



International e-Seminar



Shobhit

Institute of Engineering & Technology
Deemed to-be-University

EDUCATION EMPOWERS

on

ISSN: 2250-0510

“Biodiversity & Human Welfare”

WORLD ENVIRONMENT DAY

June 05-06, 2020

Time: 10:00 a.m. to 6:00 p.m.

**Organizer: School of Biological Engineering and Life Sciences
Shobhit Institute of Engineering & Technology
(Deemed to-be University) NH-58, Modipuram, Meerut-250110, Uttar Pradesh, INDIA.**





International e-Seminar
on
“Biodiversity & Human Welfare”

WORLD ENVIRONMENT DAY

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Abstract e-Book



School of Biological Engineering & Life Sciences
Shobhit Institute of Engineering and Technology
(Deemed-to-be-University) Meerut, India





Shobhit Kumar,

Chairman



MESSAGE

I am glad that the university is taking lead to organize e-seminar on biodiversity and human life. As we know from shruti, smruti and the scriptures, all human knowledge rests on three sets of relationships: man to Man; man to Nature; and man to God. These relationships create and expand not only the information and knowledge but they also indicate need, mode and method of maintaining balance in them all. The art and science of knowing and sustaining the balancing act are the tools of wisdom that Indian civilization has always cherished and held high as social values. Irony of the time is that we know about the best of imperative human actions to maintain and improve these relationships forming environment in their physical aspects, but we ignore them in certain misdirection of our progress, development and economy.

Hence what is most essential today is a healthy and meaningful dialogue about environment, biodiversity and human sustenance with them. It is in this larger dimension of academic concern that university seminars are of great importance. I understand the participants would contribute most meaningfully to the issues in hand and will make the event a grand success.

Shobhit Kumar

Shobhit Kumar

02.06.2020

Shobhit University

Shobhit Institute of Engineering & Technology, Meerut

(A NAAC Accredited Deemed to-be University established u/s 3 of UGC Act, 1956) NH-58, Modipuram, Meerut - 250110, Delhi NCR

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Kunwar Shekhar Vijendra

Chancellor



MESSAGE



I am glad that the university has planned and scheduled an e-seminar on the subject of Biodiversity and Human Welfare. This would be yet another international seminar that the institute would organize in a series of such exercises since it has functioned as deemed to be university.

While, I am sure the organizers have taken on board the best of the minds who can spare time this week, and the topics related to the issue, it would be useful to focus also how best the suggested measures to improve the relationship can be integrated in the projects and missions being run by the government and civil society organizations.

Ganga is cleaner under Namami Gange, and rivers like Saraswati, Kumudavathi, Vedavathi, Polar and Dravyavati have been revived, and biodiversity in their basins revived.

However, the issue in hand is not only the utility commanding water in rivers or watersheds, but also the life in all forms that would help grow more birds, small animals, micro lives and their cycle of existence in cleaner air, water, earth and sky. Pollution is a grand issue by itself. I am sure we'll walk some tiring miles in our mission and will grow more in peace and healthy ways of the coming times. Let every exercise of human dialogue pave the way of hope and assurance of the academe to the humanity. Thanks are due to the organizers. Thanks for conducting the e-seminar are assured.

Kunwar Shekhar Vijendra
02-06-2020

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Amar P. Garg

Vice Chancellor

M.Sc., Ph.D., LL.B., F.B.S., F.P.S.I., F.S.M.P., M.N.A.Sc., F.N.R.S., CAS Fellow (U.K.), DAAD Fellow (Germany)
Sectional President (2020-21) - Environmental Science, 108th Indian Science Congress
Ex-Professor & Head, C.C.S. University, Meerut | Ex-PVC, JNU, Jaipur



It is my pleasant duty to welcome all eminent keynote speakers in International e-Seminar on “Biodiversity and Human Welfare” on World Environment Day from 5-6 June, 2020 at Shobhit Institute of Engineering & Technology (Deemed-to-be-University), Meerut.

The organizers have rightly selected the most relevant topic in the present context of crisis of conservation of biodiversity in changing climate with respect to human welfare. A large number of species have already disappeared due to habitat destruction, climate change including global warming, over exploitation by human, pollution (genetic, soil, water and air), alien species, diseases and various developmental activities. Imbalance in biodiversity has led to threat to human life as evident from the recent SARS CoV-2 pandemic situation. There is an urgent need to recognize the rights of nature for healthy soil, healthy water and healthy air for sustainable happy longer human life on this beautiful earth. During COVID-19 lock down, this e-Seminar will provide an excellent opportunity for active interaction with great international Professors and prominent environmentalists to discuss various issues of biodiversity conservation and human welfare. I hope that the participants will take fullest advantage of the presence of intellectual mix of environmentalists, biologists, medical experts, agriculturists and scientists working in diverse fields. Meerut is a beautiful historical city of India and its residents have rich cultural heritage, traditions and extra ordinary courage.

On behalf of myself and the University, I welcome all eminent keynote speakers and participants in this 2-day e-Seminar.


3.6.2020
(Prof. Amar P. Garg)
Vice-Chancellor





Maj Gen (Dr.) Sunil Chandra, VSM,
Pro Vice Chancellor,
Shobhit University



MESSAGE

BIODIVERSITY AND HUMAN WELFARE

World Environment Day is celebrated on 5th June every year to promote the efforts of saving our environment. Keeping this in view, the School of Biological Engineering & Life Sciences is organizing an International e-seminar on “Biodiversity & Human Welfare” on the occasion of World Environment Day and in this context, I am happy to share my views on the subject and I am very sanguine that this two days’ seminar will be very productive in its deliberations and lot of ideas will emerge from it.

