic -cell and inducing insulin resistance. It can produce the neural and vascular derangements. Dysregulation in the cardiovascular and reproductive systems along with nephropathy, retinopathy, neuropathy, diabetic foot ulcer may arise in the later stages of diabetes. High glucose level also induces angiogenesis and cancer metastasis, and potentiates a suitable environment for infections. Chronic hyperglycemia and glucose toxicity thus carry out its toxicity in cells, produces metabolic distortion, organ dysfunction and elucidates several pathological complications which promotes public health burden.

Key words: Endemic goiter, urinary iodine, iodine in salt, thyroid hormone, thyroid autoantibodies, FNAC.

**IL-12: BIO RESTORATIVE OPTIONS FOR ENVIRONMENTALLY
DEGRADED COAL MINING AREAS**

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Environmental Impacts of Coal Mining

Coal is the most abundant fuel resource in India. It is the prime source of energy and one of the largest contributors to the industrial growth of the country. India is currently the third-largest coal-producing country in the world (behind China and the United States), and accounts for about 8.5% of the world's annual coal production. India is also currently the third-largest coal consuming country (behind the China and the United States), and accounts for nearly 9% of the world's total annual coal consumption. More than half of India's energy needs are met by coal, and about 70% of India's electricity generation is now fueled by coal. However, mining operations damage the environment and ecology to an unacceptable degree unless carefully planned and controlled. Main environmental and social problems arising from coal mining are land damage and deforestation, water pollution and changes in hydrological regime, air pollution i.e. increase in dustiness of the area, increase in ambient noise level of the area, ground vibrations due to blasting, loss of biodiversity and disturbance to wildlife, involuntary displacement and loss of livelihood of many persons and socio-economic disturbance in the surrounding villages. Overall it can be said that mining activities both by underground as well as by opencast methods affect the land in various ways like land subsidence, removal of top soil, dumping of solid wastes, cutting of roads, creation of derelict land etc. Ghosh (1990) reported that every million tons of coal extracted by the surface mining methods damages a surface area of about 4 ha in India. It is evident from the above stated impacts of the mining and associated activities on the land use that in the mining complexes the land use and surface drainage pattern undergo a major change. These changes can be minimized by carefully planning the surface layout of the mining areas and optimizing the land requirement for the various uses.

Land Reclamation is essential

Land reclamation is a broad term and is often used in varied sense in the literature of

after-use possibilities of mines spoil. It is the treatment of land creating conditions for bringing the land back to some beneficial use (TN Khoshoo, 1984). In this paper, we will be mainly discussing about Bio-reclamation. The total bio-reclamation work may be divided into regrading of the area/plantation site, site preparation including topsoil management, establishment of vegetation cover, aftercare and maintenance of reclaimed site and development of emergency plan for sub-ordinates. The later part is re-vegetation. It is to serve two purposes, namely to increase the aesthetic beauty of the terrain and to create ecological balance between the soil, microflora, microfauna and the surrounding atmosphere. Over a long period, it increases the humus content of the soil by litter decomposition and thus increases nutrient status of the soil leading to an overall productivity improvement.

Biological Reclamation can help

Natural processes take a very long time, to change the characteristic of mine spoil. Thus artificial re-vegetation on mined land can accelerate the process. The soil slowly loses the characteristics of the parent body (overburden) and gets the nature of that of local environment. Soil thus establishes equilibrium with the environment and mature soil is formed.

The speedy recovery of decomposer could be achieved by addition of organic mulch, topsoil and afforestation which are practiced in India. The main aim is to enhance the microbial life on OB dump vis-à-vis establishment of decomposer cycling or nutrient cycling. These decomposers are heterotroph and detritus feeder thus accumulation of litter layer is essential for self-sustaining ecosystem development. At the same time, optimal spoil conditions also be maintained so that microbes can survive and function.

Selection of initial Plant Species for biological reclamation

The choice of plant species depends on the characteristics of spoil, climatic conditions and ultimate land use. Grasses are more tolerant to adverse soil pH and moisture stress than legumes, and are, therefore, easier to establish. Pasture grasses and legume can be used for stabilization of spoil dumps. Trees and shrubs are used where a wind break is desired or where visual shield is required. They are also suitable to steep or rocky terrain and coarse waste. The successful vegetation establishment of waste dumps also depends on micro and macro-climate, disease and insect resistance, competition, growth pattern and propagation ability of the species.

The availability of moisture in the spoil, especially during warm dry summer, is important. If the water level is not high enough, irrigation may be necessary to provide moisture. As the vegetation matures the need for the irrigation diminishes since grasses

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get adapted to dry summer conditions.

Further Vegetation cover development (re-vegetation programme)

Environment of vegetation cover is the ultimate goal of any reclamation programme and successfulness of reclamation programme is measured in terms of vegetation density, species diversity all leads to improvement of aesthetic of the area. The type of vegetation cover development depends on characteristics of substrate, climate, nearby seed banks, types of species chosen and lastly efforts of the person concerned.

Monitoring and aftercare of reclaimed site – must for Eco-restoration success

Aftercares describe the crucial process of managing the soils and the vegetation systems after the initial re-vegetation or re-cultivation in order to ensure that the desired land-use is attained within a reasonable time period. The process would involve soil amelioration and vegetation management that is more intensive than normally associated with land in that particular use. Aftercare involves addition of fertilizer, seeds, plants, grazing, harvesting, mowing etc. The aim of aftercare is to build up the fertility until a natural cycle develops. If a reclaimed area is to develop successfully, it is essential to ensure good soil profile and vegetation cover development. This is an integral and vital part of the whole reclamation scheme and should be considered right from the planning stage. Once the soil has been ameliorated and the plants established, the system will eventually develop on its own. However, the process of development and building of a complex ecosystem, whether natural or man-made, may take so long as to be unacceptable.

**IL-13: CYCLOOXYGENASE INHIBITORS AND THEIR INTERACTIONS
WITH HUMAN HEMOGLOBIN: A BIOPHYSICAL APPROACH**

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Drug-biomolecules interaction plays a crucial role in the transport and distribution of different molecules in the physiological system. Present study is aimed to establish the interactions of widely used COX inhibitors (non-steroidal anti-inflammatory drugs) with human hemoglobin (HHb) as well as erythrocyte, using different spectroscopic, calorimetric, molecular docking, flow cytometric and biochemical assays. In vitro interaction reveals that three selected COX inhibitors, i.e., ibuprofen, etoricoxib and acetaminophen can spontaneously interact with HHb through non-covalent hydrophobic interaction and hydrogen bonding. HHb possesses one binding site for ibuprofen and acetaminophen each and two binding sites for etoricoxib as evidenced from spectrofluorimetric and isothermal titration calorimetric studies. Molecular docking supports the above findings. Alterations in tryptophan microenvironment, reduced α -helicity, and decreased esterase activity along with enhanced non-heme iron release are the major indications of conformational modifications of HHb upon interactions with these COX inhibitors. The COX inhibitors also enhance the rate of HHb oxidation, which may augment the oxidative stress within the erythrocyte. Moreover, in vitro interaction between erythrocyte and COX inhibitors has explored that ibuprofen and etoricoxib impede the structural integrity of erythrocyte by altering its size and shape as well as membrane fragility. Furthermore, these drugs also cause increased level of intracellular reactive oxygen species (IcROS) as well as phosphatidylserine (PS) exposure along with increased intracellular Ca^{2+} concentration, which indicates cell death or eryptosis. However, acetaminophen shows protection to the erythrocyte, since it reduces IcROS content, PS exposure as well as intracellular Ca^{2+} . Thus, acetaminophen may be regarded as one of the safest drug among the selected COX inhibitors. In this way, the present study provides important insights into the molecular aspects of the interaction of COX inhibitors with HHb as well as erythrocyte that may be useful in understanding its toxicity and adverse effects on human health.

IL-14: EFFECTS OF WIRELESS NETWORK RADIATION ON ENVIRONMENT: A COMPREHENSIVE STUDY

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Today use of mobile phone is not limited to voice communication only, it finds its application in every domain of life. Present investigation was conducted to perceive the possible effect of mobile tower radiation on human health, plants and birds. Initial study was started with a rigorous discussion among specialized doctors who provides some valuable suggestions, comments etc. On the basis of valuable comments, a questionnaire was developed. The survey was conducted with the help of structured questionnaire and the results were recorded. The spectrum analysis results suggest that the average power density near the tower (where inhabitant starts) is higher in beside dreamland nursing home, Saraitikar-2, Vitar Kalipur than other locations. The study results revealed that in Burdwan area, the audio logical problem is severe than Kalipur area (Hooghly) among adults. However, among children of Kalipur area shows higher audio logical problems than Burdwan area. On the other hand, sleep disturbances are higher at Kalipur than Burdwan for both adults and children. The hematological study clearly demonstrated that mobile phone tower has tremendous effect on blood hemoglobin level. The anthropometric study also revealed that both blood pressure and pulse rate were recorded higher after exposure. The health and behavioral status of plant and birds were also recorded and the results revealed that the population of birds like China hen, Bali duck, Parrot, crow, Crane, sparrow, Common Myna, Harial, Dove, Breasted water hen, Koyel, Weaver, Cormorant etc. are now almost nil. Similarly, other animals such as squirrel, bat, Indian civet, Fox, frog (*Rana tigrina*), rat, cricket, termite, Bee, Honey-bee, Bolta, Monitor lizard, Russle's viper, Green snake etc. also very rare. On the other hand, it was speculated that the production of fruits such as coconut, mango, jackfruit, papaya, Litchi, tamarind, guava, mangos etc. were severely affected by radiation. Therefore, finally it can be concluded that our environment is really under a tremendous threats. However, more research is needed to draw the final conclusion regarding this particular radiation.

Keywords: Mobile tower; Cell phone; Radiation; Spectrum analyzer; Plants and animals

IL-15: SNAKES: MYTH, REALITY AND THE CHALLENGES

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Since the time immemorial, snakes are undoubtedly the most misunderstood and universally the most despised animals in the world and this is perhaps because these slippery and creeping creatures are capable of causing human harm or even death. Although the bites of some poisonous snakes are sometimes fatal, yet most of them are not only harmless but beneficial too. Altogether, there are about 2,800 different species of snakes, of which around 725 species are poisonous. But even among them only 250 or so are able to kill people with a single bite. So far India is concerned, there are about 216 species of which only 52 are poisonous. Yet, less than a quarter of all snakes are poisonous, and they rarely attack people unless provoked. Snakes have always had a special place in myths and legends, being mostly used as a symbol of evil. And the conflict, which started since the prehistoric time, is still continuing. As a result, a large number of snakes are killed every year just because of ignorance and fear though these timid organisms not only play a vital ecological role, but also are very useful for well being of the human civilization.

Total ignorance prevails about snakes and snakebite in India and because of the superstitions many precious lives are lost. In India, up to one million snake bites are recorded in a single year of which as many as 50,000 are recorded as initial death. In Australia, for example, a country with more venomous snakes records only one fatal snake bite per year on an average. In fact, roughly the number of people died of snakebites in India, is almost equal to the total deaths of snakebite in the rest of the world. And yet most of these deaths would have been prevented if necessary medical care would have been taken. Till date, the snake anti-venom is the only treatment for poisonous snakebites not quacks, snake charmers or any traditional healer. However, Snake-bite Prevention is far better than a cure and it needs only a little bit cautiousness.

Key words: Snake, Snake bite, Venom, Antivenom, Snake-charmer

IL-16: THERAPEUTIC EFFECTS OF COPPER HYDRO-OXIDE NANOPARTICLE AND RAPAHANUS SATIVUS UPON LIVER AND ITS ANTIBACTERIAL STUDY IN SWISS ALBINO MICE

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Nanotechnology is capable of producing new materials, devices, and systems by the control of matter on atomic and molecular scales and manipulation of the properties of nanoscale materials. Conversion of materials into nano-materials leads to changes in their chemical and biological properties and catalytic activities. Coppers hydro-oxide nanoparticles are widely used in data storage, drug delivery, catalysis and bio-medical imaging. Copper is one of the most interesting elements for various biomedical applications. Copper compounds show vast array of biological actions, including anti-inflammatory, anti-proliferative, and others. Green synthesis of nanoparticles is important due to increased concern of environment pollution. Green synthesis of nanoparticles is prepared due to its co-friendly in nature. In this study, copper hydro-oxide nanoparticles were synthesized by a green route using Rapahanus Sativus and characterized by XRD, SEM, FTIR and UV. The nano-conjugate as potential anti-bacterial agent has been studied upon gram positive and gram negative bacteria. Mitochondrial derived reactive oxygen species (ROS) were increased and initiated lipid per-oxidation (LP) which regulates several signaling pathway and cytokinetic movements of the cells. This study also provides experimental evidence for its ameliorative action against hyperbilirubinemia on Swiss Albino mice. Histopathological study such as liver, biochemical test like serum bilirubin, totalbilirubin, LFT and haematological parameters justify its mode of bilirubenemic activity. The present results showed that the studied nano composite herbal extracts could be used for moderating the effects of liver oxidative stress and antibacterial activity, induced by copper oxide herbal nanoparticles.

Key Word: Copper Hydro-oxide nanoparticle, Rapahanus Sativus, Jaundice.

IL-17: ASSESSMENT OF AEROBIC FITNESS OF SOCCER PLAYERS

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The aerobic energy metabolism is dependent on cardio-respiratory status, hemoglobin and cellular transport of oxygen from lungs to exercising muscles and the ability of the tissues to utilize oxygen for catabolism. Maximal aerobic capacity (VO₂max) refers to the maximum rate of oxygen consumption during exercise. The present article aimed on assessment and interpretation of aerobic fitness of soccer players of different age groups, as the soccer players required high level of aerobic fitness. A total of 120 soccer players volunteered for this study, were divided (n=30) into 4 groups: (i) under 16 years (U16), (ii) under 19 years (U19), (iii) under 23 years (U23), (iv) senior (SR). The training sessions were divided into 2 phases (a) Preparatory Phase (PP, 8 weeks) and (b) Competitive Phase (CP, 4 weeks). The training programme consist of aerobic, anaerobic and skill development, and were completed 4 hrs/day; 5 days/week. Body composition, VO₂max, heart rate responses and haemoglobin level were measured at zero level (baseline data, BD) and at the end of PP and CP. A significant increase (P<0.05) in lean body mass (LBM), VO₂max; and a decrease (P<0.05) in body fat, recovery heart rate, hemoglobin (Hb) level were noted after training. However, no significant change was noted in body mass and maximal heart rate (HR_{max}) of the players after the training. It was suggested that these changes might be due to increase volume of endurance training which increases greater utilization of fat for energetic, enhances the activity of the cardiovascular system as well as developed oxidative capacity of the skeletal muscles, and thus oxygen delivery to the working muscle is increased. Regular monitoring of aerobic capacity during training at various stages of growth and development may provide valuable information for training and selection of players at different age groups.

Key words: body fat, VO₂max, heart rate, haemoglobin, training

**IL-18: BIOMOLECULES WITH PROMISING CONTRACEPTIVE AND
MICROBICIDAL PROPERTIES**

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The population explosion is a global problem that poses significant threat to the quality of life, more particularly in the underdeveloped and developing countries. The key requirement to combat this grave situation is the availability of suitable contraceptive devices that people would adopt to control birth rate. A number of contraceptive methods are available; however, acceptability of these methods has quite often been limited by their associated untoward side effects, failure rate or irreversibility. This prevailing situation demands the development of newer contraceptive options that should be simple, safe, reversible and cost-effective and, overall, that would be acceptable to the majority of the people.

The contemporary trends of drug discovery including reproductive health care emphasizes investigation of the terrestrial and marine environments for potent molecules, particularly in developed countries. India, the center of mega-biodiversity with her varied climatic, altitudinal and soil conditions, possesses 3500 medicinal plants. Efforts are being paid to look into the practicability of employing these herbs for fertility regulation. Saponins and terpenoids of plant origin have a variety of biological effects including immobilization of spermatozoa. Saponins represent the effective components of the majority of the spermicidal preparations that are currently available in the form of vaginal jelly, cream, or gels or as a part of a dual protection device, such as lubricated condom.

This presentation encompasses, a varied insight into the types of biomolecules present in the coelomic fluid of *Metaphirepeguana*, *Telescopium telescopium*, and *Chenopodium album*. And their effective biomolecule as a promising contraceptive with microbicidal properties.

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IL-19: ANTIPROLIFERATIVE AND CYTOGENOTOXIC POTENTIALS OF CLERODANE DITERPENOIDS, FATTY ALDEHYDES AND FATTY ACID ETHYL ESTERS

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The plant secondary metabolites are the major source of active principles to cure ailments. We are interested for purification of phytochemicals from traditionally used medicinal plants and to assess their antioxidant, anticancer and hypoglycaemic potentials. In course of our study, we could purify and characterize some extract fractions containing mainly long chain fatty acid ethyl esters, fatty aldehydes and clerodane diterpenoids from the different plants like *Ampelocissus* sp., *Crinum* sp., *Synedrella* sp., and *Clerodendrum* sp. To assess antiproliferative and cytogenotoxic potentials of the isolated phytochemicals, the established cell systems were used and the standard procedures were followed. Data indicate the different extract fractions could induce the differential mitotic abnormalities, cytogenotoxic and antiproliferative effects on the different cell systems. The highlights of materials, methods and results will be discussed in the allotted technical session.

Key words: Fatty aldehydes, diterpenoids, allelopathy

IL-20: SCIENTIFIC QUEST IS STILL AN ENIGMA

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Human Genome Project (1990-2003) costing nearly more than 100 billions of

dollars opens up new vista in identification of genes on chromosomes, highlighting the significance of genetic hereditary diseases. Gene therapy (defective gene) mostly involving in Adenosine deaminase deficiency-severe combined immunodeficiency (ADA-SCID) and cystic fibrosis (CF) is proved no success even in soma-lines suggesting that Human Genome Project is more academic rather than solving genetic problems. However, knowing genes on chromosomes and proper counselling can minimize the intensity of genetic diseases (albinism, thalassemia etc.). Awareness regarding diabetes and cancer is significant among learned people to disseminate knowledge rather than taking non-scientific remediation practices.

Apart from Human Genome Project, a very classical example in biological sciences is the exploration of polyploidy for crop improvement. Understanding the mechanism polyploidy can unravel evolutionary biology although till date it is a scientific enigma.

Keywords: Human Genome Project; Genetic Diseases; Scientific awareness; Cancer; Polyploidy.

**IL-21: INVESTIGATING THE ROLE OF EPIGENETIC MODIFICATIONS
IN THE PATHOPHYSIOLOGY OF SPORADIC BREAST CANCER USING
QUANTITATIVE HIGH-THROUGHPUT MASS SPECTROMETRY**

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Sporadic breast cancer like many other cancers is proposed to be a manifestation of abnormal genetic and epigenetic changes. Genes involved in DNA (DDR), apoptosis and immune surveillance pathways have been shown to influence sporadic breast cancer risk in north Indian population. Further to enhance our knowledge at the epigenetic level, we performed DNA methylation study involving 17 gene promoter regions belonging to DNA damage response (DDR) and death receptor apoptotic pathway in 162 paired normal and cancerous breast tissues from 81 sporadic breast cancer patients, using a high throughput quantitative DNA methylation analysis technology. The study identified five genes with statistically significant difference between normal and tumor tissues. Hypermethylation of DR5, DCR1, DCR2 and BRCA2 and hypomethylation of DR4 in sporadic breast tumor tissues suggested a weak/aberrant activation of the DDR/apoptotic pathway in breast tumorigenesis. Negative correlation was observed between methylation status and transcript expression levels for TRAIL, DR4, CASP8, ATM, CHEK2, BRCA1 and BRCA2 CpG sites. Categorization of the gene methylation with respect to the clinicopathological parameters showed an increase in aberrant methylation pattern in advanced tumors.

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These uncharacteristic methylation patterns corresponded with decreased death receptor apoptosis and DNA damage repair potential in advanced tumors. The observation of BRCA2 -26 G/A 5'UTR polymorphism concomitant with the presence of methylation in the promoter region was novel and emerged as a strong candidate for susceptibility to sporadic breast tumors. Our study indicates that methylation of DDR-apoptotic gene promoters in sporadic breast cancer is not a random phenomenon. Progressive epigenetic alterations in advancing tumors result in aberrant DDR-apoptotic pathway thereby promoting tumor development. We propose, since pathological epigenetic changes of the DDR-apoptotic genes are reversible modifications, these could further be targeted for therapeutic interventions.

**IL-22: EXPLOITATION OF PLANT GROWTH PROMOTING
RHIZOBACTERIA (PGPR) ON IMPROVEMENT OF PLANT'S GROWTH
AND HUMAN
WELFARE: A NOBLE APPROACH**

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In present days the excessive amounts of air pollutants, soil pollutants have tremendous deleterious effects on soil borne microorganisms. As many of these bacteria act as biofertilizer and are directly responsible for enhancing plant growth, so, such environmental stresses might also responsible for increasing soil sterility, reduced plant growth and yields etc. The heavy metals specifically lead, cadmium have dangerous deleterious effects on plants overall health development and to maintain increasing rate of crop yield, biofertilizer is best option rather than chemical fertilizers. Among different biofertilizers PGPRs are offering the most acceptable approach. PGPRs not only enhance plant growth but also they can solubilise inorganic phosphates in soil, produce IAA, siderophore, ammonia etc. It is experimentally proven that PGPR application can improve not only the plant growth but also can reduce the heavy metal level in the soil as well as in plants. It is also seen that PGPR can help in augmenting

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the sulphur di oxide stress level in bittergourd plants. So, from my work and my research experience it can be concluded that Plant Growth Promoting Rhizobacteria (PGPR) is offering a great way for sustainable agriculture which is not only environment friendly but also it can give a new definition of life in biological and physiological perspective simultaneously.

Key words: Environmental stress, Plant growth, soil fertility, sustainable agriculture, phosphate solubilization.

IL-23: MODERN BIOTECHNOLOGICAL ADVANCEMENTS IN HUMAN WELFARE

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Biotechnology involves application of scientific and technological approaches using biological systems, living organisms or parts thereof with a promise to produce quality, safer and cheaper products to meet the growing demands for human sustenance and welfare. With the progress of 21st century our planet faces tremendous challenges from a booming global human population which is predicted to reach 9 billion by 2050, along with limitation of available land and water resources, a conventional slower rates of crop production, growing demand for food and health securities and ever-increasing rate of pollution loads to the environment around us. Promises of biotechnological potentials over conventional practices specifically in the field of agriculture, improved livestock, pharmacology, transgenesis, food and technology, chemical industry, waste disposal and bioremediation may cope up with all these future deep challenges. Because of this astoundingly large global population food and health securities along with contributing a clean and stable environment will be the top priorities in upcoming days to ensure sustenance. Application of major biotechnological processes in newer and diverse fields of biological world like genomics, Recombinant DNA technology, cell and tissue culture techniques, immunology and pharmacogenomics, related with mitigation of food and health securities by virtue of easier and better diagnosis and therapies of intricate and vulnerable diseases have come

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up as a great boon to the welfare of mankind and its biosphere. Though the real-world applications of biotechnology gave rise to several debatable topics like the use of Genetically Modified (GM) crops, few applications in the field of medicine, etc. yet barring these few exceptions the overall impact of biotechnology with the advent of human civilization is immense and with the untiring effort of the scientific world these benefits will supersede the negatives for a better and sustainable future. However, the future research will definitely refine it keeping in view the best objectives in human relevance.

IL-24: EXOPOLYSACCHARIDE: A NOVEL BIOPOLYMER FOR ENVIRONMENTAL MONITORING.

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Environmental contamination is rapidly increasing because of huge population burst, industrialization and urbanization. Release of heavy metals and hydrocarbons into the environment is the result of this modernization which creates serious threat to the environment. So, one of the major challenges in environmental biotechnology is the remediation of heavy metal pollution. Presently, there are some synthetic chemicals which are used in absorption of heavy metals for waste water treatments and others but those chemicals have some major drawback. For this reason, scientists are in search for alternate ways to overcome this environmental hazards. Exopolysaccharides from different biological sources including the root nodule bacteria – rhizobia might be a potential alternative source for this purpose. In the present study the role of exopolysaccharide as a significant source of bioemulsifiers having bioadsorption property of heavy metals have been checked. The results show some important findings by which such environmental hazards can be overcome. Finally it can be said that rhizobial exopolymeric substances might be the potential ecofriendly compound in solving the heavy metal pollution and can be helpful in hydrocarbon degradation. Details will be discussed during presentation.