There is a complex relationship between biodiversity and human welfare. However, biodiversity and human welfare is being perceived differently today. Though, it is a well known fact that biodiversity plays a crucial role in human nutrition through its influence on world food production, as it ensures the sustainable productivity of soils and provides the genetic resources for all crops, livestock, and marine species harvested for food.

Biodiversity is central to human health. By securing the life-sustaining goods and services which biodiversity provides to us, the conservation and sustainable use of biodiversity can provide significant benefits to our health.

Biodiversity has a fundamental value to humans because we are so much dependent on it for our cultural, economic, and environmental well-being. Biodiversity forms the backbone of viable ecosystems on which we depend on for basic necessities, security, and health.

The loss of biodiversity as a result of human activities has become a central preoccupation among natural scientists, and many social scientists as well. Human welfare is linked with the preservation of biodiversity in varieties of ways. Biodiversity forms the basis of a global-life support system. Human beings have fulfilled many of their needs by taking advantage of the existence of many genes, species, as well as a “balanced” ecosystem.





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About the Organizer

SHOBHIT DEEMED UNIVERSITY, MEERUT, INDIA



Shobhit Institute of Engineering and Technology (popularly known as Shobhit University, Meerut), is a NAAC accredited deemed to-be university u/s 3 of UGC Act, 1956. Ranked among the top institutions of India. The University aspires to make academic issues and commitments as the key concerns of the young generation and thereby, make a significant contribution to the academic developments wherever they are in the world.

We believe that the essence of the University is to create, integrate and disseminate better understandings of the world around us through knowledge. Recognizing that students and faculty shift between and share all three roles, we challenge the notion that knowledge is static and insular. Instead, we welcome and enable a diverse and dynamic learning community of scholars, teachers, and learners.

We are committed to creating the best learning environment and provide the right equipment and facilities, to help our students to achieve their potential during studies. Our students learn in a variety of ways, including case studies, role-plays, and simulations. Because we know that no single approach can effectively address the range of challenges they'll encounter throughout their career, this diverse education is designed to give them the breadth and depth of skills and experience they'll need for success.

We are a research-intensive university that shares the values of high-quality teaching within an environment of internationally competitive research. We seek to provide a creative and supportive environment in which ideas are generated and can flourish.





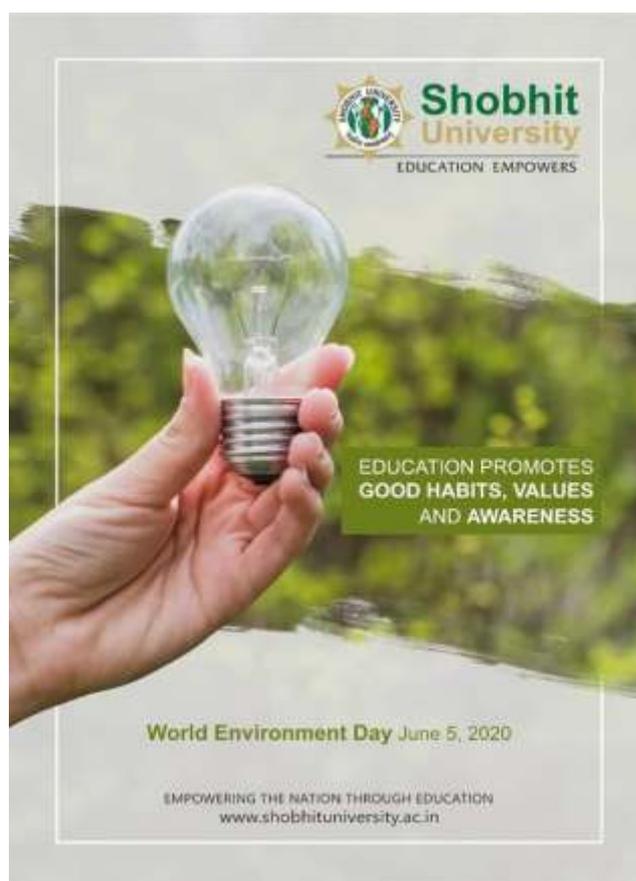
Organizer

To provide latest information about the things which are happening in science and technology, the University strategically plans and organizes workshops, seminars, conferences, and brain storming sessions at national and international level with the help of experts from academia, industry, and research organizations.

University Training & Development Centre understands that active engagement of the industry with the academia is vital for developing the required skills in the future professionals. To facilitate the industry in the current scenario of the skill gap on one hand and to enrich students with the industry exposure on the other hand; a one semester internship program has been incorporated in the course curriculum of maximum of the academic programs.

Today, Shobhit University is a preferred destination for recruitment among young universities in India. More than 200 renowned Corporate, Research Organizations and Institutions are patronizing our students by providing excellent job offers. The University has evolved into a Campus of Excellence. Our excellent talents are placed in the best of the corporate houses in India and abroad.

The University has developed the following Schools and Centre: School of Engineering & Technology, School of Biological Engineering & Sciences, School of Business Studies; School of Law and Constitutional Studies; School of Education; School of Humanities, Physical & Mathematical Sciences; Centre for Agriculture Informatics & Research; and Centre for Skill Development.





WORLD ENVIRONMENT DAY

(5th June 2020)

World Environment Day (WED) is a campaign celebrated every year by the people worldwide on 5th of June. This campaign was established to raise the global awareness among people about the environmental issues as well as take positive environmental actions. It is handled by the United Nations Environment Programme and was established by the United Nations General Assembly in 1972. It is a day to especially focus on the current environmental conditions to make environment better.