IL-25: RECONNECTING GREEN TECHNOLOGY WITH HUMAN WELFARE

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During last few decades, enormous improvements in human welfare have taken place but these have been unevenly distributed and become at a lasting cost of degradation of our natural environment. Modern civilization, industrialization, urbanization, population explosion and recent agricultural practices are immensely responsible for exploitation and contamination of natural resources by emerging toxic, hazardous pollutants in different domains of environment. Thus the problems we are facing today around the globe with climatic changes, changes to ecosystems, global warming etc. are all consequences of our actions. At the same time this kind of growth towards human welfare cannot be stopped, as it is still needed in order to improve the quality of life for those living in many developing and under developed countries. As a result nations of the world have started searching for new technology which promotes sustainable growth. Green technology is defined as technology whose use is intended to mitigate or reverse the effects of human activity on the environment. The field of green technology encompasses a continuously evolving group of methods and materials from techniques for generating energy to eco-friendly products through green initiatives so as to attain a sustainable future in which a healthy environment, economic prosperity and social justice are pursued simultaneously to ensure the well-being and quality of life of present and future generations.

IL-26: FOSSIL AND ITS USES FOR ACADEMIC AND SOCIETAL BENEFIT

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Fossils are direct or indirect evidences of prehistoric life which are predominantly found in sedimentary rocks. The method for being a fossil from a living biological organism is apparently a simple, natural phenomenon though in true sense it is an elaborate and complicated process, scientifically termed as 'Taphonomy'. Depending on various modes of preservation we can study either external or internal characteristics in fossilized organisms. Fossils can be categorized into various types. Fossils provide valuable information on the technologies adapted by Nature for making the planet Earth as only 'Living Planet' of the Universe so far known. By studying fossils we could be acquainted with the bio-geo-atmospheric evolution happened in Nature. Floral and Faunal evidences or 'Biostratigraphic Zones' are one of the reliable relative methods for dating of rocks. Fossil assemblages comprising of both macroscopic and / or microscopic forms in sedimentary strata can identify the depositional facies for hydrocarbon (coal, lignite, petroleum etc.) exploration. It is well established that the geographical positions of the continents and oceans are constantly changing due to continuous geological (plate tectonic) activities. Fossil evidences are also utilized as convincing clue in understanding the successive phases of geological-geographical evolution of the earth. Fossil study in various methods like nearest living relative (NLR) method, leaf physiognomy, tree ring analysis, stomatal index study among others are frequently used to generate paleoclimatic database which is successfully utilized for depicting future trend of climate and its change. Different charred grains and other plants parts in form of sub-fossils are found in archaeological sites which can suggest the agricultural practices and other uses of plants along with socio-cultural evolution of ancient people. Modern approach of fossil study like extracted DNA or other biomolecules and various plant specific chemicals are now successfully applied in biosystematics, calibration of molecular clock, palaeoclimatic interpretation and so on. Thus, fossils are 'Nature's treasure trove' and we cannot ignore its immense implications in our daily life. So, let's explore it either as academicians or as common people.

Keywords: Taphonomy; bio-geo-atmospheric evolution; hydrocarbon exploration; plate tectonics; climate, socio-cultural evolution

IL-27: HOW AND WHAT PLANTS TALK ABOUT ?

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Can plants talk and communicate among themselves? Do they exchange information, ideas, feelings? If so (for argument's sake), how do they do this? How they send and receive signals, how their behaviour becomes more meaningful? Research findings of last decade brings forth amazing facts and undeniable evidences in this regard.

Plants lead sedentary life and are considered to be less active. Contrary to this accepted notion, emerging evidences point that plants are not as passive as they might seem. Plants are evolved to use chemicals (secondary metabolites, mostly) to achieve extraordinarily divergent jobs, namely-to communicate among fellow members (release of volatile organic compounds), respond to diverse stimuli, defend their territory (allelochemicals), stand by to another plant's SOS cry, eavesdrop on the chemical cues of their neighbours (salicylic acid signals & phenolics), recognise their siblings (extending altruistic gestures, at times) and even how to engage with animals/ mammals (mimicking echolocation of bat by pitcher plant of Borneo rainforest).

But above all, can a plant be intelligent? Some scientists argue that, since plants can sense, learn, remember and even respond, they are capable of decision making. Plants of forest community help each other over long distances through vast mycorrhizal network, which are appropriately called Wood Wide Web (WWW). Despite these exciting facts, still it's too early to admit that plants are that much intelligent. But it has become undeniable that, plants have mastered the skill of cognition and responsiveness about their own world. In coming decades, accumulating evidences from plant behavioural ecology, may forever change how we look and think about plants.

Keywords: Plant, Communication, Signals, Response, Behaviour

IL-28: EXPLORING THE INTERACTING PARTNERS OF PROTEINS INVOLVED IN CADMIUM TOXICITY USING COMPUTATIONAL PROTEOMICS

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Cadmium is a element that is ubiquitously present as an environmental pollutant. Although in the earth's crust cadmium is present in low amount (0.1-0.5 ppm),but the anthropogenic availability of cadmium has increased as it is steadily more used in chemical and technological industry. The concentration of cadmium is generally lower in tobacco than in food, but the lungs absorb cadmium very efficiently. Cadmium-contaminated drinking water is a common source of exposure, especially in developing countries. The first organ reached after uptake into the GI-blood is the liver. Here cadmium induces the production of Metallothionein. After consecutive hepatocyte necrosis and apoptosis, Cd-Metallothionein complexes are washed into sinusoidal blood. From here, parts of the absorbed cadmium enter the enterohepatic cycle via secretion into the biliary tract in form of Cadmium-Glutathione conjugates. Enzymatically degraded to cadmium-cysteine complexes in the biliary tree, cadmium re-enters the small intestines. The cadmium toxicity are linked to more than one molecular mechanism. Cadmium has a high affinity for thiol groups and can interfere with protein function through binding to cysteine residues. A large number of interacting partners were identified for the various proteins that have been reported to be intricate players in the pathway towards cadmium toxicity. Using the computational proteomics we have studied the protein interaction of five important proteins which are known to be involved in the cadmium toxicity pathways. This is a initial steps towards the identification of interacting proteins for better understanding of the toxicity pathway and replication of this technique will help us to identify several others unknown proteins. The identified interacting partners should be explored for potential drug targets for interfering with the signal transduction events during the cascade of cadmium induced toxicity.

Keywords: cadmium, proteomics, toxicity, computation

**IL-29: DEVELOPMENT OF A DRUG COMBINATION FOR THE
TREATMENT OF HPV MEDICATED CERVICAL LESIONS**

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Cervical cancer is the most common form of cancer in women and is a leading cause of death among women in India. About 85% of the global burden of cervical cancer occurs in developing countries and accounts for 13% of all female cancers. In India the occurrence of cervical cancer is very high; an average of 22-25% of total cancer cases is cervical cancer. The infection of Human papillomavirus (HPV) is the major risk factor associated with cervical cancer. Recently a few number of vaccines are available to control the infection of HPV, however these vaccines don't protect individuals from all the strains of HPV. The persistent infection of high risk strains causes cervical cancer. The treatment options of cervical cancer include surgery, chemotherapy and radiotherapy. Most of the chemotherapy drugs are toxic and associated with severe side effects. In some cases cancer cell develops resistance to chemo or radio therapy for which treatment becomes problematic and hence new treatment options are urgently needed. Our work is focused on the development of a therapeutic regimen using both synthetic and phyto compounds with least side effects. Several compounds were screened both alone and in combination for anti HPV and anticancer activities in HeLa cells. The important compounds with effective anticancer and anti HPV activities include Curcumin, Resveratrol, Ellagic acid and Indole-3- carbinol. Our results indicate these compounds are most effective when used in combination than alone. Most of these drugs work by restoring the tumor suppressor p53 protein and Epidermal Growth Factor Receptor (EGFR). Further works are being continued for the characterization of these compounds for HPV infection and cervical cancer treatment.

Key words: HPV, Curcumin, Resveratrol, Ellagic acid and Indole-3- carbinol, p53, EGFR

IL-30: ANTIMICROBIAL RESISTANCE

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Infectious diseases are one of the major causes of mortality & morbidity especially in under developed and developing countries. The causative agents-microbes (Virus, Bacteria, Fungus or Parasite) if killed with antimicrobial agents the disease can be controlled. Antimicrobial resistance means, the causative microbes have developed some technique to resist the action of antimicrobial agents as a result medicines like antibiotics become useless and microbes grow without inhibition to increase mortality & morbidity. Antimicrobial resistance is one of the most serious global public health threat of this century. World Health Organization has taken up the matter and suggested the action plans for government sectors and for the society. This presentation focus on the present position of this major problem.

IL-31: EXERCISE CAN BE AN EFFECTIVE MODALITY FOR GRACEFUL AGING OF INDIAN WOMEN

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Since the last century human civilization has witnessed a silent revolution – an aging population. Like all other countries of the world lifespan of Indian population has increased. India is in a phase of demographic transition and trends reveal that population of elderly growing faster than general population. There were about 119 million Indians above the age of 60 years in 2015, which was about 9.56% of the total population. In 2010, about two - third of the elderly lived in villages and nearly half were of poor socio-economic status (Lela et al, 2009). Aging is unavoidable and aged population faces a number geriatric problems which include cellular atrophy, retardation

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of cell growth and tissue repair, degenerations of nervous system, gradual reduction in BMR, reduced capacity to produce immune bodies and gradual impairment of homeostasis and also decrease in motor efficiency, speed, strength, endurance, coordination and flexibility. Men and women age differently. Apart from physiological factors, aging depends on many socio-economic and cultural factors including economic condition, nutrition, lifestyle and location of living. Women are more susceptible to factors speeding up the aging process. Due to ill health, lack of participation in daily activities, increased physical and economic dependence on others, the respect of the elder women in the society and family decreases, making them burden for the family. Problems of old age are relatively less in societies where the family ties are very strong. Aging population have brought with them a myriad of socio-economic and medical problems, tackling which has become a major concern of governments all round the world. Participation in regular exercise programme is an effective modality to reduce or prevent a number of functional declines associated with aging. Various types of activities such as walking, jogging, cycling, swimming, aerobic dance and strength exercise are beneficial for health and well being and can be considered as an important contributor to longevity.

Keywords: Aging, Exercise, Geriatric problem, Indian women.

IL-32: AEROBIOLOGY- A TOOL FOR PLANT AND HUMAN DISEASE MANAGEMENT

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Air around us carries innumerable invisible biomass of particulate matters of plant and animal origin. This aerial biomass consists of pollen grains, fungal spores, algal filaments, insects' scales etc. Thus Aerobiology is a Scientific and Multidisciplinary approach focused on the Transport of Biologically significant materials drawing information from Palynology, Mycology, Plant pathology, Immunology, Biochemistry and Clinical Medicine. The aerobiological study is important for treatment of allergy and crop disease forecasting.

The airborne bioparticles can be trapped by Burkard 7 days volumetric spore trap, Burkard personal sampler, Rotorod sampler, Vertical cylinder etc. Apart from these petridishes with suitable nutrient media can be exposed to air for determining the fungi and bacteria prevalent in the atmosphere. The trapped pollens and fungal spores can be identified with the aid of microscope, reference slides, standard literature and experts.

The spore and pollen calendar can be prepared on the basis of their seasonal periodicities. It is important to record the meteorological parameters like, rainfall, relative humidity, temperature and wind speed to find out a correlation with the spore / pollen load of air. A computer aided model will be prepared for plant disease forecasting and pollen load forecasting as a precautionary measure for farmers and allergy patients respectively. The aeromycology of storage places, study of seed mycoflora, rate of seed deterioration and loss of nutritive value of different seeds will also be assessed for seed protection.

An attempt can also be made for isolation, quantification, purification and immunoclinical characterization of allergenic proteins from spores and pollens following Lowry method, column chromatography, exclusion chromatography, SDS-PAGE, IgE specific immunoblotting, ELISA, MALDI-TOF and Prick test.

Key words: allergy, pollen, fungal spore, ELISA, Prick test, crop disease, microbes.

**IL-33: INDIAN SUMMER MONSOON DURING 16.4 TO 4 MA: EVIDENCES
FROM DIATOM ASSEMBLAGES OF NORTHERN INDIAN OCEAN**

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The geographical feature of the Indian subcontinent is unique. The behaviour of the monsoon is influenced by atmospheric, oceanic and geophysical factors. Amongst the economic, social and environmental effects, the monsoon is one of the most anticipated, tracked and studied weather phenomena in this part of the world. Its effects on agriculture, flora and fauna including climates of India, Nepal, Bangladesh, Bhutan, Pakistan and Sri Lanka. Climate records exist only for the last few centuries and it is based mainly on different instruments. Estimation of global climate variability of the geological past is solely dependent on the sediments that contain evidences of past biotic signatures. This study provides a unique opportunity to assess the temporal and spatial characteristics of climate variability prior to the anthropogenic activity. Monsoon can be considered as a manifestation of the seasonal migration of the Inter Tropical Convergence Zone (ITCZ) or equatorial trough in response to the seasonal variation. Phytoplankton, specifically the siliceous microfossils preserved in the sedimentary sequence of northern Indian Ocean can play a significant role for the estimation of monsoonal variability. The siliceous microfossils of Andaman and Nicobar Basin, also designated as northern Indian Ocean are represented by diatoms, radiolarians, silicoflagellates, sponge spicules etc. As observed, in most of the samples, the silicified microfossils are present in association with the calcareous nannofossils. The relative ages of the sediments have been precisely dated with calcareous nannofossils and silicified radiolarians. The siliceous microfossils specifically the diatoms recovered from the sediments of different islands belonging to the Andaman and Nicobar Group ranging in age from ~16.4 to ~4 Ma is unique. The abundance and diversity of diatoms as well as the planktonic/benthic ratio of the diatoms have been taken into consideration for the evaluation of monsoonal variability during that period.

IL-34: HONEY, BEES AND POLLINATION

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Honey is a natural sweet substances produced by honeybees. After collecting nectar honeybees enzymatically process it within its stomach, regurgitate and finally store it in the honey cells of the hive. Besides nectar, honeybees also collect pollen grains as a source of protein from flowering plants and store it in the pollen cells. To understand the foraging pattern of a bee species within a certain biozone we generally do pollen analyses of honey as well as pollen pellets collected from bee hives. This approach of studying pollen from honey samples is known as melissopalynology. Globally nine species of honeybees occur which belongs to the genus *Apis*. Though certain bees are there which are known as stingless bees also producing honey. While collecting nectar and pollen grains honeybees help in fertilization of flowering plants through pollination. Pollination is the transfer of pollen grains from the anthers to the stigma of a conspecific flower. This pollination greatly increases the quantity and quality of many crops like fruits, vegetables and nuts. Among all the pollinators, bees are the most potent one including the western honey bee (*Apis mellifera*), the eastern honey bee (*Apis cerana*, *A. dorsata*, and *A. florea*), some bumble bees, some stingless bees, and a few solitary bees. In recent studies, the increased yield and quality of agricultural crops as a result of honeybee pollination is valued more than 17 billion dollar a year.

For nearly three decades it has been well established that there is a decline of pollinators worldwide. Researchers from different parts of India have reported a decline in the number of honeybee colonies in India. One potential consequence of declining populations of bees as pollinators is a decline in the rate of pollination. This may lead to a decrease in the reproduction of a large number of flowering plants, including many rare species and a number of crops. The probable cause of declining honeybee colonies are habitat destruction, habitat fragmentation, agricultural practices, use of pesticides and herbicides, introduction of non native animals including pollinators, climate change and diseases. To control the loss of honeybee population the key point regarding them is that, not only the science that requires attention but also the policies taken by the governments for managing landscapes be them are natural, agricultural, or urban equally important.

**IL-35: AQUEOUS EXTRACT OF HUMAN PLACENTA: COMPONENTS
AND MODE OF ACTIONS**

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Placenta, the biochemical treasure house supplies the growing fetus with substances that the fetus itself cannot synthesize. It is a rich source of many therapeutically active components. Extracts of human placenta are used for different therapeutic purposes from the distant past. It contains amino acids, peptides, proteins, nucleotides, lipids and other bioorganic compounds. Being the only discarded human organ, an extensive research has been done on placenta. The composition of the extract of placental tissue depends on the method of its preparation and consequently they show different therapeutic activities. In India, an aqueous extract of human placenta (the trade name is 'Placentrex'), manufactured by Albert David Ltd. is used mainly as wound healer and for the treatment of Pelvic Inflammatory Diseases (PID). Clinical efficacy of the topical preparation of the extract is well established in various skin conditions including chronic wounds, burns, post-surgical dressings etc. Efficacy of 'Placentrex' injection in Pelvic Inflammatory Diseases (PID) is also well documented. In modern pharmaceutical and biomedical research, it has become necessary to verify the pharmacological effects of the drugs derived from the natural source. This is to check whether they correspond to the ancient texts and to study the mechanism of actions and also to isolate the active principles. Research on 'Placentrex' has identified some important components like fibronectin type III, ubiquitin like peptide and some small molecules such as nicotinamide adenine dinucleotide phosphate (NADPH), polydeoxyribonucleotides (PDRNs), amino acids etc that might play roles in different therapeutic activities and few more are yet to be identified. The extract has the ability for in vitro nitric oxide induction in macrophages. It can stabilize serine proteases against their autodigestion by reversibly inactivating them, which enhances the efficacy of proteolytic enzymes thereby facilitates wound healing. On the other hand the extract itself showed distinct proteolytic activity. Both the properties indicate its role in modulation of enzymatic activity. Moreover, recent studies revealed that the extract has an anti-biofilm property against some drug resistance bacterial strains. The characterization and mechanism of actions of the aqueous human placental extract as well as the rationality of its use have briefly been described.

IL-36: MICROBES – THE MOST INTELLIGENT AND FUNDAMENTAL ENVIRONMENTAL CONSTITUENT FOR BIOLOGICAL RESEARCH AND ACADEMIC PURPOSE

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Study of the composition and physiology of microbial communities in the environment is the key aspect of Environmental microbiology. A major emphasis on the application of “omics” approaches to determine the identities and functions of microorganisms inhabiting different environments. Moreover, the extreme environment always offers a huge opportunistic microbe that can serve for mankind. We are trying to explore different extreme environments as well as extreme condition of our surroundings to search the new and potential microbes. During 5th Southern Ocean Expedition in austral summer (January–March, 2011), a total 55 marine bacterial isolate were found from different depth including 3 microalgal species. Most of the isolates were belongs to *Chlorella* sp., *Marinobacter* sp., *Pseudoalteromonas* sp., *Halomonas* sp., *Erythrobacter* sp., *Zunongwangia* sp., *Pseudoalteromonas* sp. and many more including a *Bacillus altitudinis* strain which was interesting and considering the complete genome it showed maximum similarity with the other *Bacillus* species those were introduced by the Scientists of ISRO from the upper stratosphere, another extreme environment. Another interesting environmental isolate was a thermotolerant *Bacillus anthracis* from Panifala Hot Spring, West Bengal. Anthrax a well-known phenomenon and obviously the reason is *B. anthracis*. Surprisingly the genome information of this *B. anthracis* was proved that it's a non-pathogenic variant. Both the *Bacillus* strains were capable to produce potential extracellular polymers that had a lot of industrial value. Among 1100 different Mud Volcanoes on Earth, a total 15 different bacterial isolates were found from Baratang Mud Volcano sediment, Andaman and Nicobar Island. *Bacillus paramycooides* and *Chryseobacterium geocarposphaerae*, these two potential industrial dye degrading bacteria were found from the coloured textile sludge of Jayashree Textile situated in Rishra, West Bengal. A total of 20 different bacterial isolates that can tolerate more than 100 µg/L arsenic were found from different arsenic contaminated area of Purbasthali Block, West Bengal. So, the proper address of those potential and helpful isolates from different environments is essential in the field of biotechnology.

Keywords: Environmental Microbiology; Southern Ocean Expedition, Bacillus sp.; Baratang, Textile

**IL-37: MANAGEMENT OF DATA IN BIOLOGICAL RESEARCH:
QUALITY CONSIDERATIONS**

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Quality has been differently defined; including fitness for the purpose or that which meets the requirement and like, the issue of quality is no less important in case of the research domain also, and obviously it is no different in case of research in biological arena. There should be subscription to quality philosophy in data acquiring/ collection/ capturing phase, during data analyses and obviously while inferring and interpreting. If there is even small failure in the part of the investigators involved, due to several reasons in the study to remain committed to quality values, the consequences could be costly, comparable to what happens in case of non-compliance to quality values in other fields. Elaboration will be made in the presentation, with relevant cases from human factor data to elucidate the adverse consequences of even making a so called minor error during data gathering, analyses and drawing inferences; and importance of using the relevant tools to minimize the error.

Keywords: analytics, reliability, errors of inference, cost of quality, anthropometry

**IL-38: MACROFUNGAL DIVERSITY AND THEIR ECONOMIC UTILITY
OF LOLEYGAON, KALIMPONG, WEST BENGAL**

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Loleygaon (27.02071°N & 88.56018°E), is a small hamlet of 5000 Lepcha population (Census of India, 2011). It is situated at an elevation of 1675m (MSL) and in a distance of 24 Km from Lava (27.05°N & 88.39°E) and 55 km from Kalimpong (27.06°N & 88.47°E). It is famous for its natural beauty and this place is popularly called as “Natural Tranquilizer”. The main attraction of this place is its luxuriant green vegetation. In 1998 a patch of forest in Loleygaon containing many century old trees is declared as a “Heritage Forest”. Main attraction of this forest is its Canopy Walk of 180m which is most thrilling journey ever a tourist enjoys in this forest. This forest comprises of more than 40 species of Fern. 3- 4 species of Gymnosperms and 150 species of Angiosperms. The major Angiospermic species are - *Betula utilis*, *Botrychium* sp., *Cardamine macrophylla polyphylla*, *Cinnamomum impressinerum*, *Digitalis purpuria*, *Eleocarpus lanceifolius*, *Gentiana pedicellata*, *Geranium nepalense*, *Ilex hookeri*, *Ilex odorata*, *Monotropa* sp., *Partia monlana*, *Ranaculus ficarifolius*, *Ranunculus tricuspis*, *Rhododendron arboreum*, *Rhododendron barbatum*, *Rhododendron dalhousiae*, *Rhododendron falconeri*, *Rhus* sp., *Ribes glaciata*, *Schisandra neglecta*, *Swertia bimaculata*, *Swertia chirata*, *Swertia dilatata*, *Swertia nervosa*, *Taxus baccata*, *Thalictrum foliolosum*, *Viburnum cotinifolium*, *Viburnum grandiflorum*, *Viburnum stellatum*, etc. and many species of orchids. Besides these there are some interesting and RET plants also, which are – *Arisaema griffithii*, *Balanophora neorensis* (a unique species of parasitic angiosperm), *Balanophora polyandra*, *Begonia gemmipara*, *Betula utilis*, *Botrychium* sp., *Cardamine macrophylla polyphylla*, *Cinnamomum impressinerum*, *Cyathea* sp., *Digitalis purpuria*, *Eleocarpus lanceifolius*, *Gentiana pedicellata*, *Geranium nepalense*, etc.

Fungi are the most diverse organisms on earth and are defined as a eukaryotic, heterotrophic which is devoid of chlorophyll and obtains its nutrients by absorption and reproduces by means of spores. Only about 6.7% of the 1.5 million species of fungi estimated in the world have been described and these are mostly in temperate regions. The tropical region which has the highest fungal diversity has not been fully exploited. Large fungi (Macrofungi) are those that form large fructifications visible without the aid of the microscope and include Basidiomycota and Ascomycota with

large observable spore bearing structures. Ecologically, macrofungi can be classified into three groups: the saprophytes, the parasites, and the symbiotic (mycorrhizal) species. Most terrestrial fungi are saprobes or mycorrhizal symbionts, but some are pathogens of plants or fungi. Macrofungi fruiting on woody substrate are usually either saprobes or plant pathogens. Fungi of various taxonomic groups producing conspicuous sporocarps are collectively known as macrofungi which include “gilled fungi,” “jelly fungi,” “coral fungi,” “stink fungi,” “bracket fungi,” “puffballs,” “truffles,” and “birds nest”. Fungi hold key roles in nutrient dynamics, Soil health, Species mutualism and interactions and overall ecosystem process.