It focuses to bring people from all countries at one track to deal and combat with the climate changes and improve the management of forests. It is celebrated with many creative activities such as tree plantation, cultural activities by students, drawing, painting, quiz competitions, debate, lectures, essay writing, banner display, speech recitation, etc on topics related to the environment protection. Workshops (regarding sustainable project management) are also organized to encourage youths about the environment and climate change issues for safe future on the earth.



In 2009, an environment fair was held in Chennai and Bangalore with the activities like on the spot painting competition, training programmes for students over e-waste management, renewable energy devices, wildlife conservation, rain water harvesting systems, waste recycle and reuse processes, debates on rising global warming, biodegradable wastes, awareness drives about “go green” revolution, etc for eco-friendly infrastructure and energy efficiency to curb global warming and save natural resources.





About the conference

International e-Seminar on “Biodiversity & Human Welfare”

Since its beginning in 1974, World Environment Day has developed into a global platform for raising awareness and taking action on urgent issues from marine pollution and global warming to sustainable consumption and wildlife crime. It is celebrated on 5 th June, every year. Millions of people have taken part over the years, helping drive change in our consumption habits as well as in national and international environmental policy. In order to celebrate this event, the theme of the International e-seminar is “Biodiversity and Human Welfare”. We invite researchers, lectures, students, industries, governments, stakeholders, and decision makers to present their results and ideas especially on sustainable biodiversity utilization in “Bioenergy, Health, Foods, and Environment” fields.

Biodiversity is fundamental for human life and vital for the functioning of ecosystems. The loss of biodiversity as a result of human activities has become a central preoccupation among natural scientists, and many social scientists as well. Although we do not know the exact scale of the problem, in particular the extent to which human beings have been responsible for the loss of biodiversity as compared to the natural evolution, the process of species extinction, green house effects and critical changes in the earth’s biochemical cycle are now increasingly emphasized.

The concept of human welfare is equally tangled. In general terms, it relates to the provision of improved conditions of living. Human welfare is linked with the preservation of biodiversity in varieties of ways. Biodiversity forms the basis of a global-life support system. Human beings have fulfilled many of their needs by taking advantage of the existence of many genes, species, as well as a “balanced” ecosystem. For instance, many plant species have formed the basis of food, fibre, medicines and many other useful items. Thus, global biodiversity survey found to be a fundamental necessity and suggests a comprehensive investigation and evaluation of the factors contributing to biodiversity and the establishment of a biodiversity monitoring network system.





Organizer



Mr Aniket Kumar



From the Desk of Organizing Secretaries



Dr. Sandeep Kumar

It is a matter of great privilege for the us to organize the **International e-Seminar on “Biodiversity & Human Welfare”** WORLD ENVIRONMENT DAY -05 JUNE, 2020, organized by School of Biological Engineering & Life Sciences at Shobhit Institute of Engineering and Technology, A NAAC Accredited Deemed to-be University, Meerut during 05-06 June, 2020. It has been a real honor and privilege to serve as the convener of the e-seminar.

We organize this e-seminar to bring together academicians, researchers and exchange their innovative research ideas, research challenges, solutions and practical experiences in all areas of Biodiversity in different Ecosystem and Management, Climate change and Imbalance of Biodiversity, Biodiversity conservation and Sustainable Human Life, Green Plasm Conservation of endangered Flora and fauna, Global Policy for protection areas, Environmental Laws and Education Awareness. This e-seminar souvenir includes an exciting collection of abstracts of key note speakers and e-posters resulting from a successful call for papers.

The e-seminar would not have been possible without the moral and financial support of Hon'ble chancellor Sir. We are honored to have key note speakers from different best Universities/Institutes on this special occasion. We would like to express our deep gratitude to the members of the advisory committee, internal advisors and e-seminar team for their valuable opinion and expertise to ensure a very high quality e-seminar program. We are thankful to our colleagues for their help to make it successful.

We are grateful to all the authors who responded to our call for papers and trusted the e-seminar with their work. The contributed papers highlight the current focus of research activities in 'Biodiversity and Human welfare' in different disciplines. They represent the current state-of-the-art research in science and technology.





***Keynote
Addresses***





Does Loss of Biodiversity Leads to More Infectious Diseases?

Amar P. Garg

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Environmentalists believe that loss of biodiversity leads to aggravation of transmission of infectious diseases from animals to humans, however, there is a group of scientists who do not agree with it. The scientific studies reveal that there is a “biodiversity dilution effect” where declining biodiversity results in increased infectious disease transmission. Increased incidences of West Nile and Lyme Diseases have been correlated with loss of diversity by various scientists. The recent emergence of new infectious zoonotic diseases that jumped from animals to humans in 20th century like SARS, MERS, Ebola, HIV and several corona viruses like COVID-19 has also been correlated by environmentalists, medical experts, geneticists and the students of bioinformatics with growing human population that is coming in greater contact with more wild and domesticated animals than ever before. Most of the great pandemics are caused by microorganisms that originated in wildlife. Smallpox, among the deadliest pathogen in the history of mankind, nearly killed third of the people it infected, descended from a virus native to camels. Measles was also from cows, most virulent strain of malaria *Plasmodium falciparum* transmitted from great apes to human, presumably by an African mosquito that fed on gorilla. Bubonic plague (*Yersinia pestis*) was another example that killed one third of the Eurasian population, that was transmitted through fleas from the reserves of infections in rodents. Human activities affect ecosystems in various ways. First, large animals are eliminated, then medium sized while small remains and survives. Scientific reports reveal that small animals like rodents and bats tend to be the very species that can pass infections to humans. Scientists have observed a clear link between decrease in incidence of diseases with increase in host diversity in nature. Similarly, large plants extinct first followed by medium and smaller while microorganisms mutate very fast to survive in changing environment. Several models “biodiversity dilution effect” have been suggested and the scientists are still not of unanimous opinion. Our observations with microbes reveal that when we have a diverse group of microbes in a Petri dish, the population of pathogenic microbes is lesser than those where the microbial diversity is less. The competition and availability of diverse habitat play an important role. It appears that declining biological diversity may lead to increasing infectious disease risk, however, it needs more deeper researches in diverse climatic conditions.





Microbial Biodiversity in Relation to Welfare of Mankind

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Microbiology deals mostly with the large group of fungi, bacteria and viruses which equal in diversity and physiological phenomena the more traditional group of organisms within the disciplines of botany and zoology. During recent years the study of microorganisms has contributed important insights into the basic problems of biology. Because of their ease of manipulation, rapid growth, highly developed capacity for adaptation, and other properties, microorganisms have become one of the preferred objects of research in biochemistry and genetics. They are employed successfully for varied purpose as studying the pathogenic nature of an organism, growing auxotrophs, gene transfer, gene expression, experiments in molecular biology, protoplast fusion, gene therapy, modification of industrial strains, food, dairy, beverages industries, pharmaceutical industries, freeing plants of pathogens and other innumerable works for the welfare of the mankind. The demonstration topics and the techniques described in the book reflect this diversity.

I believe that many biologists would like to use microbiological techniques in their research, but hesitate to do so because of lack of information. In spite of several excellent books on the physiology, biochemistry and molecular biology of microorganisms there exists no single book which can explain the metabolism of tiny creatures with a practical approach and which includes a brief text on the microbiological experiments useful for the workers in the allied fields at various levels.

Microbes are the inextricable part of living beings. They play a vital role in our body and also affect our day to day life. They are both useful and harmful. Those that are part of our body are symbiotic, while others that come from outside and cause ailments are pathogenic to us, still some are around us which can be highly useful but are not part of our body. The properties of microbes around us are being explored by researchers worldwide. Microbes and several bioactive compounds extracted from them like polysaccharides, proteins, secondary metabolites, vitamins have shown immense potential to work as dietary supplements when directly or indirectly made part of our daily diet and can have anti-microbial, anti-oxidant, anti-inflammatory, anti-coagulant, apoptotic, anti-carcinogenic, hypocholesterolemic, hepatoprotective, anti-diabetic and immunomodulatory activities. They strengthen our immune system and keep us healthy. This gave birth to the concept of microbial functional food. The presentation is a compilation of the potential of microbes like algae, fungi, yeast, mushrooms and bacteria explored by researchers as functional food for immunomodulation in the past decade. Opinions on current global market scenario, future scope and challenges in the way of developing microbial functional foods have also been discussed.





Wetland and Biodiversity

M.G. Tiwari,

Ex-President, Environment Science Section, Indian Science Congress,

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Wetlands and Biodiversity is the theme for World wetlands Day 2020. Wetlands cover 6.4% of Earth's surface and 3.4% of Indian landmass. Wetlands is the “Lands transitional between terrestrial and aquatic systems where the water table is at or near the surface land is covered by shallow water. Wetlands are not viewed as wastelands. Wetlands contribute to a healthy Environment in many ways, i.e. keeping water table high and stable, mitigate flood and trap suspended solids and attached nutrients. Water is the precious natural resource of the Earth, i.e. to increase water conservation “Slow the flow, Save water.”

The Solution of Pollution is dilution

Water is the primary factor controlling the Environment and the associated plant and animal life. Thus Wetlands is referred as the “Kidneys of the Earth.” The problem of good water pollution due to toxic metals has begun to cause concerned now in most of the cities. The toxic heavy metals entering into the ground water lead to geoaccumulation, bioaccumulation and biomagnifications. Because of their potential accumulation in biosystems through polluted, food chain accumulation has become a burning issue in recent year.

Therefore, a better understanding of heavy metal sources, their accumulation in the soil water plant system and its effect is the important issue of present day research on risk assessments.

“Think Globally- Act Locally”

Greening and green energy in context on global warming and climate change

Prof. Debashis Banerji,

Ex-H.o.D., C.C.S. University, Meerut, Presently:

Director, Samaj Pragati Sahyog, Dewas, Indore

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Biodiversity conservation in the context of Global Warming Induced Climate Change, is now of prime importance. Rich natural biodiversity, interaction between its different biotic and abiotic components conserves the ecosystem, maintains balance in the planet and sustains human welfare. However, this has not been realized properly by humans, leading to damage to the ecosystem and in return, damage to themselves. For instance, anthropogenic activities like deforestation, eco-unfriendly industries etc., have contributed heavily to pollution and most importantly global warming. The temperature in our planet earth is maintained by the mix of Green House gases CO₂, CH₄, N₂O and water vapour, present in certain proportions in the GH layer. But, due to heavy deforestation, more CO₂ and due to certain industries, rich living practices etc., unnatural Halocarbon gases with very high Global Warmng Potential have been added. This has led to





Organizer

Global Warming, visible through Climate Change. Climate change is no more a myth. Being based in and associated with rural development, climate change and its danger have become obvious to us. For instance, from nineties to early 2000, in our Malwa area of MP (Dewas, Indore), rains would come about 20 days after Monsoon broke in Kerala. Farmers would accordingly prepare their land for farming. All that, has now gone haywire. There is often rain withdrawal during sowing time and sudden heavy rains during harvest time, damaging the Kharif crops. This causes severe stress specially to the small and marginal farmers.