However despite of their various Economic importances this group is neglected one and often overlooked and left out of conservation initiatives. Macrofungal diversity is an important component of the global diversity, particularly community diversity, which is an essential part of fungal diversity. Mushrooms are widespread in nature and they still remain the earliest form of fungi known to mankind. From the “Heritage Forest” of Loleygaon during field trips author collected 32 Species of Macrofungi belongs to 26 Genera under 19 genera and 10 orders. Most of the Collected Macrofungi species are belongs to the Fungal division Basidiomycota (31 species) and only one species belongs to the fungal division – Ascomycota. Among these 32 Species of Macrofungi 28 species are economically important and used as edible mushroom or in medicinal practices. These fungi are used for the treatment of different ailments including some very crucial one like – Anticancerous agent, tumor growth resistant, in ulcer, in bedsores, as antioxidants, antidiabetic agent, etc.

Ferris et al. (2000) reported that exotic conifers plantation shows a negative effect on the fungal diversity in the forest ecosystems. Though in the Heritage forest there is no plantation work of exotic conifers but then also due to lack of proper conservation knowledge we are lost these enormous wealth of the Mycoflora of this region. We should pay proper attention to this Macrofungal flora of this region for our sustainable development.

Key words: Macrofungi, Diversity, Ethnobotanical usages, Heritage Forest, Loleygaon.

**IL-39: MOSQUITO BORNE DISEASES IN INDIA: CURRENT STATUS
AND CONTROL APPROACH IN INDIA**

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Mosquitoes are the vectors of several dreadful diseases like Malaria, filaria and viral diseases like dengue, Japanese encephalitis, yellow fever, west Nile fever, Zika, Chikungunya etc, which globally are responsible for several million deaths every year. There exist about 3000 species of mosquito of which around 100 are vector of medical significance. India owing to its subtropical and tropical climate i.e. high rainfall, relative humidity, lack of proper drainage system, water stagnation and vast vegetation cover provides the congenial ambience for mosquito growth and proliferation and thus to the transmitted diseases. India is endemic to five of the several mosquito borne diseases namely, Malaria, dengue, Chikungunya, filaria and Japanese encephalitis. In India, there are mainly four mosquito vector genera namely, Anopheles, Aedes, Culex and Mansonia each causing different diseases. About 380 species of Anopheles occur around the world of which 60 have been recorded to act as vectors of malaria to humans. In India, 58 Anopheline mosquitoes exist, of which only six taxa act as malaria vectors namely, *An. culicifacies*, *An. fluviatilis*, *An. minimus*, *An. dirus*, *An. sundanicus* and *An. stephensi*. Mosquitoes belonging to the genus Aedes (*Ae. aegypti* and *Ae. albopictus*) harbor a number of pathogenic arboviruses causing dengue, dengue haemorrhagic fever, Chikungunya, Zika, yellow fever, west Nile fever etc. Most of the Culex species inhabit tropical and subtropical countries. Species such as *Culex quinquefasciatus* is a vector of bancroftian filariasis whereas others such as *Cx. vishnui* and *Cx. tritaeniorhynchus*, *Cx. pseudovishnui*, *Cx. gelides* and *Cx. fuscocephala* transmit disease Japanese encephalitis. The genus Mansonia comprises of mosquitoes mostly found in marshy areas in tropical countries, some of which act as vectors of brugian filariasis. Majority of mosquito borne diseases do not have proper medications or vaccinations, so the sole method to decrease their epidemiological spread is through vector control. However, continuous use of synthetic insecticide based control strategy has given rise to a new phenomenon known as Insecticide resistance in many mosquito vector species. This term refers to the selection of insecticide resistant populations of the mosquito vectors under insecticide selection pressure. To overcome

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the burden disposed on India by mosquito borne diseases, the major challenge is to formulate integrated mosquito management strategy. Community participation and public awareness is a must in managing insecticide resistance and to formulate and implement an effective vector control strategy to minimize the disease rates in India.

Keywords: Mosquito; Vectors; Insecticide Resistance; Vector Control

IL-40: IMPORTANCE OF PLANT IMMUNOMODULATORS AND USE OF MODERN TECHNOLOGY FOR HUMAN HEALTH CARE

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Plants are one of the most important sources of medicines. Over the centuries, the use of medicinal herbs has become an important part of daily life despite the progress in modern medicine and pharmaceutical research. With arrival of modern chemistry in the mid-18th century, the ability to isolate, to purify specific compound and to synthesize them in large quantities became the foundations of the current pharmaceutical industry. Plant derived components are an important source of immune-modulatory agents. It has been found in several experiments that plant products can activate the immunological responsiveness of an organism directly at cell level or by inducing production of mediators.

India represents the great emporia of ethnobotanical wealth with enormously diversified ethnic groups and rich biological resources. Here Ayurveda still remains dominant compared to modern medicine. The basis of ancient wisdom of Ayurveda medicine was that a system as complicated as the human body, could not easily be cured by single compounds, rather to reset harmony of the spirit and body by the administration of combinations of medicines. The new millennium with its developed technology has provided much opportunity for validation of the uses of natural products. Interestingly Ayurvedic crude extracts sometime produce better results than a single isolated compound from it.

We have been engaged for many years to find efficacy of certain plant products for activating immunity and immunotherapeutic measures towards malignancy. Extensive work has been carried out in ethanolic turmeric extract (*Curcuma longa*),

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which could activate T lymphocytes and drive them all the way to cytotoxic T cells and at the same time could induce apoptosis to the malignant cells. FACS analysis showed majority of tumor cells in G0 phase where lymphocytes were driven more towards G2-M phase. Electron Microscopy also revealed the apoptotic condition of the tumor cells treated turmeric extract. This double edged activity of turmeric qualifies itself as an effective immunotherapeutic agent. Ethanolic turmeric extract also showed upregulation of perforin, IL-2 and IL-6 genes in course of functional differentiation much better than the commercially available curcumin.

IL-41: HUMAN PHYSIOLOGY AND PHYSICAL EDUCATION- A JUDICIOUS COLLABORATION FOR OPTIMUM WELLNESS.

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Physiology portrays human bodily organs and systems and Physical Education depicts improvement and vigorous functioning of those organs and systems. Human physiology is the study of human organs and of the cells that make them up. An understanding of human physiology is helpful in a variety of fields, such as medicine, fitness, and biology. Physical Education is instruction in the development and care of the body ranging from simple calisthenics exercises to a course of study providing training in hygiene, gymnastics, and the performance and management of athletic games. "Metabolism of Human Diseases" examines the physiology of key organs (e.g. brain, eye, lung, heart, blood vessels, blood, immune system, gastrointestinal tract, pancreas, liver, fat tissue, kidney, reproductive system, teeth, bone and joints) and how defective metabolism and signaling pathways within these organs contribute to common human diseases. Physiology explains the metabolic process and results of its malfunctioning at the same time strive to explore ways and means for overcoming the irregularities. Health and Physical Education also aims for refreshing and rejuvenation of cropping up health issues through its concept of movement. We are all accustomed with the theme "movement as the basis of life" and truly Physical Education and virtually Human Physiology believe in the theme and act upon it. In this world of globalization the defective metabolism and signaling pathways are getting more and more perturbed especially due less movement. Day by day men are getting prey to mechanized and automotive gadgets propelling towards ill health. At this juncture there should be a

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sensible association between human physiology and Physical Education converging towards good human health. There are several research studies claiming best results related to development of human health and healing of metabolic irregularities through fitness workout. Thus a constructive collaboration between Human Physiology and Physical Education can play the most influential role in optimum wellness of human being.

Key words: Human physiology, physical education, collaboration, optimum.

IL-42: THE VALUE OF INDIAN THALI

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The food actually we take makes us to survive. It provides energy, building and repair materials of the body as well as helps to combat with the diseases caused due to external and internal agents. Unfortunately many of us are unaware about the facts and figures about the food that would make us healthy to survive in better way. The myths about the food are prevailing in the society. Proper scientific knowledge behind the food is not also always accessible to us. The aim of this lecture is to provide an overview about the science of Indian thali.

By nature we are omnivore i.e. we have the capacity to take and digest the vegetarian and nonvegetarian food as well. Our digestive system has been planned and designed by nature accordingly. Thanks to our forefathers who due to their intellect and foresightness have developed our food for our effective and healthy survival. In this respect Indian food appears to be best in the world due to its excellent compilation and composition. Probiotics and Prebiotics are rather recent concepts. But it is a matter of great surprise that Indian food has both the components in excellent proportions. Curd and salad are such component that makes the colon and its microbiome much healthier. Taking parboiled rice with dal or roti with makes the class-II proteins to Class-I in a thali. Green vegetables and potatoes provide complex carbohydrates. Similarly Indian cooking oils like mustard oil, coconut oil, sesame oil and cow ghee provide excellent base for healthy fat in our body. Antioxidants are extremely rich in Indian food. Taking sweets at the end not only makes you feel great but increase the serotonin level also.

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IL-43: AQUACULTURE AND FISHERIES: ITS ROLE IN HUMAN WELFARE THROUGH TEACHING AND RESEARCH FOR SUSTAINABILITY

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Biological Sciences, the study of life, is a subject of great diversity and requires background in many academic disciplines. Careers in the Biological Sciences are available in teaching, research and industry. Aquaculture and Fisheries play a vital role in these avenues. They not only provide nutrition and livelihood to the common people but also contribute to the economy of the country, as well. Aspects like Culture (Ornamental fish farming, Pearl farming, Shell and Fin-fish culture, Culture of Aquatic plants and so on) and Capture Fisheries practices; harvesting, processing, marketing and management of fishes in post-harvesting technology are increasingly contributing to the economic growth and nutritional security of the nation and sustenance. Therefore, knowledge of Aquaculture and Fisheries in Biological Sciences should be disseminated in both teaching and research curricula of educational institutes for sustainability of human welfare.

Key words: Biological Sciences, Aquaculture and Fisheries, Human Welfare, Sustainability.

IL-44: EXERCISE INDUCED OXIDATIVE STRESS AND SKELETAL AND CARDIAC MUSCLE DAMAGE IN BENGALEE CHILDREN

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Cardiac and skeletal muscle damage and oxidative stress are common manifestation following intense exercise in children. Biomarkers of cardiac and skeletal muscle damage, high sensitivity C-reactive protein (hs-CRP) and different markers of oxidative stress were studied in pre- and post-adolescent Bengalee boys (n=22) and girls (n=22). The parameters were measured before, immediately after, 24 and 48 hours after high intensity exercise. The markers increased significantly at 24 and 48 hours after exercise in both the genders with significantly higher values in boys. Oxidative stress markers increased significantly ($p < 0.001$) in both groups following exercise. Besides gender variation, the adolescence status in a particular gender was also found to have significant effect on these exercise induced parameters in the studied population. It is concluded that high intensity exercise induced oxidative stress and increased in skeletal and cardiac muscle damage in both the groups.

Key words: Creatine kinase, LDH, LPO activity, glutathione.

IL-45: POLLUTIONAL STUDY OF SOME RIVERS OF WEST BENGAL

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West Bengal is a state in India having rich riverine ecosystem along with Bhagirathi-Hoogly-Matla estuary. Bhagirathi-Hooghly is one of the two distributaries of River Ganga. The main distributary, River Padma, enters into Bangladesh. Out of a good number of rivers in West Bengal, Bhagirathi-Hoogly is the most important river amongst them. The River Bhagirathi-Hooghly, receiving content of many tributaries like Jalangi, Churni, Damodar, Barakar etc., becomes the most important river of the state. The river splits the state into two parts- North Bengal and South Bengal. But recently the river is facing a huge loss in biodiversity as well as in its production affecting the total ecological condition of the aquatic system. More or less all the rivers of the lower part of Bengal are facing huge load of pollution. The main identified reason behind the situation is anthropogenic, posing an impact on the declining socio-economic condition of the lives of the river side areas. Surveys reveal that the industrial effluents, municipal wastes and other wastes are poured directly into the rivers mostly in untreated or semi-treated condition throughout the state. Siltation is another problem for all these rivers which results from the river bank erosion. The pollution problem is so high in these rivers that is posing serious threat to the economic growth of the state as well as the country. The objective of the review is to find out the recent pollution levels and its effect on the economy of riverside areas of the southern part of West Bengal.

Key words: South Bengal, rivers, pollution, socio-economy

IL-46: ENDOCRINE DISRUPTORS IN NATURAL WATERS: OUR CONCERN, BECAUSE WE STARTED IT

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Fishes are the cheapest source of animal protein for humans, and capture and culture fisheries are a mainstay of economies worldwide. However, being low in the food chain, fishes are usually among the first victims of anthropogenic xenobiotic inputs, and are often among the first participants in biomagnification of lipophilic xenobiotics.

The endocrine system is a chemical information network made up of certain glands, called endocrine glands, that produce and secrete chemical messages, or hormones. Hormones are important regulators of nearly every aspect of vertebrate life including metabolism, growth, reproduction, and development.

Chemicals that have the ability to disrupt normal endocrine function are collectively referred to as endocrine-disrupting contaminants/neuro-endocrine disruptors (EDCs/NEDs). Man-made EDCs are introduced into aquatic ecosystems through wastewater treatment discharge, agriculture and industrial waste. The increasing use of pharmaceuticals, pesticides, and fertilizers for maintaining and increasing fish health and growth also contributes to EDC pollution in the water body.

EDCs are emerging pollutants causing global concern because they can disrupt the endocrine system in fishes, and, in course of trophic interactions, other higher vertebrates. Our present cause for concern stems from current research which shows that due to their lipophilic nature, they bioaccumulate in fish and are transmitted up the food chain, and documented effects are available for higher order consumers, up to and including humans.

Animal and human exposure to EDCs occurs via ingestion of contaminated matrices, especially aquatic foodstuff. Exposure of different animal models to environmental chemicals such as xenoestrogens such as bisphenol A-BPA and ethinylestradiol-EE2, gestagens, and thyroid hormone disruptors, indicate that NEDs may be implicated in obesity and diabetes, may induce breast cancer cells, disrupt thyroid function, and affect the nervous system. Most studies show that EDCs can affect reproductive tract development in males due to impaired testes differentiation (testicular dysgenesis syndrome).

Important in this context is that though teleost fish neuroendocrine systems exhibit plasticity, studies so far indicate that organizational effects of neuroendocrine systems in mammals and birds are permanent. To determine the exact route and effects of EDC exposure, using affected non-human vertebrate models, more investigations are necessary as are the optimization of treatment protocols to ensure removal of EDCs from sediments, which act as the primary abiotic reservoir.

KEY WORDS: endocrine disrupting compounds(EDC), fish, dose, bioaccumulation

IL-47: DELETERIOUS EFFECTS OF LEAD AND AMYLOID PEPTIDES AND THEIR TOXIC MECHANISMS IN HUMAN BRAIN CELLS

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Lead (Pb) is a toxic pollutant known to cause several abnormalities related to brain including cognitive dysfunction and is ubiquitous in nature. -Amyloid peptides (AP) are crucially involved in Alzheimer's disease (AD). It has been reported that there is a connection between Lead and Amyloid peptides in exerting similar kinds of altered functions in brain and also long term exposure to Lead leads to increased beta amyloid formation in brain ultimately, becoming lethal to human brain cells. Still vacuum exists in terms of mechanism by which Pb affect the AP formation and exerting combined toxicity in AD patients. To fill the gap, we have systematically analyzed the toxicity of individual and combination of Pb and AP in Human Brain cells. We found that, the combination of Pb and AP was showing more toxicity than their individual exposures in Human neuroblastoma cells. The lower inhibitory concentration values were determined by both time and concentration dependent manner by using MTT assay. The data resulted in the development of enhanced toxicity when exposed Pb with either of the combinations of AP (1-40) or (25-35) and with all combinations in

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Human brain cells than individual exposures of Pb or AP (1-40) or (25-35). The severe apoptotic effect and alteration in cell cycle by arresting at S-phase were evidenced the increased toxicity of combinational exposure of Pb and AP on Human neuroblastoma cells. Furthermore, the quantitative determination of LDH and Caspase-3 activity has indicated the induction of severe toxicity. Also we have investigated the ameliorating effects of Genistein and EGCG in mitigating the toxicity being generated by the combined effects of Amyloid peptides and Lead. We conclude that both are synergistically associated with the effects such as arresting the cell cycle and triggering apoptosis during the progression of Alzheimer's disease and elucidated the protective effects of Genistein and EGCG.

IL-48: DNA BARCODING: A NOVEL APPROACH FOR SPECIES IDENTIFICATION

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A major task for any systematist or evolutionary biologist is to identify various species in a rapid, repeatable and reliable fashion. Species identification so far has been carried out mostly by classical morpho-taxonomy. One of the major problems associated with this type of species identification is that many taxonomic protocols rely on phenotypic characters and requires lengthy inspection of the specimen. However, it is not always possible to identify a specimen through its morphological features, as they may not available or not fully developed or may be destroyed due to various natural causes. Under such situations, molecular-taxonomy in the form of DNA barcoding may be the ultimate tool for species identification. The DNA barcoding has been launched as a rapid, accurate, automatable, and globally acceptable procedure for species delimitation and identification. The effectiveness of this method relies on the relatively conserved stretch of approximately 655 nucleotides of the mitochondrial cytochrome oxidase c subunit I (COI) gene with an exception in plant species. In plants, beside chloroplast based gene sequences (rbcL and matK), an internal transcribed

spacer (ITS) region of the nuclear ribosomal cistron were developed to address the basic questions in systematics. The mitochondrial genome of the animals is supposed to be a better target of analysis than the nuclear genome because it lacks introns, its limited exposure to recombination and its haploid mode of inheritance. The discriminatory power of DNA barcoding is predicted on the fact that, divergence within species is smaller than between species. For the above and other particular reasons, DNA barcoding is the most widely used molecular taxonomic approach for species recognition, which facilitates the identification of individuals of unconfirmed identity.

IL-49: MUGA SERICIN: A POTENTIAL BIOMATERIAL

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Silk is a natural fibre mostly produced by Arachnids and Lepidoptera. Among Lepidopteran silk, muga silk produced by muga silkworm *Antheraea assama*, West wood, are one of the indigenous silk of India. Silk contains two types of proteins, fibroin (75%) and sericin (25%). Both of them are utilized as biomaterials for their unique properties of compatibility, optimized mechanical properties, possible to construct topographic and morphological cues and degradable with safe by products. Different material fabrication of silk is possible. Hydrogels, tubes, sponges, composites, fibres, microspheres and thin films providing versatile platforms and interfaces for different application.

Muga sericin isolation protocol was standardized. Nano composite of sericin was produced through solvent treatment. Moisturizing capacity of sericin protein was utilized on dry snake skin. Sericin microcapsule entrapping molecules of interest was fabricated. Different pH sensitive hydrogels to release drugs at definite pH was developed. Microsphere of muga sericin can be coated with molecules to deliver to a definite destination. Even muga sericin can be utilized for nano silver synthesis or hydroxyapatite synthesis at room temperature. Recent research on utilization of muga sericin as potential biomaterial widens alternative avenues for biomaterial research.

IL-50: IMPACT OF CLIMATE CHANGES IN ALLERGY

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Allergic rhinitis is an ever-growing health problem worldwide, India being no exception. The changing pattern of global environment in the form of global warming is the key deciding factor in worsening the health problem. Deforestation and urbanisation are continuing threats to the whole of the animal kingdom. All these are adding to a paradigm shift in the disease patterns and are mandating changes in treatment protocols also. Diseases are changing their patterns and courses due to the change in our environment and ever-growing temperature of our mother earth. The only effective way to get rid of this threat is not only to treat an individual medically, but to change the environment we live in. We have to spread awareness amongst our fellow country people to refrain from doing anything that pollutes our surroundings and contributes to global warming. Stop cutting trees and plant more trees, that's what we can do at the grass root level. Spreading awareness to make our society a more congenial and pollution free is the key to better living and decrease the load of allergic episodes. Go green.

ORAL PRESENTATIONS

OP-01: UNDERSTANDING THE EFFECTS OF CODING VARIANTS OF HUMAN 3 β HSD2 AND ITS MOLECULAR EVOLUTION AMONG MAMMALS

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3 β -Hydroxysteroid dehydrogenase (3 β -HSD) Δ^{5-4} -isomerase type 2 (3 β -HSD2) is an important enzyme in the steroid biosynthesis pathway and is involved in oxidation and isomerization of the Δ^5 -steroids to form the respective Δ^4 -ketosteroids. The enzyme 3 β -HSD2 is expressed in adrenal cortex, ovary, and testis where it participates in the synthesis of cortisol and aldosterone in mammals. Studies regarding evolution of 3 β -HSD show that the enzyme has little sequence similarity to 17 β - and 11 β -hydroxysteroid dehydrogenases, other dehydrogenases, cytochrome P-450 enzymes, steroid isomerases, and steroid binding proteins. The evolutionary studies also indicated that mammalian 3 β -HSD have homology to ORFs in vaccinia virus, fish lymphocystis disease virus, bacterial cholesterol dehydrogenase and UDP-galactose-4-epimerase. In the present study, the codon usage pattern and its influencing factors are identified for mammalian 3 β -HSD2 genes. In human, mutations in the 3 β -HSD2 gene can lead to congenital adrenal hyperplasia and the deficiency of 3 β -HSD2 during adolescence results in hypogonadism in males and hyperandrogenism in females. Non-synonymous SNPs (nsSNPs) result in single amino acid substitution that has the potential to alter the structure as well as function of the corresponding protein, leading to pathogenic phenotypes. The molecular evolutionary analyses show that 3 β -HSD2 gene of closely related species exhibit similar patterns of codon bias; and both natural selection and mutation pressure are found to play important roles in shaping the codon usage patterns in mammals. So, an effective set of computational techniques are used to prioritize the most deleterious nsSNPs reported in the 3 β -HSD2 gene in human. Structural phylogenetic analysis has revealed that functional residues are highly conserved in human 3 β -HSD2; and most of the disease-associated nsSNPs are within these conserved residues.

Key Words: 3 β -Hydroxysteroid dehydrogenase type 2; Codon usage bias; nsSNP; Phylogenetic analysis.

**OP-02: PREVALENCE OF MUSCULOSKELETAL PROBLEMS AMONG
MALE CONCH SHELL WORKERS IN WEST BENGAL.**

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Conch shell crafting is a century old sector of handicrafts in all over India. Conch shell is the outer covering of marine gastropod *Turbinella pyrum* which is mainly seen in Indian Ocean. The artisans who are involved in conch shell crafting, shows supreme bequest through their unique craftsmanship. In India, West Bengal occupies the foremost position in terms of the quantum of conch shell workers. In spite of bearing a supreme position in handicrafts sector, the conch shell industry remains in a deprived position. In addition to this there is dearth of documentation regarding the occupational health problems among conch shell workers. In order to quantify the prevalence of musculoskeletal problems in conch shell artisans, a study has been done on 250 male conch shell workers by means of different questionnaire and working posture analysis. From that study it was found that they were suffering from different MSD or musculoskeletal disorders and the most causative agent for this is assumed to be the erroneous working postures obtained by them. In addition to this, it was also found that there are different physiological factors such as age, BMI, duration of working hours are significantly related with the prevalence of MSD and perception of pain to the different body parts. From this point of view more detailed study with large number of subjects is required to ameliorate their occupational health problems.

Keywords: Musculoskeletal Problems, Conch shell workers, Pain in Body parts, BMI

OP-03: INCIDENCE OF MANGO RED BANDED CATERPILLAR AND MANGO MEALYBUG & ANALYSIS OF THESE TWO VARIETIES BY X-RAY METHOD AT MALDA DISTRICT, WEST BENGAL

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Mango is nutritious and medicinal fruit of the world. Malda, district of West Bengal produces different types of mango of which Langra and Lakhanbhog mango are very much important from economical point of view. Sattari, Kazigram, Gokul Nagar Kamat are the three enriched sites for mango production of Malda chosen for the survey during 2013-2014, 2014-2015. Mango red banded caterpillar is one of the destructive pest found in the orchards of Malda district. Mango mealybugs are observed from the orchards causing damages to mango. Mango red banded caterpillars for Lakhanbhog and Langra mango are reported in the March and increase upto April and finally lowest number is found in June month. Mango mealybug are found to infect in the month of March then increasing steadily and finally lowest number is observed in week of June. Langra mango is more affected by mango mealybug but Lakhanbhog mango is heavily infested by mango red banded caterpillar. Mango red banded caterpillar, mango mealybug are recorded to infest Langra and Lakhanbhog mango when maximum temperature ranges between 29-32.8, minimum temperature is between 16.4-25.1, relative humidity ranges between 42-83, rainfall is in the range of 0-32.5mm. Internal damage caused by mango red banded caterpillar is scanned by X-ray imaging technology.

Key words: Langra, Lakhanbhog mango, mango red banded caterpillar, mango mealybug, X-ray imaging technology

OP-04: PYRROLE : AN IMPORTANT PHARMACOPHORE

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Heterocyclic compounds are referred to those cyclic compounds that contain at least one different elements as 'ring member' atoms. Heterocyclic compounds may be organic or inorganic, containing one carbon atom, and one or more atoms of elements other than carbon, such as sulphur, oxygen, nitrogen etc. within the ring structure. Thus, the one Pharmaceutical carbon elements that replace the carbon atoms in a chemical structure are commonly termed as heteroatoms. Simple N-heterocycles have received considerable attention because of their important biological properties and their role as pharmacophores.¹ The synthesis, reactions, and biological activities of pyrrole derivatives stand as an area of research in heteroaromatic chemistry, and this fundamental construction unit appears in a large number of pharmaceutical agents and natural products.

References:

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OP-05: MICROBIOLOGICAL PROFILING OF TOYS AND CLOTHES OF CHILDREN AND ANTIBIOGRAM OF THE ISOLATED BACTERIA

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Introduction: Children are commonly provided with toys which may easily be contaminated with microbes causing different pathogenic infection. This study determines the isolation and characterization of bacteria from toys and clothes of children, West Bengal.

Materials and Method: The bacterial isolates were procured from toys and clothes of children, from children day care centre of Tarakeswar, Hooghly, West Bengal. The isolated bacteria were characterized for identification following conventional as well as molecular methods. Antibiotic susceptibility test for the isolated bacteria was done following disc diffusion method.

Results: Seven bacterial isolates (GUTY1, GUTY2, GUTY3, GUTY4, GUCL1, GUCL2 and GUCL3) were procured from toy and clothe samples screened. The bacterial isolates showed resistance to ampicillin, and sensitive to chloramphenicol, ciprofloxacin, tetracyclin, erythromycin, vancomycin, gentamycin, kanamycin, gatifloxacin, levofloxacin, nalidixic acid, ofloxacin, doxycycline and streptomycin.

Conclusion: From the biochemical and molecular characterization it was found that the test clothes and toys were contaminated with several kinds of potential pathogenic bacteria. Therefore, monitoring of such bacterial contamination is mandatory through isolation of bacteria from such kind of samples and to determine antibiotic susceptibility patterns on regular basis, to combat bacterial infection to children.

Keywords: Children, toys and clothes, pathogenic bacteria, phenotypic and molecular characterization

**OP-06: EXPLORATION OF HEAVY METAL TOLERANCE AMONG
MULTIDRUG RESISTANT HUMAN PATHOGENIC BACTERIA, INDIA**

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Objectives: The association of heavy metal tolerance and antibiotic resistance has been explored among riverine and sewage water bacteria. This communication assesses the heavy metal tolerance among plasmid bearing antibiotic resistant human pathogenic bacteria.

Materials and Method: The antibiotic susceptibility of clinical bacterial isolates: *Enterobacter* spp., *Bacillus cereus* and *Bacillus subtilis* was done following disc diffusion against 13 antibiotics. Heavy metal tolerance for the isolates was determined using four salts: HgCl₂, CdCl₂, CuSO₄ and K₂Cr₂O₇, by agar dilution. Plasmid DNAs were isolated from the gram-negative test bacteria, and were subjected for analysis by agarose gel electrophoresis to visualize the DNA bands in gel-doc system.

Results: The all gram-negative bacteria showed sensitivity to kanamycin and cefoxitin, and the resistance patterns recorded among them include “Te-Cm-Tm-Pc-Me-Nx-PT”, “Mp-Tm-Me” and “Tm-Gm-Pc-Am-Ak-Nx-PT”. The all gram-positive bacteria showed sensitivity to chloramphenicol, kanamycin, ampicillin and piperacillin/tazobactam, and the resistance pattern found were: “Mp-Tc-Tm-Cx-Gm-Pc-Ak-Nx” and “Tm-Cx-Gm-Me”. For the resistant bacteria, heavy metal tolerance levels were 2.5 - 31.25 µg/ml (Hg²⁺), 37.5 - 125 µg/ml (Cd²⁺), 87.5 - 225 µg/ml (Cr⁶⁺), and 950 - 1050 µg/ml (Cu²⁺). The gram-negative bacteria, *Enterobacter* spp. (n=3) contained a single plasmid. The MAR index for *Enterobacter* spp. ranged 0.23 - 0.53, while 0.30 - 0.60, for *Bacillus* spp. isolates.

Conclusion: Monitoring of antibiotic resistance and heavy metal tolerance, and vigilance of R-plasmid among human pathogenic bacteria are recommended in order to combat the infection caused by MDR (multidrug resistant) bacteria.

Keywords: Antibiotic resistance, heavy metal tolerance, plasmid, pathogenic bacteria, MAR index.

**OP-07: ASSESSMENT OF BROAD SPECTRUM ANTIBACTERIAL
ACTIVITY OF LACTIC ACID BACTERIA FROM NATURAL HONEY
SAMPLES, WEST BENGAL, INDIA**

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Introduction: The emergence of multidrug resistant (MDR) pathogenic bacteria is a global concern. Alternative antimicrobial agents are needed to combat MDR bacterial infection. It has been reported that lactic acid bacteria (LAB) are good antimicrobial agents. The current study determines the antibacterial activity of LAB isolated from natural honey against MDR pathogenic bacteria.

Materials and Methods: Freshly collected natural honey samples were streaked on MRS agar plates, and incubated at 37°C for 24-48 h. The isolated single bacterial colony was subcultured to obtain pure colony. Conventional methods were followed for the identification of the isolated LAB. The antibacterial activity of the LAB was performed against gram-positive and gram-negative MDR pathogenic bacteria by agar-overlay and agar-well diffusion methods.

Results: Two LAB (LAB1 and LAB2) isolates were procured from the natural honey samples. The isolated LAB showed antibacterial activity against the test pathogenic bacteria having ZDI (zone diameter of inhibition) values 13-31 mm (agar overlay) and 10-21 mm (agar-well diffusion). Highest ZDI of 31 mm was observed against *Bacillus cereus* by LAB2 following agar over-lay method, while agar-well diffusion method results highest antibacterial activity (ZDI: 21 mm) against *Acinetobacter baumannii* by LAB2.

Conclusion: The LAB isolates from locally available honey might be utilized as broad spectrum antibacterial agents, in combating MDR bacterial infection; however, further studies are warranted for probiotic characterization of such LAB isolates.

Keywords: Lactic acid bacteria, honey, multi drug resistant bacteria, antibacterial activity

OP-08: WASTE MANAGEMENT

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As citizens of India, it is our duty to know how to manage the ever-increasing burden of waste in order to save our environment for the safety and security of our lives. At present, the daily per capita solid waste generated in India varies from 200 grams to 870 grams on the basis of the lifestyle and size of the town. Efficient waste management process should be adopted by each and every member of the community in a coordinated way to keep our environment save. We can follow three basic steps like Waste Management Process at Home, Waste Management Process at Neighbourhood and Waste Hierarchy. India is the first country in the world for providing constitutional safeguards for the protection and preservation of our environment along with safeguards for waste through the Constitution (42 amendment) Act, 1976. The Directive Principles of State Policy point out the commitment of State for protecting the environment. India has a large body of laws and regulations enacted by Central and State Governments as well as an increasing body of judicial decisions controlling industrial activities to prevent pollution. There are more than 200 statutes in India related to environmental matters. The major legal provisions in the last forty five years like The Water Act, 1974, The Air Act, 1981, The Environment Act, 1986, Hazardous Waste Rules, 1989, The Central Motor Vehicles Rules, 1989, The Public Liability Insurance Act, 1991, National Environmental Tribunal Act, 1995, Hazardous Biomedical Waste Rules, 1998, Recycled Plastic Manufacture And Usage Rules, 1999, Regulatory Standards, Municipal Solid Wastes Rules, 2000, Hazardous Wastes Rules, 2008, E – Waste Rules, 2011, The National Green Tribunal Act, 2010, The Draft Solid Waste Management Rules, 2015, are made for waste management properly.

Key Words – Waste, Management, Process, Environment, Safeguards.

**OP-09: AIDS AS AN INCOGNIZANT SOCIAL HAZARD:
A GEOBIOLOGICAL APPROACH OF BERHAMPORE BLOCK OF
MURSHIDABAD DISTRICT**

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HIV or human immunodeficiency virus, a long lasting vulnerable disease, was discovered for first time in the early 1980s. It has various probable ways to enter the human bodies. Now-a-days, AIDS is considered as a social hazard as it spreads in a tremendous rate and it only occur due to its incognizant nature of human civilization, especially in the third world country. Presently, due to some social barrier, the AIDS affected people are not too frequent to shearing their problems to the doctors as well as society. Thus, very minimum part of the affected people got the treatment facility provided by the government through the ART centre. Through this paper, we want to show about the fatalness of preconscious nature of human mind about this disease. Besides this, this paper also try to establish the preset day demographic scenario of AIDS affected people in the Berhampore block and also find the problem and probable oriented solution regarding this issue. To prepare this paper, simple methodology is used. Basically this paper depending upon the secondary database from various NGOs, books and journals due to its sensitive nature. Although Geoinformatics helps a lot for aquaring latitudinal and longitudinal value and necessary maps and diagrams. Finally, it considered that social consciousness regarding this matter is too much necessary as well as put some short of light on bridge population also.

Keywords- Bridge population, incognizant nature, Geoinformatics, Social barrier, Social hazard.

OP-10: LONG DISTANCE OR MARATHON RUNNING AND THE IMMUNOLOGICAL CONDITION OF ATHLETES- A REVIEW.

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Though sport and physical activity has wide range of constructive benefits on Physical as well as mental health of an individual sometimes participation in intense sport or long duration physical activity may be harmful for athletes or human being. Running a marathon, competing in a long-distance cycle race or doing an extended workout can stress out our immune system enough to make us ill. In fact, research suggests that marathoners are six times more likely to become ill following their 26-mile races than the average person in the street or the runner who puts in an easy three-miler. When sports-active people try to do too much, their performances slide and they fall ill. Of all immune cells, NK cells, neutrophils function is suppressed. However, moderate athletes that over-train report an increased number of self-reported upper respiratory tract infections. Endurance athletes, by the nature of their training, put themselves in danger of a decreased immune response. According to one study, triathletes may show a decreased number of monocytes and white blood cells (WBCs, disease-fighting immune cells). A drop in the number of leukocytes (WBCs) to below 4000 per micro liter of blood is often tied to an infection. A healthy diet is essential to maintaining good health. Many vitamins and mineral are precursors and cofactors necessary for proper immune functioning. Carbohydrates should compose more than 50% of your daily calorie count. Our body needs sunlight — which the winter decidedly lacks — to synthesize vitamin D. In these dark months take a Vitamin D supplement.

Key words: Marathon, Immunology.

**OP-11: A COMPARATIVE STUDY ON SELECTED
ANTHROPOMETRICAL
MEASUREMENT OF MALE AND FEMALE UNIVERSITY STUDENTS**

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Purpose of the present study was to analyse the relation between selected anthropometric measurements of male and female university students. Forty university students with ranged between 22 to 25 years were randomly selected as subjects. Mean, SD and independent 't' test were used for data analysis. On the basis of result it was observed that height, weight, biceps, triceps, sub-scapular, abdominal supra-iliac, thigh and calf skin folds were significantly greater in female than male. No significant difference was observed for BMI.

Keywords: Anthropometric Measurements, BMI.

OP-12: ANTIOXIDANTS AND THEIR IMPORTANCE IN HEALTH AND FITNESS-A COLLECTION OF LITERARY THOUGHTS AND IDEAS.

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Oxidation is like ageing. It occurs behind the scenes, slowly progressing until something wears out. The oxidation process leads to the production of free radicals in the body – molecules that possess an unpaired electron. These unstable molecules move through the body ‘stealing’ electrons from other molecules, causing damage to cell membranes and other structures, including cellular proteins, DNA and lipids. Oxidative stress arises when the ratio of pro-oxidants – or free radicals – to reducing agents shifts out of balance. Experts estimate that over 100 conditions arise as a result of oxidative damage. These conditions include cancer, atherosclerosis, hypertension, diabetes, cataracts, inflammation, autoimmune diseases, hepatitis, obesity, fibromyalgia, chronic fatigue syndrome, and neurological diseases including Alzheimer’s disease. Antioxidants are found in certain foods and work to prevent some of the damage caused by free radicals by ‘neutralising’ them. The nutrient antioxidants include vitamins A, C and E and the minerals copper, selenium, and zinc. Stress, alcohol, cigarette smoking, sunlight, pollution, and other factors can accelerate oxidation. Exercise appears to increase reactive oxygen species, which can result in damage to cells. Some studies have reported that supplementation with vitamins C and E, other antioxidants, or antioxidant mixtures can reduce symptoms or indicators of oxidative stress as a result of exercise. Antioxidants in acute physical exercise and exercise training remain a hot topic in sport nutrition, exercise physiology and biology, in general (Jackson, 2008; Margaritis and Rousseau, 2008; Gomez-Cabrera et al., 2012; Nikolaidis et al., 2012). During the past few decades, antioxidants have received attention predominantly as a nutritional strategy for preventing or minimising detrimental effects of reactive oxygen and nitrogen species (RONS), which are generated during and after strenuous exercise (Jackson, 2008, 2009; Powers and Jackson, 2008). Antioxidant supplementation has become a common practice among athletes as a means to (theoretically) reduce oxidative stress, promote recovery and enhance performance (Peternej and Coombes, 2011).

Key words: Antioxidants, health, fitness.

OP-13: BODILY AND PHYSIOLOGICAL BENEFITS OF AQUA EXERCISE-A REVIEW.

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The use of water for cleansing and religious means existed among the Greeks, Romans and Egyptians. The fathers of healing, Pythagoras (B.C. 530) and Hippocrates (B.C. 460), used water with friction and rubbing for the treatment of gout and rheumatism (Metcalf, 1898). Presently, research aims to investigate the affects of aquatic therapy on the human body in many capacities such as joint flexibility, functional ability (Templeton, Booth, & O'Kelly, 1996), muscle strength, and aerobic fitness (Wang, Belza, Thompson, Whitney, & Bennett, 2007). Aquatic therapy is becoming more popular due to the therapeutic benefits of water. These physical properties of water may provide increased relaxation, ease of movement, resistance, and support (McNeal, 1990), with the added benefit of lower impact forces (Barela & Duarte, 2008) and pain levels (Hinman, Heywood, & Day, 2007). The increased hydrostatic pressure causes a hypervolaemia, which influences the haemodynamic effects of exercise in water. Water resistance and temperature affect the metabolic pathways utilized during exercise. As a result the use of land-based norms to prescribe and monitor water exercise may be unreliable. This review focuses on upright exercise in water, namely cycle ergometry and walking/running. Oxygen consumption (VO₂) and heart rate are influenced by the depth and temperature of the water, exercise mode and speed. For example, cycle ergometry on land and in water yield similar maximal oxygen uptake (VO₂max) responses. However, shallow water running elicits a VO₂max which is approximately 10% lower than similar land activity. Deep water running yields a 26% lower VO₂max than on land. Cycle ergometry and walking/running in water have been shown to provide cardiovascular benefits in line with the American College of Sports Medicine guidelines. However a complex interaction exists between the water, exercise and subject variables which will affect the exercise response. Future research should focus on the biomechanical and neuromuscular effects of exercise in water at various depths.

Key words: Aqua exercise, Physiological.

OP-14: PHOSPHATE SOLUBILIZATION POTENTIAL OF NONPATHOGENIC *FUSARIUM EQUISETI* KUSF0105 UNDER VARIED CULTURAL PARAMETERS

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Presence of soluble phosphorous in the soil is an important determining factor for the overall growth and the development of the agricultural crops. Phosphate solubilizing microorganisms are the potential candidates for releasing the soluble phosphates from its bound complexes and thus make them available to the plants in utilizable forms. The present study was conducted to determine the effects of various culture parameters on the phosphate solubilization ability of the nonpathogenic *Fusarium equiseti* KUSF0105 isolated from soil sample of an agricultural field of Bamnabad village in Raninagar block II, Murshidabad, West Bengal. Nonpathogenic nature of the isolate was established by performing pathogenecity test on several seed plants. High phosphate solubilisation index (1.52) was found on Pikovskya agar medium. Phosphate solubilization was estimated by spectrophotometric method using molybdate vanadate reagent. Maltose (1800 ppm) and ammonium sulphate (1800 ppm) respectively were found to be most stimulatory in phosphate solubilization by the *Fusarium* isolate. Ammonium chloride also influenced phosphate solubilization nearly to the same extent (1780 ppm). Significantly, in acidic pH 4 (1830 ppm) and at 27°C temperature (1620 ppm), phosphate solubilization was found to be most satisfactory. Notably, with the increase in pH, phosphate solubilization declined gradually. Growth and phosphate solubilization of the isolate were completely checked at 37°C. Thus, the *Fusarium* isolate could be exploited in agricultural fields as a potential phosphate biofertilizer.

Keywords: Phosphorous, Fusarium, pathogenecity test, solubilisation index, phosphate biofertilizer etc.

**OP-15: MUTAGENIC EFFECTIVENESS AND MUTAGENIC EFFICIENCY
IN NIGELLA SATIVA L. (BLACK CUMIN).**

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Attributes like lethality, injury and sterility from M1 generation and viable mutation frequency assessed at M2 were used to determine mutagenic efficiency and effectiveness. Results showed that the mutagens employed were effective and the potentialities of the chemical mutagens were higher than physical mutagen (-irradiation). Results also indicated that the employed doses of different chemical mutagenic treatments were efficient specifically the threshold doses.

Keywords: Mutagenic effectiveness, mutagenic efficiency, mutagens, mutation frequency.

**OP-16: GROWING POPULATION AND CHANGING AGRICULTURE
PATTERN- A THREAT TO FOOD-SECURITY: THE STUDY IN TWENTY
YEARS' INTERVAL ON NADIA DISTRICT, WEST BENGAL**

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Food-security is related to the basic human need and it covers issues like intake of nutrients, immunity and child health. The concept of food security is a matter of comparative study, as it depends upon the local food habits, environment, and level of physical and mental exercise. In the present paper Nadia district of West Bengal is considered as study area and a temporal study has been done on issues like changing pattern of agriculture with decreasing trend of food-crop production in one end and rising population causing expansion of residential land in the cost of cultivable land in other end. One of the significant indicators to measure food-security is the availability of food, but in present world the most difficult task is to supply plenty of foods as well

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as healthy foods as per demand. In the present work an attempt has been made to highlight issues on agricultural sector to cope with the demand of more and more food production and its adverse effects on soil quality, ground water and finally on human health. The methodology applied in this work includes analysis of secondary data through statistical techniques and interpret several recent issues of the study area in the socio-economic perspective to evaluate the status of food-security at a temporal interval.

Key words: food-security, agricultural pattern, population growth, human health.

OP-17: COMPARISON ON LIPID PROFILE BETWEEN SEDENTARY GIRLS AND GIRLS REGULARLY PERFORMING CLASSICAL DANCE.

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Dance is a form of art that normally involves rhythmic movement of the body and accompanied with music. Dance helps to extend the limits of human physical ability, expressiveness and spirit. When it comes to health dance can be a very effective way of establishing a lasting healthy living. Anecdotally it can be said that dance potentially motivate and excite young people. Dance provides an active, non-competitive form of exercise that has potential positive effects for physical health as well as mental and emotional wellbeing (Chatterjee, 2013). It has the potential to motivate and excite people and it can be a way of engaging people in physical activity (Clippenger, 1997). As a physical activity and a creative art form, it is believed that dance can make a significant contribution to the healthy-living agenda (Marshall, Sarkin, Sallis & McKenzie, 1998). Dance therapy as exercise is known to increase the neurotransmitters called endorphins which increase a state of well-being. Dance increases total body movement, which helps to improve circulatory, respiratory, skeletal, and muscular systems (Quin, Redding & Frazer, 2007). Indian classical dance involves systematic workout which definitely has far reaching positive impact on biochemical components of human being too. As a dancer by passion and a scholar in the field of Physical Education the author strived to conduct a research study to analyze the difference of Lipid profile between classical dancers and sedentary females. The

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investigator randomly selected 30 females from various dance schools and 30 girls from the hostels of university of kalyani as the subjects. Blood samples of the subjects were collected and Lipid profile was estimated with the help of laboratory test. It was found that the dancer females had lower levels of Total cholesterol, Triglyceride, LDL, VLDL as well as HDL in comparison to their sedentary counterpart.

Key words: Lipid, Classical, Dancer, Sedentary.

OP-18: ROLE OF PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) ON GROWTH AND DEVELOPMENT OF *Momordica charantia* L.var. *muricata* TO AUGMENT SULPHUR DI OXIDE STRESS CONDITION.

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In today's scenario the agricultural system is suffering from lots of problems which are not only because of the deliberate application of chemical fertilizers but also due to tremendous air pollution which is exerting numerous deleterious effects on agricultural crop yield and overall plants health. The agricultural field's fertility is getting reduced day by day as an immediate side effect of continuous application of chemical fertilizers. To overcome such a situation PGPR is the best option because it provides an eco friendly approach. In this study Plant Growth Promoting Rhizobacteria (PGPR) strains were isolated from the rhizospheric soil of paddy and chilli (both these agricultural fields were just beside of 34th National Highway, Chakdaha) and were characterized by conventional microbiological techniques. Among series of isolates two PGPRs were finally selected on the basis of their good PGPR characters and antagonism test's result. Then both PGPR strains were applied on *Momordica charantia* L. var. *muricata* under sulphur di oxide stress condition. The results indicated that both PGPR strains helped in enhancement of plant growth, dense chlorophyll content, significant shoot & root growth and increased leaf number etc. in respect to the control set (i.e., without PGPR). So, from this experiment it can be concluded that these

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PGPRs might be safely used as biofertilizers under sulphurated area particularly.

Key words: Sulphur di oxide stress, PGPR, soil fertility, soil microbiology, air pollution.

OP-19: A POPULATION GROWTH MODEL INCLUDING HERMAPHRODITES

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Biomathematics or mathematical biosciences are concerned with the applications of mathematical techniques to get an insight into the problems of biosciences. Biomathematics include both mathematical modeling in biology and medicine and give useful informations to enlight the complex biological situations. In the present article, it is proposed to enlight a mathematical model on population dynamics (also called demography). The field entails the study of population growth, population dispersal, effects or immigration, emigration and mixing of populations, effect of age structure on population sizes etc.

OP-20: THE AERIAL JOURNEY OF FRAGRANT PLANTS

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Essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants. The oil bears the name of the plants from which it is derived. Out of vast number of plant species, essential oils have been well characterised and identified from only a few thousand plants. The oils are stored as microdroplets in glands of plants. After diffusing through the walls of glands, the droplets spread over the surface of the plants before evaporating and feeling the air with perfume. The most odoriferous plants are found in tropics.