It seems, the solution for checking further global warming, lies in Greening and Green Energy practices. We at, Samaj Pragati Sahayog, based in District Dewas, MP have made some attempts to ameliorate the situation. Our main and pioneering work has been in a dryland tribal area amidst dry teak forests. The basic paradigm of our work is to bring development through Environmental Regeneration, Employment Generation and Empowerment. Our work involves, firstly, Rain water water harvesting with some watershed development interventions, as making of trenches, bunds, gully plugs etc., in the ridge area, and farm bunds, farm ponds etc., in the plain valley area of the village watershed unit. Such interventions led to rise in ground water level leading to water fills in previously dry wells.

Such water availability, made rabi cropping possible with consequent 90 % decline in out migration. We also promoted less water intensive crops and No Pesticide Managed (NPM)

Farming. As, the water conservation interventions, simulated dense forest's role in water conservation, the villagers realized the value of forests and started to conserve their forests, as far as possible. We have several other livelihood security activities. With people retained in their villages, community based forest conservation become possible. Through our empowerment programmes we have made villagers self reliant. Similarly, through empowerment of NGOs, officials and interested people at our Baba Amte Centre for People's Empowerment, we have been able to upscale our work from one village in early nineties, to around 13 states and 100 districts, through hand holding.

Title: Environment influencing Genetic diversity leading to Birth Defect

Ajit K Saxena,

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Globally, environmental factors such as contaminated air, soil, water and increasing temperature (global warming) are interfering with human life to thrive well. Genetics is one of the challenging fields in medicine for the clinicians and scientists for the management of genetic disorders. Such disorders are highly complex due to interactions between the environment and genes influencing “Birth defects”. During embryogenesis, large numbers of extrinsic & intrinsic factors are responsible to maintain the normal physiology of stem cells and later these factors have been characterized as stem cell markers Oct 4, Nanog 3 & Sox 2 also known as transcription factors. Stem cells have three distinct characteristics- self-renewal, ability to proliferate extensively and ability to transform in to multiple cell- lineages i.e. ectoderm, mesoderm and endoderm. Stem cell is one of the promising areas in the field of biotechnology for the management of various genetic disorders like neural tube defects and chronic wounds. Interestingly, if mutation occurs in Oct 4, Nanog 3 & Sox 2 large number of anomalies such anorectal malformations, congenital anomalies of central nervous system (i.e. neural tube defects), infertility, and cancer arises. Therefore,





curiosity has been developed to characterize / identify stem cell markers (Oct 4, Nanog 3 & Sox 2) in preclinical diagnosed patients and their correlation has been made with MTHFR gene act as epigenetic factor to assess the “risk” factor using RT-PCR technique. Study was further extends to evaluate nucleotide changes by Sanger’s method to identify “novel” gene mutations. Findings are characterized either up / down regulation of expression of Oct 4, Nanog 3 & Sox 2 or complete disappearance (null) of these markers. The most interesting findings are significant down-regulation and complete absence (null mutation) of Oct 4 band (577bp) in cancers of Pancreas suggesting play an important role during tumorigenesis. Furthermore, in case of NTD (anencephaly), expression of Oct 4 increases two folds. DNA sequencing analysis revealed novel **frame shift mutation** of a base pair at position 183 C →T in an isoforms of Oct 4. The epigenetic marker MTHFR showed genetic heterogeneity in cancer, infertility and neural tube defects (Saxena et al 2019, 2020). These findings suggest a role of mutations of stem cells with epigenetic factors are responsible for abnormal differentiation and further development in human. The study also highlights the isoforms of Oct 4 which act as major player in maintenance of pluripotency during ontogenetically development. In conclusion, role of stem cells plays a significant role in clinical conditions and a source of regenerative medicine for the management of “Birth Defects” and various genetic disorders. However, the recent advancement of technology will lead to development of new diagnostic tools as endeavour by innovation of iP cells and may help for future well-being.

Effects of Global Warming and its relation to planting local species of trees



Dr R.H Dahiya

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Global warming is the rise in the average temperature of earth’s atmosphere & oceans and its effects are visible through Global Surface Temperature. Arctic Sea Ice, Sea Level Rise, Carbon Dioxide Level Rise Frequent Flood Occurrences, and Death of Ocean Life. Since about 1950, the Earth’s global surface temperature has risen by just more than over 1 degree Fahrenheit. Basically the surface temperature of Earth is increasing gradually and that will affect the life on Earth in times to come. A significant decline has been recorded in the Arctic Sea Ice level since the last 30 years. The decline is found to be nearly 32%. While the sea ice area has since increased from the record low of 2007, the level remains far below those recorded since 1979. As we know when water warms it expands add this to water melting from glaciers and the arctic and you will see a measurable amount of sea level rise. Carbon dioxide (CO₂) has existed in our atmosphere longer than mankind. As we all know, CO₂ is part of a natural process involving plants and animals as well as volcanic eruptions. Manmade CO₂ comes from the burning of fossil fuels used in energy plants, manufacturing plants and the various modes of transportation As we all know by now, CO₂ comes from nature and from man. If the Earth warms, CO₂from nature increases as well. When there is less ice in the arctic regions, the Earth will absorb more of the Sun’s energy, which will create more warmth since the oceans will release more CO₂. This cycle is known as a positive feedback. As permafrost regions on the Earth begin to melt, more greenhouse gases including methane which is known to have even a bigger impact on the greenhouse