**OP-21: SPECTATOR'S PRESENCE IN THE SPORT ARENA AND ITS
IMPACT ON ATHLETIC PERFORMANCE -A LITERARY OVERVIEW.**

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Audience and Crowd Effects in Sport There is no social-psychological effect is more important to athletic performance and outcome than the audience, or spectator, effect. When the crowd gives it to the athlete, the athlete gives it back to the crowd. - Dan O'Brian Social Facilitation- Research is based on the notion that the presence of audience of one or more spectators can facilitate performance. Research in the area of social facilitation was significantly influenced by the work of Robert Zajonc. His model proposed that the presence of an audience has the effect of increasing arousal (drive) in performance subjects. The presence of audience will enhance the performance of a skilled individual while causing a decrement in the performance of an unskilled individual. From a sport psychology point of view, social facilitation was defined as "consequences upon behavior which derive from the sheer presence of other individuals". Few authors have argued that the home advantage could be due to factors other than the audience, such as jet lag, travel fatigue, sleeping conditions, changed eating habits, unfamiliarity with local conditions, and referee bias. The most viable explanation for the home court advantage: the presence of a supportive and interactive audience. The determining factors influencing audience or spectators effect on athletic performance are Social facilitation, Home court advantage, Home court disadvantage and Characteristics of the audience. Key research has noted that bigger home crowds generally lead to a higher percentage of home wins. When investigating crowd advantage in sports Agnew and Carron (1994) saw a clear relationship between crowd size and distinct home team advantage in sports. These findings were subsequently backed up by Schwarz and Barsky (1997) who saw increases in crowd size correlating to increased home team win percentages in baseball- particularly when first division home teams played against second division ranked away teams.

Key words: Spectators, arena, athletic.

**OP-22: POLLEN ANALYSIS OF APIS CERANA INDICA HONEY SAMPLES
FROM JALPAIGURI DISTRICT, W.B.**

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Pollen grains and nectar of flowering plants collected by the worker bees constitute the primary source of food for bee colonies (Deodikar and Thakar,1953). Melissopalynological study is one of the most suitable means in understanding bee forage (Suryanarayana,1987). The foraging behaviour of worker bees is very specific and is believed to be genetically predisposed the flower visited by bees belong to three distinct categories: (a) flowers providing both pollen grains and nectar (b) flowers providing only pollen grains (c) Flowers providing only nectar. By pollen analytical investigations potentiality of the flora of a region for honey production by any particular bee species/variety can be evaluated. *Apis cerana indica* is indigenous species of bee in West Bengal. Individual combs are uniform in thickness having honey stored in the honey cells in the upper part, brood in the middle and lower parts and pollen stored on the two sides of the comb adjacent to the brood cells. In plains of West Bengal spring-summer is the productive season when rural honey collectors make their collection from wild hive simply by squeezing. While doing so, along with honey from honey cells pollens stored in pollen cells come out and get mixed together. Thus, squeezing honey samples contain pollens of flowers visited by bees exclusively for nectar source as well as those exclusively for pollen source in addition to the flowers visited for both the purposes.

**OP-23: METHODOLOGY OF ENVIRONMENTAL AUDIT IN
EDUCATIONAL INSTITUTION**

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Environmental Audit or Green Audit is an assessment of the extent to which an organisation is observing practices which minimize harm to the environment . It is a general term that reflects various types of tools and evaluations which can quantify an organisational environmental performance and position. In other words, it is an independent third-party assessment of the current status of an organisation , generally an industry, but it is equally important to assess the Standards of environmental parameters in an educational institution, such as - School, College or University . It is because, an Educational Institute is the key builder of a Nation.

This paper, is an illustrative format for carrying out an Environmental Audit in an Educational Institute. It has been tried to include almost all the fields involved in an educational Institute. The format is split into 12 parts: A-L. Part –A includes the name, address and all the units of the institution and their area distribution. Parts B-K ,include the various parameters which are to be taken into consideration while carrying out the audit. These are: Solid waste, Water resource,Electricity, E-Waste, Hazardous waste,Biodiversity, Noise, Indoor Air and Water quality, Fuel consumption and wastage of Time. Part- K would include the steps taken by the Institution for sustainability.The format is user–friendly, the language usage is concise and simple.The data involved are mostly numerical which can be easily made available and a few experiments are involved which can be carried out in the Educational institute itself or any other laboratory. Finally , remedial options are provided in order to guide the auditors.

Keywords : E-waste,BOD,SOX,NOX,SPM

OP-24: FERN SPORE LONGEVITY: SEA BED SEDIMENT MAINTAIN A VIABLE SPORE BANK

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Fresh water and marine sediment often harbour reservoir of plant diaspores, from which germination and establishment may occur whenever the sediments fall dry. Therewith they form valuable records of inter and intra specific diversity. While ferns may constitute a considerable part of vegetation diversity and sediments are known to contain fern spore. We tested the potential of ferns to establish from a sea or lake bottom using experimental studies on spore survival and gametophyte formation as well as a spore bank analysis on sediments from a coastal area of West Bengal. Our experimental results revealed clear difference among species. Germination rates decreased with time of storage in saline water. Smaller and less viable gametophytes were produced when saline storage lasted for a year. Effects on germination and gametophyte development clearly differed. Only two small gametophytes emerged from fresh water sediments. We conclude that marine and likely fresh water sediments will generally be of little value for long term storage or fern diversity. The development of any fern vegetation on a former sea floor will depend heavily on the deposition of spores by natural or artificial means of dispersal.

OP-25: IMPORTANCE OF PRANAYAMA IN PRESENT DAYS SPORE BANK

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Human lifestyle is changing very fast in the world. Our activities of daily life lead to stress full and gradually going to unmanageable situation. It makes imbalance between the structure and functional units of our body. Now a day an awareness is being observed among the people and choosing yoga and pranayama as for its natural remedies. The almost important molecule in our body is oxygen. A Constant and steady supply of oxygen is needed for normal functioning of tissues and organs. Pranayama, generally known as one of the breathing exercises. Pranayama is an important branch of yoga. It is beneficial for human being in physical and mental health.

Objectives: The purpose of this study is to observe the benefit of pranayama in human life.

Methods: A systematic search on Pub Med, Google Scholar and Medline was done to review the relevant studies.

Results: Based on the reviewed of 10 article results indicate that the short - term effect of pranayama was seen on the respiratory system and the long-term effect had been found as beneficial for nervous system, circulatory system, endocrine system and also helps to maintain the homeostasis of internal organs and their functions.

Conclusions: Regular practice of pranayama may enhance over all well - being and quality of life.

Key words: Yoga, Pranayama and Health.

**OP-26: A PRELIMINARY STUDY ON THE EPIPHYTIC PTERIDOPHYTES
IN COOCH BEHAR DISTRICT OF WEST BENGAL, INDIA**

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Epiphyte, sometimes called air plant, grows upon another plant merely for physical support. Epiphytes have no connection to the ground and are not parasitic on the host plants. They have amazing adaptations to obtain water and nutrients as a result of such habit. Epiphytic plant species are an important part of biological diversity and contributes higher phytodiversity in vertical space. Epiphytic vegetation is very rich in moist and cold regions and mainly composed of angiosperms, mosses and pteridophytes. The present study aimed to explore epiphytic pteridophytic diversity in Cooch Behar district of West Bengal, India. The district is situated at the foothills of Eastern Himalayas and considered as one of the hotspots in India having rich floral diversity including pteridophytic flora. Preliminary survey reveals a total number of twelve epiphytic species of fern and fern-allies comprising of eight genera and six families. Among the observed families, Polypodiaceae is the predominant one and is represented by seven species with the highest occurrence of *Pyrrhosia*. *Samanea saman*, *Cassia renigera*, *Polyalthia longifolia*, *Tectona grandis* among others are found as hosts for the epiphytes. More extensive field study will enrich the database of epiphytic pteridophytes of West Bengal.

Keywords: Epiphyte; Pteridophytes; phytodiversity; Kooch Behar.

**OP-27: EFFECT OF EXCESS IODINE IN FEMALE REPRODUCTION
IN ADULT RATS**

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The indiscriminate consumption of iodine on a regular basis for the uncontrolled salt iodization programme in environmentally iodine replete regions has been found to be detrimental to normal thyroid physiology due to disruption of thyroid function. The existence of a thyroid-ovarian axis suggests that under exposure to excess iodine, the ovarian physiology may be affected. However, the effects of consumption of iodine in excess on the female reproductive system has not been studied. The present investigation was thus conducted to study the effects of iodine in excess on the ovarian physiology.

Excess iodine (EI) was administered for a duration of 60 days at a dose of 100 EI; hundred times excess of the recommended daily iodine requirement was selected as thyroid physiology remained euthyroid. The experimental animals were divided into two groups of control and 100 EI. Estrous cycle, iodine nutritional status, ovarian iodide accumulation, ovarian and uterine histology and morphology, assay of steroidogenic enzyme activities of the steroidogenic pathways, serum steroid hormonal, gonadotrophins, THs profiles, ovarian expression of steroidogenic enzymes at transcriptional level and fertility index of the experimental animals were investigated.

On exposure to excess iodine, a euthyroid status of the thyroid gland was maintained but a hypoestrogenic state developed due to the antiestrogenic effects of the accumulated iodide in the ovary. The developed hypoestrogenic state was evident from the reduced activity of the steroidogenic enzymes, decreased serum steroid hormonal profiles as well as morphological characteristics. A remarkable effect of excess iodine was compromised fertility as observed from the zero fertility index in the excess iodine administered group of animals compared to the control group.

It may thus be concluded that excess iodine the tolerable range though maintained a euthyroid condition but developed a state of hypo-functional ovary with a state of compromised fertility of these animals.

Keywords: Fertility index, Iodine excess, Ovary, Steroidogenesis, Thyroid, Uterus.

OP-28: NEXT GENERATION SEQUENCING FOR PREDICTION OF BIOSYNTHETIC PATHWAY OF METABOLITES IN AEGLE MARMELOS (L.) CORR.

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In the post genomic era, ‘next-generation sequencing (NGS)’ technology has revolutionized the pace of DNA sequencing in plants and animals. NGS technology, allow holistic profiling of RNA expression in non-model plant species in which limited molecular genetics studies have been performed. RNA sequencing (RNA-seq), provides whole-transcriptome expression profiles of selected plant tissues or cells, thereby permitting the integrated analysis of transcriptomes and metabolomes in any plant species. Transcriptome analysis followed by identification of potential candidate genes involved in the secondary metabolic pathway will lead to a better understanding of biosynthesis, regulation and chemical diversity of secondary metabolites in *Aegle marmelos*. Apart from gene discovery, transcriptomes also serve as invaluable reservoirs for discovery of SSRs, whose discovery earlier depend on the availability of DNA sequence. There is not much information available on the nature and frequency of SSRs in *Aegle marmelos*. SSR markers designed from coding regions (transcriptomes) are more conserved compared to genomic SSRs and therefore show more transferability between species. The transcriptome annotation analysis will present the most abundant genetic resource *Aegle marmelos*. It will serve as the foundation for other functional genomic research efforts and genetic engineering to improve the production of active principal compounds.

Keywords: Aegle marmelos, transcriptome, NSG, metabolite

OP-29: TRANSCRIPTOME ANALYSIS IN MANGIFERA INDICA L.: AN ATTEMPT TOWARDS DEVELOPMENT OF PERENNIAL HIGH QUALITY MANGO FOR WEST BENGAL

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The flowering phenomenon in mango (*Mangifera indica* L.) is a complex one. Normally, it crops heavily in one year (on year) and bears less or no crop the following year (off year). Again, it yields heavily the next year. The rhythm of bearing in Mango is not strictly 'alternate' but 'irregular' or 'erratic'. Fruit set in Mango is a varietal character, depending upon several factors such as time of flowering, sex ratio, efficient cross-pollination and intensity of flower drop. Varieties differ from one another in these respects and this leads to varying fruit set in different varieties. Mango fruit development and ripening are the programmed processes; conventional indices and volatile markers help to determine agronomically important stages of fruit life (fruit-setting, harvesting maturity and ripening climacteric). More and precise markers are required to understand this programming; apparently, fruit's transcriptome can be a good source of such markers. The transcriptome analysis information generated can be utilized for identification of potential parents, desired hybrids in early nursery stage and would assist breeders by bringing precision breeding and also make available mango fruit during the 'off' years. Gene expression analyses for flowering in fruit crops allow the identification of genes and the study of their relationship with reproductive processes. Transcriptome information generated can be utilized for identification of potential parents, desired hybrids in early nursery stage and would assist breeders by bringing precision breeding and also make available mango fruit during the 'off' years. Volatile components of mango fruits are responsible for the aroma, fruit quality, ripeness, consumer acceptance and serve as high-quality index for mango germplasm screening for superior local cultivar development Globally, Mango crop improvement

initiatives were mainly focused on disease resistance, or fruit size, sweetness, or color. However, the differential volatile composition and aroma properties of mango germplasm resources are still a grey area of investigation which may have significant contribution towards the irregular fruiting pattern. Therefore, correlation study and cluster analysis of both transcriptome profile and volatile composition may reveal novel insights into the complex mechanisms involved in the irregular fruit production and diversified aroma of mango cultivars which would help us to develop superior, high yielding and stable fruit producing mango varieties with optimum health promoting aroma-active components.

Keywords: Mangifera, transcriptome, flowering, fruit, germplasm

OP-30: EXPLORATION OF THE ROLE OF MACROBENTHOS IN MAINTENANCE OF AQUATIC ECOSYSTEM : A STEP TOWARDS THE DEVELOPMENT OF SUSTAINABLE AQUACULTURE IN WEST BENGAL

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India the second highest producer in culture fisheries produces fish 37,91,920 Ton/Year. In India West Bengal is the highest producer produces 16.71 lakh Ton fishes per year but it can not fulfill the demand which is 16.95 Lakh Ton/Yr (Hand Book of Fisheries Statistics 2015-2016, Directorate of Fisheries). To increase the production more and more water bodies are included under pisciculture. In organized fisheries two techniques are used 1. All the macrobenthos are removed along with weeds and 2. The pond is dried after 3-5 years for 3 months and bottom soil is dredged out. The common practice is having tremendous ecological effect viz. soil degradation, loss of biodiversity, eutrophication etc. The future is decrease of productivity in pisciculture. To prevent this situation sustainable pisciculture technique has been developed in some countries (England, Bangladesh etc). In today's pisciculture the common practice is removal of all macrobenthos due to the misconception of their negative co-relation

with phytoplankton population. Recently China tried to establish the relationship between *Bellamyia* and phytoplanktons for the development of sustainable pisciculture. The role of other macrobenthos are still unexplored. We have found that the macrobenthos has an important role in nutrient recycling. The nutrients helps in the growth of phytoplankton population. The pond health is maintained by removal of excess nutrient and thus eutrophication is prevented. There is an urgent need to establish the role of macrobenthos in pisciculture practice for future sustainable development.

Keywords: Pond, Fishery, macrobenthos, eutrophication, sustainable developmen

**OP-31: ESTABLISHMENT OF PLANT RESCUE CENTRE IN
BERHAMPORE GIRLS' COLLEGE, MURSHIDABAD, WEST BENGAL.**

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Plant genetic resource is the key components of any ecosystem. For development to be sustainable, conservation and use of genetic diversity must be at its core. The actual wealth of a country is its diverse weeds, which harbor genetic diversity, act as medicine source, stalk of food plants and fodder and also help sustaining the ecosystem. India accounts for 45,000 species of plants of which 17,500 are flowering plants. West Bengal is having 3580 species of it (ZSI, 2012). Murshidabad is having near about 183 species of monocot and 453 species of dicot plants. Variation is the law of nature, it occurs everywhere and every moments. Increasing urbanization, increasing agricultures and introduction of exotic species is now reducing this diversity. The rapid erosion can be stopped by establishing plant rescue centre and the reintroduction of the plants. In the face of massive erosion of germplasms from the world, the plant rescue centre is the safe house for conservation and restoration of the near extinct plants. Expansion of urbanization and cultivation make the weeds vulnerable for extinction, but it is the so called weeds that reflect the diversity of plants. Weeds are the predecessor of crop plants, source of medicine and reservoir of alleles.

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So conservation of wild plants are very much important, it also fulfill India's obligations under conventions on biological diversity with special reference to Article 6 and 7 of UNEP (1992). An attempt has been made to prepare a consolidate list of wild plants species of Berhampore Girls' College and these plants has been conserved in proper way in the rescue centre. At present 80 plants and 30 Mango varieties are under conservation attempt, the number which are well established in the campus rescue centre.

Keywords: Plant rescue centre, Berhampore, weeds, conservation

OP-32: EXPLORATION AND DOCUMENTATION OF SACRED GROVES OF MURSHIDABAD, WEST BENGAL

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A sacred grove or sacred woods are any grove of trees of special religious importance to a particular culture. Sacred groves were most prominent in the Ancient Near East and prehistoric Europe but feature in various cultures throughout the world. They were important features of the mythological landscape and cult practice of Celtic, Baltic, Germanic, ancient Greek, Near Eastern, Roman, Indian and Slavic polytheism, and were also used in India, Japan, and West Africa. Examples of sacred groves include the Greco-Roman temenos, the Norse hörgr, and the Celtic nemeton, which was largely but not exclusively associated with Druidic practice. In India, sacred groves are scattered all over the country, and do not enjoy protection via federal legislation. Around 14,000 sacred groves have been reported from all over India, which act as reservoirs of rare fauna, and more often rare flora, amid rural and even urban settings. Experts believe that the total number of sacred groves could be as high as 100,000. Threats to the groves include urbanization, over-exploitation of resources, and environmental destruction from Hindu religious practices. While many of the groves are looked upon as abode of Hindu gods, in the recent past a number of them have been partially cleared for construction of shrines and temples. The entire Murshidabad

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district is covered in search of Sacred Groves. It is found that these are of two types in nature. The Groves with “Hindu Deity” and “Muslim Kabarsthan”. Many small patches are found as “Kabarsthan” and many trees are considered as “Sacred Trees”. Only the places are considered having high diversity of vegetation, protected by walls, maintained by a statutory authority and age old. 153 of these places are recorded with high vegetation diversity along with animal diversity. The insects and invertebrates are not recorded. Only the vertebrates are considered.

Key words: sacred groves, Murshidabad, sacred tree, kabarsthan

OP-33: DOCUMENTATION OF THE FISH NATURAL RESOURCE OF RURAL HOWRAH

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The fish natural resource of India is rich and diversified characterized by many rare and endemic fish species. Due to irrational fishing practices, environmental aberrations like reduction in water volume, increased sedimentation, water abstraction and pollution over the years this diversity is on a decline. Few species have been lost from the freshwater ecosystem of India and some now belong to the vulnerable, endangered and threatened category. It is important to prepare a zone- wise database for listing the fish diversity in our country. A database on fish biodiversity is also essential as a decision making tool for conservation and management of fish germplasm, protection and preservation of endangered species and mitigation of anthropogenic activities so as to fulfill India’s obligations under Convention on Biological Diversity. Howrah district of West Bengal comprises diversified ichthyofauna in various habitats. There is no information regarding the distribution, population dynamics of this natural resource in Howrah district. In the present work is survey and documentation of the freshwater fish fauna of Howrah district. This study will help in increasing the public awareness for protection of this natural resource.

Keywords: Ichthyofauna, Howrah District, Documentation, Conservation.

**OP-34: PREDICTION OF POSSIBLE MUTATION IN THE ENZYME
TYROSINASE: A BIOINFORMATIC APPROACH**

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Tyrosinase is a ubiquitous enzyme in microorganisms, animals and plants. Effects on melanin synthesis pathway is mediated by tyrosinase, which is frequently associated with pigmentation. Analysis of mutation in tyrosinase gene in some specific domain results several different types of mutants with various degree of structures of proteins and most of them leads to missense mutation. Mutational study in signal peptide domain has some deleterious effects on m TOR signaling pathway, causing numerous human diseases. Due to the change in the structure of the protein and reduction in its stability, the function of the protein may be altered, leading to decreased expression. Protein instability caused due to mutation represents degradation of mutant proteins which can be a prevalent disease-causing mechanism. An attempt has been made bioinformatically, for prediction of different types of mutation possible in various domains of the enzyme, tyrosinase which may result possible mutant protein, thus causing various diseases. Our results strengthen the hypothesis that mutation in some specific amino acids like leucine found to be effective signal activator in m TOR signaling and T cell activation and function as an essential amino acid. The result can be validated in wet lab in precise manner.

Key words: Tyrosinase, mutation, leucine, m TOR, bioinformatics

OP-35: CARDIOMETABOLIC RISK PROFILE IN ADULT BENGALEE FEMALES: EFFECT OF PRACTICING BHARATNATYAM

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The prevalence of cardio-metabolic diseases, one form of the major life threatening Non Communicable Diseases (NCDs), has increased dramatically in the past decades in countries that are undergoing rapid nutrition and lifestyle transitions including India; and the control and management strategies has become a sort of bottleneck for country's social and economic development. As being physically active is one of the major modifiable factors having potential to favorably influence health, it is increasingly becoming the choice of action. On the other hand, dance is an accessible and appealing form of physically active recreational activity practiced through ages. Present study, in this backdrop, aims to find out the impact of regular practicing of Bharatnatyam, a cost effective, feasible and culturally appropriate traditional form of recreational activity, on indicators of cardio-metabolic derangements. Data on traditional as well as novel indices of cardio-metabolic disease risks - namely waist circumference (WC), waist to hip ratio (WHR), waist to height ratio (WHtR), body adiposity index (BAI), neck circumference (NC), sagittal abdominal diameter (SAD) and body roundness index (BRI) - were obtained from 96 Bengalee female individuals (age range 19-24 years) constituting the Bharatnatyam practicing group (BPG) with a minimum dancing experience of 5 years. Measurements were also obtained from 111 female individuals constituting Control Group (CG), of similar age, socio-economic and ethnic background but no dancing or any other regular physical activity background. A significant ($P < 0.05$) favorable impact in respect of cardio-metabolic disease risk factors of Bharatnatyam dancing has been found in BPG individuals compared to their CG counterparts. Practicing of Bharatnatyam, a traditional Indian dance form has been found to lower cardio-metabolic disease risks reflecting a better health status in individuals practicing it regularly.

Keywords: metabolic risks, physical inactivity, recreational activity, upper body obesity, young adults

OP-36: PEST DYNAMICS, DAMAGE ASSESSMENT AND BIORATIONAL CONTROL METHOD OF MANGO MEALY BUG, DROSICHA MANGIFERAE AT MALDA REGION OF WEST BENGAL

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Mango mealy bug is a notorious pest of mango and ranked 2nd after mango hopper in the amount of damage inflicted. It is a sucking pest and cause fruit drop due to unremitting sap sucking from the base of the twig or peduncle which bears fruit.

To study the bioecology of this deadly insect pest, seasonal pest abundance was noticed by visual counting in the infested parts during morning hours in each standard meteorological week throughout the pest infesting period from 2011-2015. The twigs were tagged. The abiotic factors like temperature, humidity, rainfall or sunshine hours were also noted. The pest number reached its peak during 15-17th SMW and there were significant positive correlation of pest number and temperature but pest number was negative correlated with humidity and sunshine hour.

The amount of damage inflicted by this pest was assessed by deducting % of fruit loss in the pest infested plants from that in the control plant i.e. where there is no pest attack. To assess the damage the twigs with significant pest number (minimum 15) was tagged and then the number of pests and fruits were counted in each week starting from pin-head, pea-nut, marble stage to maturity. The % of fruit drop from the start then was calculated and the % of damage varied from 40%-70%.

Modern day pest control approach concentrates more on environment friendly way to curb the pest and one such ecofriendly, less toxic method was tried to control this pest. One funnel type sticky trap (FTST) was tied to the trees 4-5 feet above the ground and lime was added at the base of the traps and it was fascinating to notice that crawlers and nymphs number below the trap was significantly higher (67 and 11-2012, or 26 and 04) than above the trap as these nymphs couldn't cross the trap to reach above. So, this funnel type sticky tap can be utilized successfully as one the most popular IPM tool to control mango mealy bug.

**OP-37: GENETICALLY ENGINEERED MICROBES ASSISTED
DEGRADATION OF SYNTHETIC POLYMER - A FUTURISTIC
APPROACH TOWARDS ENVIRONMENTAL PURIFICATION**

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Polymers are the building block of life and serve as both structural and functional moieties of natural as well as anthropogenic creations on earth. Although biopolymers are the important components of ecosystem and major recyclable material in different bio-geo-chemical cycle, but the synthetic polymers other side are the potent bio-hazardous material and environmental toxicant. Due to wide applicability and cost effectivity, synthetic polymer production uplifted in geometric scale despite of their toxicogenic property resulting in a sharp increase in plastic waste generation in last decade. Synthetic polymers due to their prolonged shelf life in natural environmental condition create soil and water pollution in a logarithmic progression. Therefore, suitable technologies are in urgent need to solve this plastic waste associated problems. In the present scenario, biochemical degradation of synthetic polymers can be a suitable environment friendly alternative to the costly and less eco-friendly physico-chemical mineralization of plastic waste. Scientists working in the associated field of research have already reported different genetically engineered micro-organisms from bacterial (Xiao et al. 2011) and fungal (Gu et al. 2000) possessing degradation potentiality of polythene.

Microbial degradation of synthetic polymers involves multistep enzyme assisted process leading to break down into its structural monomers and oligomers. The process of degradation involves both aerobic and non-aerobic path but non-aerobic mineralization proves more economic due to the generation of methane as by-product (Starnecker and Menner 1996, Gu et al. 2000). Different genetically engineered members of *Pseudomonas*, *Clostridium*, *Rhizopus*, *Aspergillus* etc. have been reported as degrading micro-organisms which involves environment friendly enzymatic degradation of polymers (Bhardwaj et al. 2012). However, the method requires fine calibration to remove dependency of microbial growth on environmental conditions which is a major hindrance for its wide applicability.

Keywords: Synthetic polymer; Polythene; Genetically engineered micro-organisms; Bio- degradation; Non-aerobic path.

OP-38: ALCOHOL ADDICTION: TEMPORARY FUN WITH PERMANENT CONSEQUENCES

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Addiction is a form of dependence or compulsion for any specific thing that leads to a severe craving for it. Alcohol addiction is the physical and psychological dependence on alcohol. Alcohol has been a food product since the Stone Age, circa 10,000 B.C. It has been found to play diverse roles ranging from a beverage of enjoyment to dietary and bartering uses. However, it is currently a topic of debate whether alcohol serves a therapeutic or medicinal function or is harmful to humans. Several literature publications suggest that moderate consumption of alcohol may increase cognition, exhibit anxiolytic effects, reduce coronary artery-related events such as myocardial infarction, and prevent the onset of both diabetes and dementia. However, profuse uncontrolled consumption of alcohol causes severe effects both physiologically and psychologically often leading to addiction and dependence. Alcohol addiction is a chronic relapsing psychiatric disease characterized by physical dependence and tolerance to alcohol that together cause a strong craving to consume alcohol accompanied by the inability to stop drinking. It has an association to different diseases and injuries with enormous social and economic impact.

Battling and preventing addiction had been a topic of research since early early 17th century. Management of alcohol addiction includes various perspectives like detoxification, medications and even psychotherapy. Detoxification is normally used along with medications like benzodiazepines, acamprosate, naltrexone, disulfiram, etc. Psychotherapy on the other hand deals with the psychological issues underlying the causes of addiction and addiction itself. However, the medications have prolonged side effect of their use. This has led to further research to formulate new age drugs with fewer side effects which might target specific receptors involved in addiction with the view to eradicate addiction related problems.

Keywords: Alcohol, Addiction, Benzodiazepine, Psychotherapy, Detoxification

OP-39: ASSESSMENT OF RESPIRATORY PREDICAMENT OF BUS DRIVERS IN TWO DIFFERENT ENVIRONMENTAL STATES OF AFFAIRS

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Bus drivers have to commute in different environmental conditions. Exposure to environmental pollution is one of the main hindrances of their job. Road traffic was the potential cause to increase emissions of pollutants such as carbon monoxide, oxides of nitrogen, particulate matter, and hydrocarbons. These exposures caused different type of respiratory problems in bus drivers. According to area of work i.e., rural and urban, the 254 subjects were alienated into group 1 and group 2 respectively. Different physical parameters were measured and ECRHS-II questionnaire was administered to know their respiratory status. Lung function test was measured and sputum cell was counted from the induced sputum of the subjects. From the spirometric findings it was observed that SVC, FVC and FEV1 were significantly lower among the group 2 bus drivers. The mean value of SVC and FEV1 were significantly decreased with the smoking habit. It was revealed from the stained slide of sputum sample that the mean value of total count of sputum cells was significantly decreased in group 2 subjects and mean value of neutrophil count was significantly increased in group 2. From the study it may be concluded that the bus drivers of both rural and urban vicinity were prone to respiratory illness due to their regular dusty working environment. Regular exposure to this environment was the potent cause of different types of respiratory illness.

Keywords: SVC, FVC, FEV1, neutrophil count, bus drivers.

**OP-40: IDD AMONG PREGNANT WOMEN OF MURSHIDABAD
DISTRICT IN WEST BENGAL**

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Iodine Deficiency Disorders (IDD) is a significant public health problem in the World including India. Although the number of countries with iodine deficiency decreased, still in several studies conducted around the world the pregnant women have been found to be particularly vulnerable to IDD. Totally 524 pregnant women (aged between 18-45 yrs) were clinically examined for goiter from five sub divisions of Murshidabad district. The overall goiter prevalence was found to be 17.74%. Most of the goiter was palpable (grade-1) however; visible goiter (grade-2) also existed. To evaluate the occurrence of associated iodine deficiency disorders (IDD) every pregnant women was examined or enquired individually. In the studied population, most prevalent abnormalities were feeble mindedness (41.8%) followed by deaf mutism (11.3%), squint (1.9%), miscarriage (8.6%) and still birth (2.3%). Urinary iodine and thiocyanate concentrations were measured for all subjects and the mean urinary iodine were found 13.6 ± 9.4 . The mean thiocyanate excretion levels were 0.634 ± 0.26 . The overall clinical observations suggest that the pregnant women of the studied region are affected by goiter or they are iodine deficient but biochemically they have no iodine deficiency as evidenced by their urinary iodine excretion pattern. They consume foods containing thiocyanate precursors as evidenced by urinary thiocyanate excretion pattern. Thus in spite of the consumption of adequate iodine, existing goiter prevalence may be due to the consumption of dietary goitrogens/ antithyroid substances that possibly come through food and water.

Key words: Iodine, IDD, Pregnant women, Urinary iodine, Urinary thiocyanate

**OP-41: METAGENOMICS FOR CONSERVATION AND
THERAPEUTICS - CASE STUDIES FROM RHIZOSPHERE AND GUT**

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Environmental Genomics approaches have enabled the rapid identification of the various microbial members that contribute towards the microflora of a particular geographical/environmental/organism specific niche. Metagenomics has enabled us to get an insight into the segment or group of microorganisms which could not be cultured in vitro, thus opening up new vistas into the understanding of form and function of that community. With the application of shotgun metagenomic approaches in metagenomics, metatranscriptomics have emerged to enable the quantification of the total number of transcripts of corresponding genes which are overexposed in a particular community. This approach has not only contributed towards the elucidation of functional classification of the microbial cohort, but also has paved way for correlation between the soil characteristics and microbial community assessment. The soil around the roots of plants was defined as the rhizosphere which has gained importance due to the presence of both growth promoting and pathogenic microbes. Plant phenotypes and traits should now be explored on the basis of the quantum of the rhizospheric microbiome. The signals from the plant roots not only influence the recruitment of the microbiome but also regulate the functions such as quorum sensing, regulation of microbial gene expression and other microbial activities for example - biofilm production, conjugation and symbiosis and virulence. Another specific niche environment is found in the gut of organisms and this microbiome contributes to a broad range of biochemical and metabolic functions that directly or indirectly affect the entire metabolic and cognitive system. Numerous factors such as age, geographical location, genetic makeup, and individual health status significantly influence the diversity, stability, and relative abundance of the gut microbiome. This presentation shall discuss some interesting facets of both rhizospheric and gut specific case studies ranging from plants to mice to human.

Key words: Metagenomics, Rhizosphere, Gut.

OP-42: INHIBITION OF GLYCOLYSIS IN CANCER CELLS: A NOVEL STRATEGY FOR CANCER TREATMENT

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Cancer cells frequently exhibit increased glycolysis for the generation of ATP to meet the energy demand. Nearly 80 years ago Warburg observed this unique behaviour of cancer cells. He attributed this metabolic alteration to mitochondrial “respiration injury” and considered this as the most fundamental metabolic alteration in malignant transformation or “the origin of cancer cells”. Vast amount of research are also consistent with this Warburg effect in a wide spectrum of human cancers. Mitochondrial malfunction and hypoxia in the tumor are considered as the two major reasons for the Warburg effect. Under physiologic conditions, generation of ATP through oxidative phosphorylation in the mitochondria is an efficient metabolic process, which produces far more ATP molecules from a given amount of glucose compared with glycolysis. However, when the ability of cells to generate ATP through mitochondrial oxidative phosphorylation is compromised, cells are able to adapt alternative metabolic pathways, such as increasing glycolytic activity to maintain their energy supply. Mitochondrial respiratory function can be negatively affected by multiple factors, including mutations in mitochondrial DNA (mtDNA), malfunction of the e-transport, aberrant expression of enzymes involved in energy metabolism, and insufficient oxygen available in the cellular environment.

The mutations in mtDNA are likely to cause alterations of the encoded protein and compromise the respiratory chain function. The constant generation of ROS and the increased free radical stress in cancer cells would cause damage to both mtDNA and the e-transport chain, thus dependency on glycolysis. Hypoxia is another important factor that contributes to the Warburg effect. The fast growth of cancer cells and rapid expansion of the tumor mass usually outpace new vascular generation, resulting in an insufficient blood supply to the tumor tissues. Such a hypoxic environment within the tumor mass limits the availability of oxygen for use in mitochondrial respiration and synthesis of ATP and forces the cancer cells to up-regulate the glycolytic pathway as the only source of energy.

The compromised ability renders cancer cells highly dependent on this metabolic pathway for survival. As such, it is conceivable that the metabolic

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alterations in malignant cells may be exploited to serve as a biochemical basis to develop therapeutic strategies to target this metabolic abnormality. One possibility is to inhibit glycolysis and preferentially kill the cancer cells that are dependent on glycolytic pathway for ATP generation. Professor Huang et al. presently working on this area and already established some valuable results in colon and lymphoma cells. Depletion of ATP by glycolytic inhibition also potentially induced apoptosis in multidrug-resistant cells, which should be a promising strategy to overcome drug resistance. Several works are now ongoing illustrating excellent clinical implications in human cancers. As the Warburg effect and hypoxia are very common in human cancers, the progressive research in such thought may have broad application in cancer treatment.

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**OP-43: PRIMARY FISHERMEN CO-OPERATIVE SOCIETIES IN
MURSHIDABAD: PROBLEMS AND PROSPECTS IN AQUACULTURE**

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Aquaculture sector has potential contribution to the national income, nutritional security, employment opportunities, social objectives and export earnings. Cooperative society is an organization of group of people with collective responsibilities and thoughts for the development of the needy, especially underprivileged. Fishermen Cooperatives are formed for increased productivity at fishery sector using the skills of the fishermen as well as development of their socio-economic condition. Primary Fishermen Cooperative Societies (PFCS) function at Village level, Central Fishermen Cooperative Societies at District Level and Apex Federation at State Level. Studies have shown that productivity of fish and other economically important aquatic organisms have been significantly increased by the formation of fishermen cooperative societies in different parts of the world. Murshidabad District has 3rd highest freshwater area in West Bengal (28,348ha). This district has highest number of Primary Fishermen Cooperative Societies (113 Nos.), highest water area (21,425 ha) under possession of PFCS as well as highest number of fishermen (19,312) as members in West Bengal. Still, there is deficit in fish production to fulfill the growing demand of the district and per hectare fish production is declining in recent time as per statistical data of fishery dept. of Govt. of West Bengal. So, there is a need to study for developing mechanism of proper utilization of the huge freshwater resources of the district as well as involvement of large number of semi-skilled fishermen for increased productivity and socioeconomic development at village level. A survey has been made to different PFCS of Murshidabad district by random sampling method to find out their problems and prospects in the field of aquaculture which will be discussed here.

**OP-44: STATUS STUDY ON SELECTED FUNCTIONAL FITNESS
IN OLD AGE MALE**

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Functional fitness is the prime factor in every person to live a full and balanced life. The purpose of the present study was to find the selected functional fitness status of old age male. 20 old age male ages ranged from 55-65 years were selected as the subject for the study. To assess the upper and lower body strength of the subjects, test consisting of arm curl and chair sit and stand test. Chair-sit and reach test and back stretch test was conducted to assess upper and lower body flexibility. For analyzed of the data mean and SD was calculated and interpreted.

Key words-Functional fitness, Strength, Flexibility

**OP-45: SOCIO-ECONOMIC IMPACT OF LIVESTOCK DEVELOPMENT
IN INDIA**

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Agriculture in India still accounts for a substantial part of the GDP (16%) and employment (49%). However, the annual growth rate of agricultural and allied sector fluctuates widely from 1.5 percent in 2012-13 to (-) 0.2 percent in 2014-15 and 4.9 percent in 2016-17 since more than 50 percent agriculture in the country is dependent on rain. Among the components of agriculture and allied sectors, livestock occupies the second position after crop in Gross value added (GVA) to the economy. Comparative statistics reveal that while the share of agriculture and allied sectors in total GVA of the economy are declining, that of the livestock has been increasing substantially: the share of livestock in GVA in agriculture has increased from 21.8 percent in 2011-12 to 25.7 percent in 2015-16. These structural changes has brought into a change in the sources of income of the farm household: the share of livestock in total farm incomes increased from 4 percent in 2002-03 to 13 percent in 2012-13. The country is experiencing increased trade openness: value of both the export and import of livestock and livestock products are increasing.

No doubt, livestock rearing has become one of the most important economic activities in the rural areas of the country providing supplementary income for most families dependent on agriculture. Apart from providing a subsidiary income to the families, rearing of livestock provides cheap nutritional food to millions of people. Still there is demand-supply mismatch in the livestock market which is a challenge for food security of the country. Livestock are the best insurance against the vagaries of nature like drought, famine and other natural disasters. Since a major portion of agricultural and allied workers are women, growing economy of livestock and its byproducts could be a good source of sustainable income generation of rural women that may add to their empowerment initiative.

POSTER PRESENTATIONS

**PP-01: ADRENO-CORTICAL MORPHOLOGY AND FUNCTIONALITY
UNDER THE INFLUENCE OF EXCESS SELENIUM AND
SELENIUM-IODIDE**

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Selenium (Se) and iodine (I) are micronutrients linked in a potentially important interrelationship due to their effects on synthesis, secretion and functionality of thyroid. Although these elements are obligatory for the normal functioning of the thyroid gland, exposure in excess of either or in combination can cause disruption of normal structure and operations of not only the thyroid but also of the associated hypothalamo-hypophyseal-adrenal axis which may lead to the generation of oxidative stress in long run.

In this background adult male Wister rats were administered inorganic selenium, iodine and selenium in combination at doses relatively above the recommended level and adrenal structural and functional status was evaluated. Along with an increase in body weight and adrenal gland weight, significant increase of 3β HSD and 17β HSD activity was observed in Se+ I co-exposed group in comparison to only Se treated group; with a concomitant increase in serum corticosterone and lipid peroxidation levels in Se+ I co-exposed group. Histological observations reveal cellular hypertrophy and increased cortical area with hyperplasia in both groups but to a greater extent in Se+ I group.

The findings of the present study thus indicate that Se in excess induces alterations of the adrenal gland associated with elevated lipid peroxidation levels (LPO) and as well as corticosterone probably due to alterations in pro-oxidant/antioxidant balance however, on co-administration with excess I there is greater disruption of adrenal morphology and further elevation of LPO and corticosterone levels due to combined effect of excess Se and I leading to development of augmented oxidative stress via disruption of thyroid or otherwise. This study will be helpful to understand the physiological status of adrenal and stress generation in populations where environment is rich in selenium and iodine has been introduced through iodized salt.

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Keywords: Selenium, Iodine, Adrenal, Hydroxysteroid Dehydrogenase, (HSDs), Lipid Peroxidation (LPO), Corticosterone

**PP-02: PROLONGED EXPOSURE OF EXCESS IODINE EXACERBATE
THE FUNCTIONAL STATUS OF LYMPHOCYTES**

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Introduction: Humans and animals are often exposed to excess iodine for prolonged duration for using iodine-containing medicinal preparations and iodized salt containing iodine more than recommended level. Changes in T lymphocytic activity and its subset ratio found responsible for initiating abnormal autoimmune responses. Iodide-excess-impairment on peripheral blood lymphocytes (PBL), the antioxidant balance of PBL, serum cytokine level and lymphocytic DNA damage status rather autoimmune changes have not been explored adequately. Thus the objective of the study is to reveal excess iodide induced impairment of PBL in adult male rats to understand the autoimmune alterations indirectly.

Materials and methods: Adult male rats of 120 ± 10 gmbw were divided broadly in two groups depending on the time of the administration of the excess iodine (500EI), i.e., 30 days (500EI30D) and 60 days (500EI60D) respectively to analyze pro-inflammatory cytokine levels (IL6 and TNF) in serum, oxidative stress parameters and DNA damage of PBL.

Results: Significant impairment in the activity of superoxide dismutase, catalase, GPx and GSH activities and significant elevation of NO and lipid peroxidase activities in the lymphocytes of treated group were observed. Overall results showed that exposure of excess iodine for different durations increased the level of pro-inflammatory serum cytokines (IL6 and TNF) and DNA damage of lymphocytes depending on the time of exposure.

Conclusion: Prolonged exposure of excess iodine causes impairment of lymphocyte

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function by altering antioxidant enzyme activity, serum cytokine levels and lymphocytic DNA damage that in turn may alter autoimmune function.

Keywords: Excess iodine, peripheral blood lymphocytes, oxidative stress, cytokine, DNA damage.

PP-O3: LEPTIN'S ROLE IN OBESITY

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Common obesity is a multi-factorial trait, contributed by the "obesogenic" environment of caloric abundance and increasing automation, sedentary lifestyle and an underlying genetic susceptibility.

The Ob gene codes the 16 kDa protein hormone leptin, which is one of the main genes that has been linked to the obesity phenotype in humans. Leptin, a 167 amino acids peptide hormone is secreted at high levels mainly by the white adipose tissue and at low levels in gastric epithelium and the placenta as an afferent satiety signal, produced in proportion to the mass of adipose tissue.

Leptin exerts its effects by binding to its receptor (LEPR) expressed in the brain and in peripheral tissues. The long form of the leptin receptor (Ob-Rb), highly expressed in the hypothalamus, is supposed to mediate most of leptin's effects. Leptin signals via the Janus Kinase and Activator of Transcription (JAK/STAT) pathway but also modulates a number of other signalling pathways in the brain, such as the PI 3-kinase, MAPK, and mTOR pathway. In the hypothalamus leptin inhibits neuronal pathways that stimulate food intake by counteracting the orexigenic effects of NPY/AgRP neurons and by activating anorexigenic POMC/CART neurons.

Increase in fat storage leads to increased leptin, which inhibits the satiety centre in the hypothalamus. In contrast, the reduced ability of leptin to regulate appetite and weight gain is known as leptin-resistance, which can lead to obesity-related phenotypes. Defects in leptin transport across the blood-brain barrier, in LEPR signalling and in the neural pathways involved in energy homeostasis regulation are some of the mechanisms involved in the resistance to leptin. Single

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point mutations in the Ob gene can produce non-functional leptin protein due to the disruption of key intramolecular features, resulting in a chronic obesity phenotype.

Current modes of therapy include gene therapy using recombinant adenoviruses, which serve as vectors for leptin cDNA, as well as direct leptin injections. While both approaches have shortcomings and require further research to improve their effectiveness, they demonstrate potential means of correcting specific metabolic disorders.

PP-04: MALE OSTEOPOROSIS: THE NEW SCAM TO THE WORLD

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Osteoporosis, means porous bone, a silent emissary to mankind, was previously known as 'women's disease'. According to WHO definition osteoporosis is a systemic metabolic disease of the skeleton characterised by low bone mass and damage of bone tissue leading to unbalanced bone homeostasis and increased bone fragility and risk of fracture. The disease affects all ages and racial groups and in this current time, male osteoporosis is as relevant as osteoporosis in women for discussion. In today's world, among 5 there is 1 osteoporotic patient where 20% of people with osteoporosis are men. 12 million men are at risk. This disease is unrecognisable at primary stage as there is no prominent symptom until a fracture or pain occurs.. Although all bones can be affected but the bones of spine, hip, wrist are most likely to break. In osteoporosis there is a reduction in bone mass per unit volume without any change in the nature and mineralisation of the bone i.e. bone is quantitatively deficient but qualitatively normal. It is of two types-primary (idiopathic or age related) and secondary (endocrine, genetic etc.). There are various causes of osteoporosis like excess use of steroid (in asthma or rheumatoid arthritis), low level of sex hormones, hypogonadism, GI disorders, genetic history, exogenous androgen submission, alcohol and opioid abuses. Osteoporosis may inherit as monogenic disease and sometimes it can be hardly distinguished from mild form of osteogenesis imperfecta caused by dominant mutations of COL1N1 and COL1A2 genes. The development of osteoporosis depends on the lifestyle, physical

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activity, nutrients etc.

In males, testosterone is converted into oestrogen and androgens which works through ER ALPHA receptor, changes the IGF-1 concentration and regulates bone homeostasis. Testosterone replacement therapy (TRT) is one of the most beneficial way to treat male osteoporosis in this purpose. Other hormones like GH, estradiol, leptin, adiponectinetc have important role in prevalence of osteoporosis. Osteoporosis in men comprises a major public health issue due to the severity of their consequences and economic burden they pause. Prevention and treatment follows the same principles as in osteoporosis in women, although there are fewer medication alternatives available.

PP-05: PROBIOTIC CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY AGAINST CLINICAL BACTERIAL ISOLATES OF LACTIC ACID BACTERIA ISOLATED FROM FRESH WATER FISHES, WEST BENGAL

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Introduction: The use of probiotics in aquaculture is anticipated to be an excellent strategy for the prevention of infectious microbial diseases. The current study stands for the isolation, identification and characterization of lactic acid bacteria (LAB), from fresh water fishes, and determination of antibacterial activity against pathogenic bacteria.

Materials and Methods: The LAB isolates were procured from intestine and gills of fresh water fishes, and identification of LAB was done by gram-staining, and biochemical tests including sugar fermentation. The antibacterial activity of LAB was determined by agar well method against clinical bacterial isolates: *Bacillus cereus*, *Listeria monocytogenes*, *Staphylococcus aureus*, *Escherichia coli*, *Proteus vulgaris*, and *Acinetobacter baumannii*. Haemolytic, gelatinase and DNase tests were done for the LAB isolates. Antibiotic susceptibility test for LAB isolates was performed against 15 antibiotics.

Results: Total 8 LAB isolates were obtained. All the isolates were gram-positive,

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non-spore forming, catalase and oxidase negative. All were MR positive and negative for VP, indole, citrate, and gelatinase. The strains had growth inhibitory activity against both gram-positive and gram-negative test bacteria. The zone diameter of inhibition of the isolated LAB ranged 12 – 20 mm, for the gram-positive clinical bacteria, and 13 – 21 mm, for gram-negative clinical bacteria. The isolated LAB strains showed negative results for haemolytic, gelatinase and DNase tests. The LAB isolates showed mixed status of antibiotic susceptibility.

Conclusion: The LAB strains from fishes might be useful as the probiotics, and such strains can be applied alone, or in combination with antibiotics, based upon the antibiogram of the isolated LAB.

Key Words: Lactic acid bacteria, fresh water fish, antibacterial activity, probiotic property.

PP-06: INSIGHTS INTO THE SEQUENCE AND STRUCTURAL SIMILARITY OF 3-HSD1 MRNA ACROSS DIFFERENT SPECIES

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3 β -Hydroxysteroid dehydrogenase (3 β -HSD) is a membrane-bound mitochondrial enzyme that catalyzes the conversion of Δ^5 -3-hydroxysteroid into Δ^4 -3-ketosteroids, leading to the formation of progesterone from pregnenolone and androstenedione from DHEA. There are two isoforms of 3 β -HSD have been characterized: type 1 is mainly expressed in the placenta, but also found in the skin and mammary gland while type 2 is predominantly expressed in the adrenal cortex and gonads. Type 1 3 β -HSD mRNA has also been detected in several regions of the brain including cerebral cortex, thalamus, hypothalamus olfactory bulb, hippocampus, caudate putamen, cerebellum etc. Studies regarding evolution of 3 β -HSD show that the enzyme has little sequence similarity to 17 β - and 11 β -hydroxysteroid dehydrogenases,

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other dehydrogenases, cytochromeP-450 enzymes, steroid isomerases, and steroid binding proteins. The occurrence of 3 β -HSD1 mRNA and/or protein has also been described in sub-mammalian vertebrates. Therefore, in the present study we want to understand the sequence based and structure based similarity and dissimilarity of Type 1 3 β -HSD mRNA across different species.