effect, are released from the soil that was once frozen, again this is positive feedback. The rapid increase of CO₂ level in atmosphere has to be controlled to keep global warming under check. Further to overcome these problems we need to plant more trees of indigenous origin particularly under the Indian context. Amongst many of the species and varieties of Indian trees is a wonder tree called NEEM *Azadirachta indica* which is a weapon against Global warming due to its multiple characteristics and benefits not only for the environment, and biodiversity but also for human beings and animals in various modes and under various uses. The reason for planting this tree is because Neem is ecologically very special. It can tolerate very high levels of pollution and has the capacity to recover even if most of its foliage is dropped. Studies have shown that Neem tree is one of the most suitable species for checking urban pollution in industrial locations and it has potential in green belt development in hot spots with known history of high air pollution.

Threats to Biodiversity in India – Challenges, Opportunities and the role of International organizations

Prakash Rao, Ph.D.

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Over the years, biodiversity of planet earth has been subjected to severe stress from a variety of factors. Some of the underlying causes of environmental degradation include Intensive agriculture practices (soil degradation, overuse of chemicals, ground water) ,Population explosion - pressure on land and resources, Industrialisation and urbanisation , Developmental policies - depletion of water table, increased floods and drought, water logging and salinity, atmospheric emissions, water pollution, loss of biodiversity, traditional knowledge systems, less environmentally friendly technologies, Informal manufacturing sector growth in urban centres and in recent times the global problem of Climate change

Forests and climate change are two critical issues of biodiversity in the context of human welfare. Forests resources inherently serve the important function of protection of our landscape through watershed protection, providing clean water sources, control lean erosion, clean air, and a host of economic benefits like -Timber production, fuel, fodder, small scale industries, medicines. It is with this context that we are also faced with severe stress to forest biodiversity through increasing deforestation. While India's forests cover accounts for 22-23% of our land resources, there are several factors which have led to deforestation like changing demographic profile, fuel wood consumption, industrial development - Infrastructure projects, over grazing, agriculture, cultivation of cash crops like rubber, tobacco, oil palm etc, Developmental Projects- mining, industrialisation, dams , hydroelectric projects, tourism and climate change.

The second key issue is the growing problem of Climate change. Changes in precipitation, temperature, glacial melt patterns and sea level rise are being seen as increasingly affecting the world's ecosystems





and natural resource base. The Inter-Governmental Panel on Climate Change has provided clear evidence of the impacts of climate change on our biodiversity and the increasing vulnerability of some of our critical ecosystems and consequences for livelihoods of people across borders. As a global commons issue, the governance of extreme climate variability places additional stress on fragile ecosystems. In India impacts of climate change on ecosystems have had diverse effects e.g. Agricultural ecosystems in North India- temperature shifts, insect pests, Evergreen forests in Karnataka, NE Region - erratic rainfall patterns, Himalayan ecosystems in range states - potential loss and change in land use (Glacial melt, landslides, soil erosion, rising temperature, availability of suitable habitat), Grasslands, desert ecosystems in Maharashtra, Rajasthan,- changing weather patterns, land use, Coastal ecosystems - cyclones in West Bengal, Tamil Nadu etc. In high human density locations in South and South east Asia, shifts in regional climate have led to adverse impacts on ecosystem dependent communities e.g. freshwater, agro economy, forestry and fishing. These are likely to have serious implications on biodiversity conservation, GDP and economic growth.

According to the Living Planet index of WWF, various scenarios show how the choices we make might lead to a sustainable society living in harmony with robust ecosystems, or to the collapse of these same ecosystems, result in a permanent loss of biodiversity and erosion of the planet's ability to support people. Biodiversity suffers when the planet's biocapacity cannot keep pace with human consumption and waste generation. This growing pressure on ecosystems is causing habitat destruction or degradation and permanent loss of productivity, threatening both biodiversity and human well-being.

In this context, the role of various National Governments and International organisations like the UN assume critical importance. Inter-governmental treaties like the UNFCCC, CBD and UNCCD have been at the forefront of creating mechanisms which can help biodiversity conservation. The UN SDGs through its seventeen goals also strive towards sustainable development through actions which involve not only human welfare but also an equitable role in promoting biodiversity.

Geospatial Sciences for Biodiversity Monitoring and Conservation

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Sustainable biodiversity conservation requires periodic assessment and monitoring which using conventional methods is time consuming, cumbersome and most of the time unreliable. In recent years focus in conservation has shifted from species conservation to habitat conservation and it is in this context geospatial sciences which include remote sensing, Geographical Information System (GIS) and Satellite based navigation systems like NaVIC and GPS have emerged as the potential tools for biodiversity monitoring and conservation. Remote sensing amenable Essential Biodiversity Variables or EBVs which are derived measurements required to study, report, and manage biodiversity change are





increasingly been used provide the first level of abstraction between low-level primary observations and high-level indicators of biodiversity. In my discussion I shall focus on the work carried out for forests and wetlands, two of the most important ecosystems using geospatial tools.

Biodiversity Conservation & Sustainable Human Life

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We need to maintain Natural Recourses for future Generations for this we must answer following questions our self. What is biodiversity conservation? Who’s involved? What do they do? How does biodiversity conservation fit into other big picture goals like sustainable development? What exactly is sustainable development? This Webinar takes a closer look at biodiversity conservation and how it fits within the larger concept of sustainable development. Humans use the planet’s resources such as forests, oil and minerals. Many of these resources have accumulated or have grown over thousands or even millions of years!