Key Words:3 β -Hydroxysteroid dehydrogenase type 1; mRNA; Phylogenetic analysis.

PP-07: COMPARATIVE HOMOLOGY MODELLING OF 3-HSD1 ACROSS DIFFERENT SPECIES

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3 β -Hydroxysteroid dehydrogenase (3 β -HSD) is a membrane-bound mitochondrial enzyme that catalyzes the conversion of Δ^5 -3-hydroxysteroid into Δ^4 -3-ketosteroids, leading to the formation of progesterone from pregnenolone and androstenedione from DHEA. In human, two isoforms of 3 β -HSD have been characterized: type 1 is mainly expressed in the placenta, but also found in the skin and mammary gland while type 2 is predominantly expressed in the adrenal cortex and gonads. Thus, 3hydroxysteroid dehydrogenase type 1 (3 β HSD1) is a critical enzyme in the formation of all classes of active steroid hormones, and is also involved in the inactivation of potent androgen dihydrotestosterone (DHT). Therefore, this enzyme is suggested to modulate active sex steroid production or inactivation, with a role in hormonedependent breast cancer. The purpose of this study was to investigate the similarities and differences of 3 β HSD1 across different species at the structural level.

Key Words: 3 β -Hydroxysteroid dehydrogenase type 1; Homology modelling; Protein.

**PP-08: DETECTION OF ESBL AND MBL AMONG PLASMID BEARING
MULTIDRUG RESISTANT HUMAN PATHOGENIC BACTERIA, INDIA**

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Introduction: Production of extended spectrum -lactamase (ESBL) by bacterial pathogens provides resistance to extended spectrum -lactam antibiotics. The current study determines the antibiotic resistance pattern of some clinical bacterial isolates and investigates the ESBL and MBL (metallo -lactamase) production as well as detects R-plasmid among the bacterial isolates.

Materials and Method: The clinical bacterial isolates: *Escherichia coli*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Acinetobacter baumannii* and *Staphylococcus aureus*, were subjected to antibiotic susceptibility by disc diffusion. The ESBL and MBL of the isolates were detected by NCCLS phenotypic confirmatory test, double disc synergy test and combined disk test. Bacterial MBL detection was determined following carbapenem-EDTA method. Plasmid DNA isolated from the test bacteria was screened by agarose gel electrophoresis and the plasmid bands were analyzed in gel-doc system.

Results: The test bacteria showed resistance to one or more antibiotics among ampicillin, cefotaxime, ceftazidime, kanamycin, nalidixic acid and piperacillin. The zone diameter of inhibition for the test bacterial isolates ranged 6 – 26 mm. Most of the bacterial isolates were positive for ESBL and MBL production, and presence of plasmid.

Conclusion: Production of ESBL and MBL remain the causes of increasing multidrug resistance among human pathogenic bacteria harboring plasmid. This study also underlines the importance of regular monitoring of bacterial resistance, including -lactamase production, and screening of R-plasmid among clinical bacterial isolates.

Key words: Human pathogenic bacteria, antibiotic resistance, ESBL, MBL, R-plasmid.

**PP-09: INSIGHTS INTO THE EVOLUTIONARY RELATIONSHIP OF
AROMATASE AMONG THE VERTEBRATES**

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Aromatase, also known as estrogen synthase, is responsible for the biosynthesis of estrogens. The enzyme is membrane bound and belongs to the Cytochrome P450 family (CYP19A1). Aromatase converts androstenedione to estrogen and testosterone to estradiol. This enzyme is localized in the ER of the cell and the expression of the enzyme has tissue specific regulation. Aromatase is a monomeric enzyme containing 503 amino acid residues and a heme as prosthetic group. The iron-containing porphyrin group is present at the active site of aromatase and the reaction centre is formed by the heme iron. Aromatase can be found throughout the body in different locations such as gonads, endometrium, skin, bone, placenta, adipose tissue and brain. Aromatase is the only known enzyme in vertebrates capable of catalyzing the aromatization of a six-membered ring. Therefore, in the present study we want to understand the phylogenetic relationship of aromatase using DNA and protein sequences. We also want to understand the structural similarity of aromatase across different species.

Key Words: Aromatase; DNA; Protein; Phylogenetics

PP-10: GREEN ARCHITECTURE

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India is one of the second fastest growing economies in the world. Construction industry is the second largest employer and contributor to economic activity after agriculture. The construction industry is growing at a very rapid rate. But this construction industry is one of the least sustainable industries in the world because it uses tremendously non-renewable resources. Construction has also a major influence on the environment in its consumption of energy as it generates huge amount of carbon dioxide in the environment which ultimately leads to global warming from the greenhouse effect. Therefore, to solve these matters, it is required to go for “sustainable construction” or “green buildings”. A green building/architecture refers to both a structure and the application of processes that are environmentally responsible and resource -efficient throughout a building’s life cycle.

The aim of this review paper is to study the objectives and fundamental principle of green buildings, its distinctness from other buildings, the increasing rate of green architecture in India, its benefits and how it exert influence on the natural resources etc. It is very important because normal construction uses many non-renewable resources and also consuming a huge amount of energy and both these leads to the degradation of the environment. But the concept of green building makes efficient use of land, materials, energy and water and thus it generates minimal or no waste and provides a healthy indoor environment for its occupants.

Keywords: Tremendously, sustainable construction, resource-efficient, distinctness, indoor environment

PP-11: CADMIUM SULPHIDE NANOPARTICLES AND GAMMA IRRADIATIONS INDUCED DESYNAPSIS WITH ASSOCIATED PHENOTYPIC MARKER TRAIT IN CORIANDRUM SATIVUM L. (APIACEAE)

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Two dwarf mutant lines of *Coriandrum sativum* L. (Apiaceae) designated as mut. I and mut. II are screened at M3 to possess concomitant desynaptic behavior of chromosomes. The mutants are raised following seed treatments with cadmium sulphide nanoparticles (CdS-NPs) at 0.50 g mL⁻¹ for 4 h duration (mut. I) and 200 Gy gamma irradiations (mut. II). Both the desynaptic mutants are 'medium strong' type demonstrating enhanced number of univalent per cell and reduced chiasma frequency per nucleus at diplotene-diakinesis and metaphase I (MI). The univalents in the mutants are random in distribution as well as polar and equatorial orientations. The mutant meiocytes show variable types of associations at MI including 22I formation; although, the predominant association is 11II. Both the mutants demonstrate different types of irregular chromosome separations and bridge formation with or without a fragment in anaphase I (AI) and anaphase II (AII) cells. Fertility of pollen grains is 94.47 % in control plants and is reduced in the mutants. The potentiality of CdS-NPs in inducing cytogenetical mutant like desynapsis alike to gamma irradiations is highlighted.

Key words: Cadmium sulphide nanoparticles; Coriandrum sativum; Desynapsis; Gamma irradiations; Meiosis.

PP-12: ISOLATION AND CHARACTERISATION OF DARK SEPTATE ENDOPHYTES FROM *Aloe barbadensis* MILL. AND ITS TEST OF POTENTIALITY ON PLANT GROWTH AND DEVELOPMENTS.

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Dark septate endophytes are a group of endophytic fungi characterised by melanised septate hyphae that occurs in the roots of plants. This type of fungi can increase plants growth directly or indirectly and crop yield also.

In present study an attempt has been made to isolate and characterise the dark septate endophytes and their colonisation in the roots of an ethnomedicinal plants *Aloe barbadensis* Mill. The plants exhibited significant colonisation of DSE. Two different strains of dark septate endophytes were isolated from the roots of the plants. Pure cultures were established (ABD1 and ABD 2). Both were analysed. ABD 2 has shown better results in ammonia production, phosphate solubilisation, IAA production, production of HCN, heavy metal test etc.

The strain were applied to plot cultures to check the potentiality of the fungus and the study proved that the isolated fungus are definitely promoting the plant growth, satisfy to be a DSE and had can be used as a potential biofertilizer for promoting the all most plant growth as well as *Aloe*.

PP-13: CUCURBITACEAE: THE GOURD FAMILY

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The family Cucurbitaceae consists of 120 genera and 800 species and is divided into two subfamilies-Zanonioideae and Cucurbitoideae. Special structures known as tendrils develop in the area between the leaf and the stem in some species of gourds. The flowers of species in the gourd family are unisexual, containing either male stamens or female pistils, but not both. Depending on the species, individual plants may be monoecious and have unisexual flowers of both sexes, or dioecious, meaning only

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one sex is represented on the plant the fruits of members of the gourd family are a type of berry, that is, a fleshy, multi-seeded fruit. In this family, these fruits are sometimes known as pepos. The pepos of some cultivated varieties of squashes and pumpkins can be enormous, weighing as much as hundreds of pounds and representing the world's largest fruits. In many species of gourds, the fruit is indehiscent, meaning it does not open when ripe in order to disperse the seeds.

PP-14: GREEN BIOTECHNOLOGY

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Biotechnology can be defined as the technique of using microorganisms, plant or animal cells or their components to produce products and processes useful to human beings. The term was first coined by Karl Ereky in 1917. According to its applications, biotechnology is classified as red, white and green biotechnology. Green biotechnology is applied to agricultural processes. An example of green biotechnology is the designing of transgenic plants or genetically modified crops (GM crops) to grow under specific environmental conditions or in the presence of certain agricultural chemicals. A transgenic crop is a crop, which contains and expresses a transgene. The technique of GM crops has two unique advantages – 1. Any gene can be used for transfer. 2. Change in genotype can be precisely controlled because only the transgene is added into the crop management. Some examples of GM crops are as follows :A) Bt-cotton :It is created by using a bacterium, *Bacillus thuringiensis*. In 1987 Barton et al isolated Bt gene from *Bacillus thuringiensis*. It forms protein crystals during a particular phase of growth. These crystals contain a toxic insecticidal protein. B) Golden rice :In 2001 Potrykus developed “Golden rice”. It is a variety of *Oryza sativa* produced through the genetic engineering to biosynthesize beta-carotene, a precursor of vit-A. Golden rice differs from its parental strain by the addition of three beta-carotene biosynthesis genes.

PP-15: SIGNAL CASCADE MECHANISM OF PLANT GROWTH REGULATORS

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Plant hormones are signalling molecules produced by plants, which have profound effect on growth and development at very low concentration. Again plant growth regulators are all compound irrespective of naturally occurring or synthetic and control plant growth.

Plants life cycle was thought to be regulated by genome expression of only five types of hormones: Auxin, Gibberellins, Cytokinins, Ethylene and Abscisic acid. However, there is now compelling evidence for the existence of plant steroid hormones, the Brassinosteroides, that have a wide range of morphological effects on plant development. A variety of other signalling molecules that play roles in resistance to pathogens and defence against herbivores have also been identified, including Jasmonic acid, Polyamine. Thus the number and types of hormones and signalling agents in plants keep expanding.

Auxin deserves pride of place in any discussion of plant hormones. For nearly 30 years after discovery of auxin in 1923, scientists tried to ascribe the regulation of all developmental phenomena in plants to auxin. Most important role of auxin in higher plants in the regulation of elongation and growth in young stems and coleoptiles. On the other hand, gibberellins are most often associated with the promotion of stem growth; it can induce large increase of plant height. Cytokinin induces cell division of plant and occupies an important role in growth and development of plant.

However the ultimate goal of research on the molecular mechanism of hormone action is to reconstruct each step in the signal transduction pathway, from receptor binding to the physiological response.

PP-16: PALYNOLOGICAL AND PHYSICO-CHEMICAL ASSESSMENT OF NATURAL HONEY SAMPLES IN NADIA DISTRICT, WEST BENGAL FOR ESTABLISHING APIARY IN THE AREA

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A total of 62 natural honey samples were collected from different localities in Nadia District, West Bengal and assessed palynologically and physico-chemically. All the honey samples were acidic in nature as the pH values range from 2.2 to 4.3 and the specific gravity varies from 1.003 to 1.075. The electrical conductivity (EC) of studied honeys is recorded from 0.08 to 2.18 ds/m² suggesting variations in mineral contents. The variations in colour of honeys have also been determined from dark (dark amber) to light (water white) on basis of 7 USDA colour standard chart with an aim to correlate with floral sources. Palynological study is done to identify the flora as nectar source in honey samples which reveal existence of 12 different types of pollen grains of the taxa *Coriandrum sativum*, *Brassica nigra*, *Nigella sativa*, *Borassus flabellifer*, *Phoenix sylvestris*, *Psidium guajava*, *Lagerstroemia speciosa*, *Datura stramonium*, *Albizia lebeck*, *Parthenium hysterophorus*, *Sesamum indicum*, *Syzygium cumini*. Among the observed pollen grains, *Coriandrum sativum*, *Brassica nigra*, *Nigella sativa*, and *Borassus flabellifer* are found predominant in all the samples suggesting establishment of apiaries in vicinity of these croplands for providing continuous nectar sources to honeybees.

Keywords: Coriandrum sativum, Brassica nigra, Nigella sativa, Borassus flabellifer, pH, electrical conductivity, colour

PP-17: EFFECTIVITY OF AZOLLA LAM. AS BIO-FERTILIZER IN FARMING OF COMMERCIAL RICE VARIETY PRATIKSHA (IET-15191) IN WEST BENGAL, INDIA

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A field experiment was carried out at Chandipur, North 24 Parganas district of West Bengal, India during rainy season in three consecutive years 2015, 2016 and 2017 to study the effects of Azolla Lam. on production of one of the locally popular commercial rice varieties Pratiksha (IET-15191). The experiments was performed through randomized block design (RBD) method which includes five treatments (CTRL: control- without any fertilizer; CDCF: chemical fertilizer dose- commonly used by farmers; CDRA: chemical fertilizer dose- recommended by Department of Agriculture, Government of West Bengal; ODAC: organic dose- presently used by Azolla and cow dung; ODAO: organic dose- presently used by Azolla only) having three replications each. The quantitative parameters for full-grown rice plants are grain yield and straw production. Soil analysis was also done to compare the soil fertility changes between chemical and organic farming after three years of farming. One-way analysis of variance (ANOVA) was performed to assess the collected data. After three years of experiments, the total income from grain and straw production is quantified on basis of MSP (minimum support price provided by Government of India) and maximum profit was estimated through ODAC treatment (19.70%) followed by CDRA (14.73%), ODAO (12.23%) and CDCF (3.54%) respectively as compared to control (CTRL- 13.54% loss). The soil analysis is also found as promising by recording more enhancements in soil organic carbon (SOC), soil organic matter (SOM), total nitrogen (TN) and soil water holding capacity (WHC) in organic doses rather than chemical doses. Thus, the present study suggests continuous and long term applications of Azolla along with cow dung as bio-fertilizer will support the farmers positively and more importantly it will increase the soil health leading to sustainable agriculture.

Keywords: Rainy season, commercial rice varieties, organic farming, cow dung, organic carbon, organic matter, total nitrogen, water holding capacity

PP-18: BIPOLAR DISORDER

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The word 'Bipolar' means two extremes. For the many millions experiencing Bipolar Disorder around the world. Life is split between two different realities, Manic and Depression. There are many variation of Bipolar Disorder. For someone seesawing between emotional states, it can feel impossible to find the balance necessary to lead a healthy life.

Modern research has proposed an association between an impaired blood-cerebrospinal fluid (CSF) or blood-brain-barrier and subgroups of patients suffering from different psychiatric conditions, such as Schizophrenia, depression and other affective disorder. The purpose of this study is to evaluate whether dysfunction of blood-brain-barrier is over represented in a cohort of bipolar patients, compared to age and gender matched healthy control group, i.e. quantify and further validate past research finding and aim the study against a specific disorder documentation is limited.

Mood stabilizer are the mainstay of treatment for Bipolar Disorder. For mood swings, this disease is also known as Manic-Depressive Illness. This condition is classified as Bipolar I Disorder- if there has been at least one manic episode, with or without depressive episodes; and as Bipolar II Disorder- if there has been at least one hypomanic episodes (but no manic episodes) and major depressive episodes.

“The risk of suicide in Bipolar Disorder over the lifetime is estimated to be over 15 times that of the general population”

Keywords: Manic, Depression, Cerebrospinal, fluid, Emotion, Schizophrenia, Hypomanic, Suicide.

PP-19: HEART ATTACK

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Every 34 seconds someone dies from heart and blood vessels diseases. America's No.1 killer (41%) in 1990 to 2016. In India though it rose by around 34% from 116 to 209 deaths per one lakh population in the same period, says a new international study published by eisevier in the journal of the American College of Cardiology. According to Dr. Deepak Natarajan, Senior Consultant Cardiologist, Indraprastha Apollo Hospitals, Anually, nearly 72 lakh people die due to heart attacks worldwide of which nearly 50% cases are from india.

A Heart Attack occurs when the blood flow to a part of the heart is blocked i.e. coronary occlusion leading to tissue damage. The another name of heart attack is Myocardial Infarction. A heart attack occurs because coronary arteries that supply the heart with blood slowly become thicker and harder from a build up to fat, cholesterol and other substances called Plaque. If the plaques break open a blood clot from that blocks the blood flow, then heart occurs.

Recently many research are done on heart attack by Indian Institute of Science in Bengaluru, in Tamil Nadu. Akash Manoj is a student of this institute invented Akash's device. To achieve this, Akash used a non-invasive technique to develop the device, which involves the detection of a protein called FABP3 in the blood. The device can be placed around the wrist of the back of the ear.

Keywords: Coronary occlusion, Plaque, Myocardial Infarction, Akash's Device.

**PP-20: DETERMINING BEEKEEPING POTENTIALITY IN UTTAR
DINAJPUR DISTRICT OF WEST BENGAL, INDIA THROUGH
MELISSOPALYNOLOGICAL STUDY**

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Beekeeping is a scientific management of honeybee colonies to get honey and other hive products like wax, bee venom, royal jelly, pro polis, pollen etc. It is century old non-land and agro-based income generating industry in our country. West Bengal, an agricultural economy based state in India, has been recognized by KVIC (Khadi and Village Industry Commission under the Ministry of Micro, Small, and Medium Enterprises, Government of India) as high potential area for establishing beekeeping industry as because of natural existence of Asian (*Apis dorsata*, *Apis cerana indica*, *A. florea*) and European (*Apis mellifera*) honeybees and their preferred bee foraged floral sources. The report of Food Processing Survey, West Bengal identified major honey producing areas in this state, which are North and South 24 Parganas, Nadia, Murshidabad, Uttar Dinajpur, Midnapur East and Bakura (www.home.wb.gov.in). Melissopalynological studies carried out in different areas of West Bengal reveal that *Coriandrum sativum* (Apiaceae), *Brassica* sp. (Brassicaceae), *Litchi chinensis* (Sapindaceae), *Artocarpus heterophyllus* (Moraceae), *Cestrum* sp. (Solanaceae), *Mangifera indica* (Anacardiaceae) among others are the major bee preferred plants and natural resource for honey production. Reports on floral survey in Uttar Dinajpur district also record the availability of these bee foraged plant taxa in the area which could be potential source for establishment of an efficient and profitable beekeeping industry through proper scientific research.

Keywords: Honeybees, KVIC, floral survey, bee-foraged plants, beekeeping industry

PP-21: ANDROGYNE-THE CURRENT SCENARIO

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One of the most undeserved , unrecognized communities in the society which faces lot of crises is the 'ANDROGYNE- THIRD GENDER'. The Europeans and other countries name it as 'TRANSGENDER' or 'TRANSSEXUAL'. Where 'TRANS' means across or beyond, which does not connote to a gender. It is usually said to be an umbrella term.

Indian census - it's seen that, they have never recognized the 'TRANS' people but in 2011 census, with details related to their employment , literature etc. It is noticed that about 4,88 lakh transgender people exist. As many as 64% of transgender people in the united state lack health insurance.

The main reason behind 'THIRD GRNDER' is abnormal sex hormone levels in the fetus before birth. The commonly known medical causes for these conditions include a metabolic disorder named congenital adrenal hyperplasia and abnormalities in the chromosome. Due to such variations it may involve genital ambiguity, and combinations of chromosomal genotype and sexual phenotype other than XY male and XX female.

Practically, the problem is not with their inclusion but is how we can stop the blind faith that creates T-G. "WE NEED TO SAY, WITH ONE VOICE, THE TRANSGENDER PEOPLE ARE VALUED, THEY ARE LOVED, THEY ARE US, THEY DESIRE TO BE TREATED FAIRLY AND EQUALLY."

KEYWORDS : Androgyne, congenital adrenal hyperplasia, genital ambiguity.

PP-22: WHAT'S IN YOUR MILK?

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In the present scenario, food adulteration is a prominent incident all over the country. Food adulteration refers to intentional degradation of the quality of food offered for sale either by admixture or substitution of inferior substances or by the removal of some valuable ingredient. 'Adulterant' is any material employed for making the food unsafe or substandard or misbrand, containing extraneous matter. Milk is an essential food from birth till old age. However, Indian Council of Medical Research (ICMR) has reported repeated milk adulteration which cause hazardous health effects. The detergent in milk and other adulterants such as urea, caustic soda, formalin etc can cause food poisoning, gastrointestinal complications, and damage of body tissues, destruction of proteins, heart problems, cancer and also even death. At present, milk is being adulterated through more sophisticated procedures. Milk adulteration detection techniques need to be very specific and rapid. Types of quantitative detection techniques depend on the nature of adulterants in milk are LC, ELISA, PCR usually used for detection of adulterants in milk. Adulterants are mainly added to increase the shelf life of milk, also used for increasing the storage period of milk. Generally water is added to milk to increase the volume content of the milk. Although financial gain is considered to be one of the major reasons for milk adulteration, inadequate supply for the increasing population all over the world has paved the ground for this as well. However, whatever be the cause, milk adulteration needs to be regulated strictly to avoid disastrous consequences as it serves as a food for the population from infants to old age.

PP-23: PLASTIC : A BLESSING TO ENVIRONMENT

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Plastic is now a days an important part in our everyday life. Broadly, our daily life rely upon the use of plastics. Synthetic plastics are the simple chain molecules that are linked together and this structure is called POLYMERS. All forms of plastics are derived from renewable biomer sources, such as – crude oil . Plastics derived from crude oil such as petroleum rely more on scarce fossil fuels. When plastics made from petroleum are burned, they release the carbon-di-oxide in the atmosphere, leading to Global Warming,that is very threatening to the living being for sustaining on Earth.

With the advancement and development of science and technology, synthetic polymers are important in many branches of industries mainly in packaging industry. But after 19th Century, synthetic polymers and plastics have been widely used globally that possess dangerous effects on the environment. However, it has an undesirable influence on the environment and causes problems with deposition of waste and consumption of it.

Therefore, there is a tendency to replace the polymer with biodegradable polymer that can be beneficial because these requires natural materials like –starch (potato), natural fibres etc to produce such plastics commercially. Not only that this biodegradable plastics can be decomposed easily through microbial activity and these are ecofriendly and non- toxic and this kinds of materials can be soluble in water.

Therefore, bioplastics are the part of solution to accumulate plastic waste and using biodegradable polymers in a variety of industries and its production to market instead of synthetic materials that can significantly help to protect the natural environment .

KEY-WORDS: Synthetic plastics ,biomer , bioplastic , biodegradable polymer

**PP-24: POTENTIAL ANTIOXIDANTS VITAMIN C AND VITAMIN A
CONTENT DURING RIPENING OF MANGIFERA INDICA L. VAR.
KOHITOOR**

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Antioxidants are molecules that quench free radical reactions and delay cellular damage. Thereported epidemiological evidence suggested that consumption of foods high in natural antioxidants, like fruits and vegetables, is associate with lower risk of oxidative stress-related disease.Mango is an excellent source of bioactive compounds such as provitamin A, vitamin C, phenolic, as well as dietary fibre, minerals, essential to human nutrition and health.Antioxidants exists both in enzymatic and non-enzymatic forms in the intracellular and extracellular environment. Vitamin C and vitamin A are the non-enzymatic antioxidants but differ in their solubility. The antioxidant activity of vitamin A is conferred by hydrophobic chain of polyene units that can quench singlet oxygen and other electronically excited molecules and progression of many degenerative disease. The small molecule antioxidants neutralize the ROS in a process called radical scavenging and carry them away. The main antioxidants in this category is vitamin C.Evaluation of activity of antioxidant is becoming increasingly relevant in the field of nutrition as it provides useful information with regard to health.