The 2010 WWF living Planet Report estimates that we’ll need the equivalent of two planets by 2030 to support human populations if we continue with our current consumption patterns!

Where will we find that second planet? What happens if we don’t find it?

What alternatives are there? These are the unanswerable questions therefore we have to follow Sustainable model for development.

Sustainable human development is about living on earth without taking more than can be naturally replaced. It is about good health, good living conditions and long-term wealth creation for everybody. All these things must occur within the carrying capacity of the planet. To understand sustainable development, think about its three pillars: “economic wealth”, “social equity” and “environmental health”; or in other words “profit”, “people” and “planet”. All three are linked to each other. In other words, any development has to be not only economically sound but also beneficial to social equity and environmental health. Lastly, we must ask these hard questions ourselves and act accordingly for Sustainable human life:

What if I don’t own this?

Do I need everything I own?

What are my real needs?

Am I aware of what I eat, how it produced & how far it has travelled?

Is my computer Energy efficient? Is my computer free of Persistent Organic Pollutants (PoPs)?

What is my favorite means of transportation? Do I know how to save electricity and gas?

What I can do to be more sustainable?

It required the deep sense of belonging to the planet and owns it as its integral part.





Microbial diversity and humans: A scientific perspective

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Bacteria are the pioneer living forms on earth. They have appeared on this blue planet even billions of years before the genesis of *Homo sapiens*. Researchers opine that a legion of microbes had been found living inside and outside of our body, may be 10 times as many microbes than our own cells. Microbes and humans share a very special relation with beneficial, neutral, detrimental and multitude of effects. An array of microbes that includes bacteria, fungi, algae, virus and protozoans have deep impact on human health and the biosphere as a whole. It is well known that in the environmental compartments microbes play pivotal roles in recycling of nutrients, balance of trophic chains, physiological activities in the flora and fauna, as well as the conservation of natural habitats. The recent scenario of a viral pandemic has made scientists to redefine their assumptions on these cellular and subcellular entities which are not visible for our naked eye. Here in this paper tries to explore the intricate relations shared by humans and microbes.

Imbalance of Biodiversity and Threat to Human Life

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Human survival and its economic well-being are essentially related to biodiversity survival, which in fact is reflective of the well-being of any ecosystem. It plays a significant role in modulating the ecosystem function and stability. Heterogeneously distributed on the earth, comprising 5 - >50 million species, this biodiversity is presently considered to include diversity within species, between species and ecosystems. Its loss has been ecologically as well as economically worrisome because it represents the potential wealth in the form of new crops, pharmaceuticals, petroleum substitutes, biocides and other products. The economics of the earth would grind to a halt without the support of ecological life support system. The total ecosystem services for 16 biomes have been valued in the range of 16-54 trillion (10^{12}) US dollars/year. Further, biodiversity extinction could be a big deterrent to the evolutionary capability of living organisms (essential component for the functioning of earth's ecosystems) to cope up with the alterations of environmental characteristics. Increasing population, resource consumption and pollution could be attributed to cause a large scale destruction and fragmentation of unique habitats. This has posed as the biggest threat to native biodiversity followed by biological invasions with marked interference in the structural organization and composition of plant communities, especially in dry tropics. Growing concern for preserving biodiversity owes to the realization that it is being lost before





its size is known. Excessive exploitation of ecosystems evident at local to global scales with profound adverse impacts on biodiversity is proving highly detrimental to the rights of people along with their cultural diversity. Thus, looking at the present extinction rate of species, the emerging biodiversity imbalance is likely to jeopardize the ecological balance to the extent to challenge human existence.

Soil-Water Conservation and Management to preserve Biodiversity in the temperate mountainous Ecosystem of Western Ghats in the Context of Climate Change

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Climate change is one of the widely discussed topic among all the sectors in the globe. One of the greatest challenges of our time is to protect fragile bio-environment and biodiversity from climate change implications and global warming. Climate change and extreme weather events affect soil and watershed hydrology and have a long term influence ecological processes. Because of unpredictable nature of climate change, it becomes more vulnerable to manage and preserve soil and biodiversity. In recent years, the gap between water supply and demands has widened and the demand of water for irrigation has been increasing due to climate change and frequent occurrence of extreme weather events like drought and floods. Therefore, it is essential to adapt climate resilient agriculture and to solve potential water resources problems for human's existence and well-being. It is significant to note that the global mean surface temperature has increased more rapidly about 0.18°C per decade in last 25 years, with the last decade (2001–2010) being the warmest decade on record. Our efforts to understand specific impacts of climate change on soil-water and agriculture, remains inadequate in highly sloping hilly region of Nilgiris where runoff from rainfall events is more than 95 per cent. Therefore, it is imperative to implement water harvesting structures like ponds besides conserving natural ponds. Also, soil conservation measures like bench terracing, contour bunding, vegetative barriers etc., need to be implemented to protect and conserve our precious soil from runoff. Also, frequent changes in land use practices especially conversion of swamps and forests to agricultural activities accelerate carbon di oxide (CO₂) emission and aggravates global warming impacts. Therefore, the present paper evaluates the role of climate change on soil and watershed, hydrology at a regional scale and discusses alternative mitigation strategies through efficient climate smart agriculture, soil and water resources planning, integrated water resources management, climate modelling and projections with emphasize on climate smart agriculture and preservation of biodiversity in the fragile temperate mountainous ecosystem of Nilgiris.