Kohitoor is a 'Royal' or 'Elite' variety of Murshidabad district of West Bengal. It is well known for its exotic flavour, texture and aroma. The vitamin content was estimated through different in vitro assay such as vitamin C was done by DNPH method and Vitamin A was done by TCA method. Tree ripening mangoes were harvested from the orchards for do the tests. Vitamin C and vitamin A content in Kohitoor is moderate, which indicates that in this ripening stage the value of vitamin C and vitamin A was not high. The present study was undertaken to determine the amount of vitamin C and vitamin A of one of the important variety of Murshidabad, for its food nutritional value and further documentation in this respect.

Keywords: Mango, antioxidants, vitamin C, vitamin A, tree ripening, Murshidabad.

PP-25: SMOKING IS INJURIOUS TO HEALTH

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Tobacco use is well known to have disastrous consequences on our health. Nevertheless, many people decide to ignore the risk and go on smoking. According to the most recent statistics, nearly one out of every five people in Quebec is a smoker. There are approximately 120 million smokers in India. According World Health Organization (WHO) India is home to 12% of the World's smokers. More than 1 million die each year due to bad effect of tobacco in India. According to an estimate of WHO in 2002, 30% of adult males in India smoke. Smoking is a serious problem in today's society. No matter how you use it, tobacco is dangerous to your health. There are no safe substances in any tobacco products. Cigarettes contain about 600 ingredients which burn; they generate more than 7000 chemicals according to the American Lung Association. Many of these chemicals are poisonous and at least 69 of them are linking to cancer. In the United State the mortality rate for smokers is 3 times that of people who never smoked. While the effect of smoking may not be immediate, the complications and damage can last for years.

Tobacco smoking can affect various systems of our body such as respiratory system, cardiovascular system, central nervous system, digestive system, reproductive system etc. Various diseases such as cancer in various organs in our body, emphysema, COPD (Chronic Obstructive Pulmonary Disease), peripheral artery disease etc can arise.

Keywords:-Smoking, Tobacco, Emphysema, COPD, Peripheral artery disease

PP-26: SUSTAINABLE TRANSPORT

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Sustainability is a concept that denotes ecological functions and steady demands of ecological resources so that there may be continuous supply of ecological resources for development management one hand and ecological balance on the other hand. Now the term sustainable transport came into use as a logical follow-on-from sustainable development and is used to describe modes of transport; and system of transport planning which are consistent with wider concerns of sustainability. It sometimes known as green transport that does not use or rely on dwindling natural resources. Instead it relies on renewable or regenerated energy rather than fossil fuel that have finite life expectancy.

It aims for efficient transit of goods and services and sustainable freight and delivery system. It includes source of energy, technology employed and the infrastructure used to accommodate the transport (roads, railways, airways, waterways and terminals). Now a day's transportation becomes an integral part of any national economy. But it has significant impact on the environment. Greenhouse gas emissions from transport are increasing at a faster rate which becomes the serious environmental problem. As a result of which a huge changes in climate occurs. These changes could increase the risk of delays, disruptions, damage and failure across our land based, air and marine transport. So, as early as possible sustainable transport is much needed for our environment.

This paper reviews that sustainable transport system make a positive contribution to environmental, social, economic sustainability. Sustainable transport saves money. In times of using fuel prices, walking, cycling and eco-driving are an ideal way to save money as different types of eco-friendly fuel, like bio-diesel (which refers to vegetable oil or animal fat based diesel fuel consisting long chain alkyl esters). Sustainable transport is environmentally friendly. Calculated with average passenger numbers ,car use much more energy and emit more greenhouse gases and air

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pollutants .zero bus, hybrid electric bus ,hybrid bike help to reduce GHG such as carbon dioxide and health threatening pollutants. Beside this CNG, LNG is used in water transport system. These reduce the carbon mission compared to heavy fuel operation.

There is a need to maximize the use of all existing sustainable transportation facilities. The greatest challenge facing intermodal transportation lies in integrated development and maintenance between modes to realising efficient & sustainable transportation system.

Keywords: sustainable transport, dwindling, eco-friendly, sustainability, transportation.

PP-27: URBAN HEAT ISLAND

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The Urban Heat Island is a major and critical phenomenon for environmental quality management. The rapid growth of urbanization leads to the cumulative effect of all the negative impacts in the form of pollution, settlement developments, use of vehicles and so on day by day. Heat Islands develop when a large fraction of land is replaced by infrastructure that trap Incoming Solar Radiation during day and radiate back at night. This slows the cooling effect of air temperatures in less urbanized areas. Due to the basic facilities rural peoples migrating towards urban areas and this lead to the expansion of cities, towns, surfaces are paved and vegetations are completely cleared to keep urban areas cool. It reveals the fact that Built-up areas evaporate less water resulting into elevated surface and air temperature of the cities. This ultimately create a pressure upon industries and availability of resource is reduced. Excessive fossil fuel burning vehicle uses, industrial emission directly affect atmosphere. The approximate contribution of Carbon-di-oxide, Methane, Chlorofluorocarbon, Nitrous oxide, NOX, SOX, etc gases are the cause for heating urban areas. These harmful gases absorb the

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Solar Radiation excessively and provide heat surroundings.

UHI change like seasonal behaviour, rising of the sea level, glacial melting and also multiple diseases etc. In order to manage the situation afforestation is necessary, using energy-efficient appliances helps in reducing the heat and make the environment greenery).

The aim of this paper review that to contribute on the regional environmental quality management under climate change conditions and about the future status on climate change, potential adoptive strategies made to overcome this situation .It comprises of two parts - one phenomenon in urban areas and the other on the mitigative strategies for the heat island on urban areas and projected climatic conditions.

Keywords: Urban Heat Island; Infrastructure; Incoming Solar Radiation; urbanization; Afforestation

PP-28: OBESSIVE COMPULSIVE DISORDER

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Excessive thoughts (obsessions) that lead to repetitive behaviour (compulsion), also knows as OCD. It is a mental disorder, perform certain thought repeatedly (called 'Rituals'), or have certain thought repeatedly (called 'Obsessions'). People are unable to control either. The thought or the activities for more than a short period of time. Common activities include hand washing, counting of things, and checking to see if a door is locked. The activities occure to such a degree that person's life (daily basic) is negatively affected. The condition is associated with tics, anxiety disorder, and an increased risk of suicide. The cause is unknown, there appear to be some genetic components with both identical twins, risk factor include a history of child abuse or other stress including events. Treatments involves counselling. Such as talk therapy, cognitive behavioral therapy (CBT) and some time antidepressants such as selective serotonin reuptake inhibitors (SSRIS). CBT for OCD involves increasing exposure to what causes the problem while not allowing the respective problem while repetitive behavior to occur. Treatment can help but this condition can't be cured. It lasts for life long.

PP-29: RETHINK YOUR DRINK .GO ON GREEN.

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As a person for a glass/bottle of cold drinks when he is thirsty , he agree more readily compared to a glass of cold water!!

Who does not like to drink cold drinks? It has become one of the favourite drinks of people. Specially after a long day when one peel thirsty, then he wants a cold drinks. Even, for many children grabbing a soft drinks at school seems like a quick fix for energy and nutrition . We first need to find out why cold drinks have become such a beverage partner in our life. May be it is the taste that drags us towards this drinks. Soft drinks or cold drinks contain various ingredients that can damage our health.

Drinking a single 330ml can a day of surgery drinks translates to more than 4.9kgs of weight gain per month. Increased the level of suger in our body causes Hyperglycemia, because cold drinks are rich in calories or kilocalories. The calorie and cholesterol level in cold drinks block the arteries of the heart. Prolonged intake of cold drinks causes blockage in arteries and keep pressure on heart. Some people have tendency to drink beverages right after their exercise. As a result the muscles tend to fatigue increases after consumption of cold beverages. The beverages contains lots of preservatives and artificial flavours. This tends to damage the cell growth or increases infection in organs, this could result in cancer of various organs. The ph level of coke or pepsi or other black cold drink is about 3.2. This ph level decides the acidic nature of a liquids. Hence this beverages are acidic in nature and can dissolves bones and enam als very quickly. High dose of caffeine can causes irritability, restlessness, tension, insomnia, high BP , clinical test on this beverage proved that it contains added preservatives to such an amount that could lead to infertility in males.

People can try many other beverages that could be much better replacement of cold drinks, such as -lassi, thanda, various fruit juices. On the other hand this beverages contain carbonated water that help to treat constipation, aids in digestion, appetite suppression. It also contain sodium and caffeine that help in muscle contraction , muscle strength and increase metabolism.

It is not easy to give up on cold drinks in one day. Regardless of the few benefits that soft drinks may deliver, we need to be aware of the risks that go along with their consumption.

PP-30: BREAST CANCER

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Globally Breast cancer is the 2nd most common cancer in men and women world wide. India accounts for the 3rd highest number of cancer cases among women after China and the US, growing annually at 4.5 to 5% , new data shows.

Breast cancer is a malignant tumor arising from the cells of the breast or milk gland . There are two main types of breast cancer i.e. Ductal and Lobular carcinomas. Most breast cancer are Ductal carcinoma type. Breast cancer predominantly occurs in women, it can also affect men over 60 years of age . Symptoms are similar to the symptoms in women, with the most common symptom being a lump in skin of the breast tissue or nipple discharge.

Breast cancer is the most frequently diagnosed cancer among women in 140 of 184 countries worldwide. There are more than 3.5 million breast cancer survivors including women in the United states . In the US in 2018, there will be an estimated 266,120 new cases of breast cancer diagnosed in women and 2,550 cases diagnosed in men. From 2005 to 2014, there will be an estimated 41,400 breast cancer deaths will occur, 480 men will die from breast cancer.

Key words: Malignant tumor, Ductal and Lobular carcinoma, Breast cancer

PP-31: USE BOTH SIDE, BETTER THAN ONE SIDE

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The 4R's provides an ecologically sound and environmentally friendly approach to minimizing and managing waste and waste streams. The 4R's is a logical and methodical method by taking steps Reduce, Recycle, Reuse, Refuse a waste stream into incremental fractions.

The aims of 4R's are-to keep waste away from dumping grounds, to keep ground water unpolluted, to help avoid air pollution due to informal and formal recycling agencies. Conserving energy by recycling instead of mining for metals underground. Journey from product to raw material and give a greener heat their universe to get more projects in low budget.

Reduce is the first step towards the way of controlling the negative impacts of waste. Waste has becoming now-a-days a huge problem for healthy environment. So, we have to reduce various types of pollutants in some effective waste. Recycling can be recycled if we use proper way. Recycling can prevent the waste of potentially useful materials to be recycled are either brought to a collection centre or picked up from the curbside, then sorted, cleaned and reprocessed into new materials, used in manufacturing. Reuse is the third step of 4R's which an alternative method of environmental waste management. In the process of reuse materials can be used instead of throwing them away. On the other hand the unused material can be passed to those, who can use them too. Like plastic cups, plates, utensils, plastic bag can be washed and reuse. Using less water is also a step of recycling. Refuse is the first stage of waste management, which is to buy or accept products that can harm. The heap of garbage, full of water produces many harmful gases including greenhouse gas. This is reason of air pollution and the garbage mix in water and causes water pollutions. Then it is called refuse. Mainly used pots, plastics bags, tyres, used wood; old newspaper, old electronic equipment etc are the examples of refuse.

Using the 4R's process we can save ground water and can prevent "Global Warming", we can save energy also it helps to create jobs in the recycling and manufacturing industries. In this process we have to reduce various types of pollutants. This is an attempt from modern generation to save the earth and live healthy life.

Keyword: Eco-friendly, sustainable development, reduce, recycling, reuse, refuse, waste produce, environmental pollution.

PP-32: A GLIMPSE AT NIPAH VIRUS

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Nipah virus, a member of the paramyxovirus family, provides one of the most striking examples of an emerging virus and illustrates many of the pathways leading from a wildlife reservoir to human infections. It was first emerged in Malaysia in 1998. Clinical presentation ranges from asymptomatic infection to fatal encephalitis. In 1995 in Australia, a previously unidentified paramyxovirus, Hendra virus, infected horses and was transmitted to humans, where it induced fatal pulmonary complications.

Prior to 1998 there had been no reports of a disease of wildlife, domestic animals or humans that would subsequently be considered infection with Nipah virus. Despite the emergence of the related virus, Hendra, a number of years before Nipah virus, there was nothing to herald the sudden appearance of this virus, which in itself is surprising given the regularity of outbreaks since it appeared. Although Malaysia has had no more cases since 1999, but outbreaks continue to occur in Bangladesh and India.

In the Malaysia-Singapore outbreak, the characterization of Hendra virus paved the way for the identification of the causative agent of disease and thus, transmission occurred primarily through the contact with pigs, whereas in Bangladesh and India, it is associated with ingestion of contaminated date palm sap and human-to-human transmission.

It was seen that both of the Nipah virus glycoproteins (G and F) when expressed as vaccinia virus recombinants induced an immune response in hamsters which protected against a lethal challenge by Nipah virus. Similarly, passive transfer of antibody induced by either of the glycoproteins protected the animals. In both the active and passive immunization studies, however, the challenge virus was capable of hyperimmunizing the vaccinated animals, suggesting that although the virus replicates under these conditions, the immune system can eventually control the infection.

When viruses participate in a host-parasite interaction in which the pathology induced by the virus is minimal, this can lead to a persistent infection. Although a number of virus-animal models have been studied in the laboratory, little is known to what extent they are operational in nature. In southeast Asia and Australia, pteroid bats (flying foxes) are the natural host for a number of viruses. Due to recent changes in ecological conditions, in particular slash-and-burn agricultural methods, these bats are

increasingly coming into contact with humans and domesticated animals. In this situation, the viruses resident in the bats may cross the species barrier and result in a more virulent, even fatal disease.

In 1998 in Malaysia, a virus closely related to Hendra virus and now designated Nipah virus infected pigs and subsequently humans, where it was responsible for 265 cases of encephalitis, of which about 40% were fatal. Molecular biology studies have shown that these two new viruses have a similar genomic structure, but as their genomes contain some 2,000 nucleotides more than previously studied paramyxoviruses, the Hendra and Nipah viruses have now been classified into a new genus, Henipaviruses, within the family Paramyxovirinae.

Lastly, if an efficient program to prevent or treat Nipah virus infection in humans is to be developed, it will be necessary to define the viral antigens which are important in inducing protective responses and to formulate potential immunoprophylactic treatments. In the present study, we expressed the two Nipah virus glycoproteins (G and F) in vaccinia virus recombinants to evaluate their contribution to protection. To do this, hamster animal model, in which the animals die of acute encephalitis following Nipah virus infection. Using this model, it was shown that vaccination with vaccinia virus recombinants expressing either of the two Nipah virus glycoproteins protects the animals from fatal infection. Furthermore, passive transfer of antibody from immunized animals to naive animals protects them from a lethal Nipah virus challenge.

PP-33: ECO-CITY FARMING

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Organic farming is a one of the most relevant subjects in this age of pollution complex diseases and many other such complexions that have become a threat to the living world. Sustainable agriculture is nothing but a production system of food from plant or animals by using different agricultural techniques that protects the public health; human communities, environment and animal welfare.

Organic farming is important through many ways. It saves us from toxins and harmful chemical present in our food chain because conventional method of farming. It helps to restore the fertility of soil. Promoting crop rotation it encourages balanced host relationship. Organic residues and nutrients produced on the farm and recycled back to the soil.

Earth worms are one of the most important soil animals that have the capability to maintain the fertility of soil and hence these are playing a key role in sustainability. The mutual action of earthworms brings faster decomposition as earthworm's condition, aerate, fragment and enhance surface area of the organic matter for microbial action. They maintain the physicochemical properties of the soil by converting biodegradable materials and organic waste from their burrows to deposit the vermicast on the surface. The vermicast acts as a buffer, it has significantly lower volatile solid content and high nitrogen, phosphorus, potassium content which is easily available for the plant. The presence of humic acid and plant growth material in the vermicast can increase plant growth and crop yield in both natural and managed ecosystems.

One of the most useful sides of organic farming is that it is eco-friendly. It is very meaningful for the environment. It is also low cost so farmers can easily adopt this system. They can also practice it of their own.

Key words: Earthworm, pesticide, sustainable, agriculture, vermicomposting

PP-34: APHID-PLANT CHEMICAL INTERACTION AND ITS APPLICATIONS IN BIOLOGICAL PEST CONTROL

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Among the other pests aphids are economically important insect pest of agriculture and forests crops. They feed on phloem sap of plants by using their extremely efficient mouthpart i.e., long and flexible stylets. Due to their phytophagous nature they have an adaptation i.e., ductile reproduction includes biparental reproduction and parthenogenesis. During feeding they have to cross physical and chemical barriers and also many other defenses of plants. But we will focus on CHEMICAL INTERACTIONS. That interaction is done by the attack of aphids. The feeding habit of aphids establishes a long-term interaction with the host plant that is made by a wide variety of induced, reciprocal, responses. However, it is in the very first phases of plant selection that it is possible to assess whether a plant is suitable for an aphid species. The cues a winged aphid use to decide landing are visual and chemical. Some of the volatile compounds that are involved in the long-distance recognition of a host plant (broad bean) by *Aphis fabae* (Scopoli) have been recently identified. So basically, during the time of attack by aphids, many genes of the plants are activated and later that results in the production of chemicals. These chemicals attract the other natural enemy of aphids and acts as ATTRACTANT. This results in reduction of aphid attack or infection to plant. This naturally occurring reaction involving chemical help in biological pest control without using any synthetic chemical (most of them are harmful for environment) and generation of sustainable pest control occurs. If we can increase this reaction in case of crop that will increase sustainable development without hampering ecosystem and production of crops are increased.

PP-35: BIODIVERSITY, OUR SAVIOUR

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Biodiversity generally refers to the variety and variability of life on earth. The biodiversity of an area influences every aspect of the lives of people who are the part of it. For all humans, biodiversity is first a resource for daily life. The services these species provide contribute to the delicately- running natural cycle that help make earth habitable to human and contribute to our way of life in many ways , from providing us food and pharmaceutical to helping reduce the impact of natural disasters such as floods. Not only biodiversity contributes in human welfare by providing fruits, fodder, fuel, medicines but also has its role in advancing agricultural practices through agro- biodiversity and in biotechnology through the discoveries of diverse viruses, fungi, animals etc .Biodiversity is positively correlated with ecosystem productivity, which states that the more species there are, greater the productivity of the ecosystem and more the human life is benefitted. Thus, if humans want to continue benefitting from the abundance of these natural goods and services, the biodiversity that establishes them must be preserved. Despite the benefits from biodiversity, today's threat to species and ecosystem are the greatest recorded in recent history and virtually all of them are caused by human mismanagement of biological resources often stimulated by misguided economic policies and pollution etc. Maintaining biodiversity ultimately has a vital role in maintenance of human health through many medicines derived from plants and, recently animal toxins which are now in research process.

PP-36: BIOFERTILISERS: THE NEED OF THE HOUR

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Microorganisms or microbes are microscopic organisms, which may exist in its single celled form or in a colony of cells. They infect the living organisms and cause serious diseases. But microorganisms are also very useful to human beings. We use microbes and microbially derived products almost everyday. The microbes help in the preparation of medicines, in food industry, in brewery, in agriculture and in bakery. Fertilisers are natural or artificial substances containing the chemical elements that improve growth and productiveness of plants. Chemical fertilisers are primarily made from non-renewable sources including fossil fuels. They grow plants but do nothing to sustain the soil, because the nutrients are readily available, there is a danger of overfertilisation. They also results in bioaccumulation or biomagnification. Biofertilisers are organisms that enrich the nutrient quality of the soil. For example Rhizobium, Nostoc, Anabaena, Rhodospirillum etc. They add nutrients to the soil through natural processes of nitrogen fixation, phosphorous solubilisation and organic matter decomposition. They restore the nutrient cycling of the soil and stimulate plant growth through the synthesis of growth promoting substances. Sikkim is the first organic state of India. Around 75,000 hectares of agricultural land, was gradually converted to certified organic land by implementing organic practices and principles. The total organic production in the country is estimated to be around 1.24 million tons while the total area under organic farming is 0.723 million hectares. A number of other states in India like Mizoram, Arunachal Pradesh and Kerala are now trying to become organic.

PP-37: MICROBES IN GOLD PRODUCTION

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The role of biological agents in the mining industry is currently limited to the use of microorganisms in bioleaching and bioremediation. However, there are number of ways in which biotechnology will be used in the near future to aid the mining industry. This review focuses on the development of novel biotechnologies and the role they will play in gold exploration, processing and remediation. The development of these biotechnologies has been enabled by advances in our molecular level understanding of the role microorganisms play in solubilisation, dispersion and precipitation of gold, brought upon by the rapid development of molecular genetics techniques over the past decades. This fundamental knowledge is now being used to develop new methods for gold exploration, processing and remediation. An understanding of microbial species distribution in soils overlying mineralization can be utilised to develop bioindicator system that assists with gold exploration. An in-depth knowledge of how microorganisms interact with gold complexes is being used to develop biosensors, further supporting exploration. Processing technologies are being improved based upon advances in our understanding of the interaction between microorganisms, cyanide and gold. For instance, cyanide-biosensors, furthur supporting exploration. Processing technologies are being improved based upon advances in our understanding of the interaction between microorganisms, cyanide and gold. Cyanide producing microorganisms are being investigated for use in-situ leaching of gold. In turn the use of cyanide utilising microorganisms for the degradation of cyanide is being explored .Combined the implementation of biotechnologies in the gold mining sector is set to revolutionize the industry, leading to the greener, more efficient extraction of gold. Microbial destruction of cyanide and its related compounds is one of the most important biotechlogies to emerge in the last two decades for treating process and tailings solution at precious metals mining operations. Full scale bacterial process have been used effectively for many years in commercial applications in North America. This paper presents an overview of the destruction of cyanide in mining related solutions by microbial processes.

PP-38: MICROBES AND OUR MIND

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Stress, anxiety, and depression are emotions we all feel at some point in our life. Some people do a greater degree than others. These emotions are the part of the human life. Being a social animal, we need to be presentable in front of the rest of the world. Some microbes especially the gut microbes control that behaviour.

The community of microorganisms living in the human gut estimated to total 100 trillion, may have a profound effect on many aspects of our physiology, including immunity, metabolism and even our brain.

Generally bacteria influence the brain through vagus nerve, other strains seem to use different pathway. After scientific study, it is shown that gut bacteria especially species belonging to Lactobasillus & Bifidobacterium, can influence social behaviour, anxiety stress & symptoms of depression. Just activity in the gut seems to affect the brain, mental stress and can lead to intestinal problem.

This gut–brain connection could have clinical implications, as influencing the gut microbes through diet may serve to ameliorate some psychiatric disorder. These microbes when ingested produce health benefits in patients with psychiatric illness. These include food containing probiotics, live strain of gut-friendly bacteria.

Through this review work we just want to aware the people about these unknown facts of our body which may help us in near future.

PP-39: NAKED MOLE RAT: THE ONLY EUSOCIAL MAMMAL

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There are several degrees of sociality present in the animal kingdom. Among them the highest is eusociality. The Eusocial animals have 3 characteristics. They are, cooperation in brood care, rearing of reproductive caste by non reproductive caste, and overlap between generations. In the mammalian class it is shown only in Naked Mole Rat (*Heterocephalus glaber*). This rat commonly called sand puppy, live in East African desert. As they live in deep tunnel their body is fully adapted with that environment. They can live within 5% of oxygen utilizing fructose instead of glucose producing lactic acid. Naked mole rat is thermo-conformer rather than thermo regulator as they can change their body temperature according to environment. a key neurotransmitter, called substance P is lacking in their skin which results pain insensitivity in them. The most important character of naked mole rat is their resistance to cancer. Two genes called P16 and P27 prevent cellular reproduction at much higher cell density. They are the longest living (up to 32 years) rodents. In the caste system, they are divided into queen, male and worker. Queen is the only female reproductively active and the male chosen by queen is active worker and other males are sterile. Workers feed pups by faecal matter of them and adults by large root tubers. They have symbiotic bacteria to ferment fibres. Thus their eusocial behavior helps them to live in that adverse environment.