Eastern Himalayan Agro-biodiversity hotspots in North Eastern Region of India.

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Eastern Himalayan ranges begin with the snow-clad Holy Peak Mountain of Khanchendzonga in Sikkim to cover North-Bengal Hills, Arunachal Pradesh, Assam, Meghalaya, Tripura, Mizoram, Nagaland and Manipur having its trans boundary linkages with Nepal, Bhutan, China, Bangladesh and Myanmar in the far east. Eight states of North Eastern Region(NER)India comprise of unique diversity of physical features including UNESCO World Heritage Site of Khangchendzonga-the world's 3rd highest peak that provide Himalayan environment to nourish the ever green diverse forest ecosystems of NER with rich biodiversity hotspots .The entire hill tracts of NER are organic by default that support diverse farming systems under diverse agro-ecosystems to meet the needs of hundreds of socio-cultural ethnic groups with large concentration of tribal population living in harmony with natural environment and practicing traditional knowledge based ethnic agriculture rich in traditionally conserved genetic diversity of crops.

Of the different types of indigenously designed farming systems including terraced land, sedentary type, agro-forestry, mixed farming, inter cropping, alder based farming etc, unique farming system that characterized NER is the Jhum cultivation or shifting cultivation having deep rooted intricacy with their tradition and culture which is a 'necessary evil' from the view point of biodiversity conservation. As many as 45 crops are cultivated in the same site of jhum cultivation and they are sequentially harvested. Sikkim being a purely organic state and most other states' farming systems too are organic and organic produces are common in the region. Low land agro ecosystems where variety of paddy cultivation is practiced.

Agro-biodiversity hotspots of the region include diversity of crops and economically important plants. Cereals, pseudocereals, millets, Legumes, vegetables, fruits, tuber, spices, oilseeds, beverages like tea, coffee and sugar yielding crops invariably found in NER. Presence of a variety of bee species in NER which are regarded as the most important species by the indigenous people owing to their abilities of mass pollination of crops which helped in the preservation and conservation of diversity of traditional crops. Diversity in other economically important plant species of NER include medicinal plants and Orchids (in Sikkim), wild relatives of pseudo cereals, millets, legumes, vegetables, tuber crops, spices, etc. Preponderance of endemic species under different categories of plants is other unique identity of NER biodiversity hotspots. For instance, *Camellia caudate*, *Sacharumsikkimensis*, *Albizia arunachalensis* in Sikkim, Bengal and Arunachal Pradesh; *Coix lacryma-jobi* var. *ma-yuen* in Nagaland; *Parkia timoriana*, *Zanthoxylum rhetsa* in Manipur. In addition, the entire NER is a hotspots of diversity of bamboo species used by indigenous population for multi purposes including medicinal and





vegetable use. Albizia, Chireta, common yew, Costus, Indian podophyllum, Juniper, Picrorhiza, Large cardamomum, Rhododendrum sps, variety of orchid species are important plant species in Sikkim Himalaya. Diversity of indigenously valued crop species and their wild relatives and endemic plants used by tribal are highlighted in the deliberation as it has long list beyond the scope of keynote abstract. Indigenous people preserve and conserve rich agro biodiversity since time immemorial. Let's conserve biodiversity. Conservation of biodiversity is for human welfare as logical evidenced may be drawn from the COVID-19. So this year's World Environment Day is more special in creating awareness of biodiversity in the welfare of mankind. Let 'celebrate Biodiversity with great enthusiasm to promote the environment of the Earth.

Is our ignorance towards harmony of biodiversity giving rise to COVID 19 like situations?

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The World Health Organization's "One Health" initiative advocates managing the issue of human health in relation to the environment and biodiversity. It has three main objectives: combating zoonoses, ensuring food safety and fighting antibiotic resistance.

Destruction of the forests, the villagers settled on the edge of deforested zones hunt wild animals and send infected meat to cities – this is how Ebola found its way to major human centres. So-called bush meat is even exported to other countries to meet the demand of expatriates and thus spreads the health risk far from remote areas.

The Convention on Biological Diversity is the international instrument for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable participation in the benefits derived from the use of genetic resources", which has been ratified by 196 countries.

Given the importance of public education and awareness for the application of the Convention at all levels, the General Assembly proclaimed May 22, the date of approval of the text, International Day for Biological Diversity in 2000.

Loss of biodiversity also means that we are losing, before discovery, many of nature's chemicals and genes, of the kind that have already provided humanity with tremendous health benefits. Traditional medicine continues to play an essential role in health care, especially in primary health care.





Conservation of Biodiversity in Ancient India: A concise review

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The Rio Earth summit (1992) had endorsed historical agreement like Agenda 21 which recognised sustainable development. Intriguingly, ancient Indian civilization also understood the importance of forest biodiversity conservation and found to be similar to Rio principles. The modern concept of biodiversity organization is simply a replication of many ancient Indian civilizations. In Atharvaveda earth is to be honoured as well as protected like our mother “ bhoomi mata putroham prithivyah” Many India communities have inherited such practise. The morals of Buddhism as back as 2500 years suggested conservation of plants verses the rights of animals to freedom from fear. The idea about protection of animals by making sanctuaries for animals was dated back to the 3rd Century B.C.E In ancient India, planting and rearing of trees was a highly developed practice. Manusmriti written in the post-Vedic age, is the world’s first ethical compendium on human jurisprudence, presented by Maharshi Manu which stated its role in saving the integrity of the natural environment. According to its text biodiversity means all living forms broadly assigned to Chara (movable living world) and Achara (immovable like plant kingdom). Storage organs of plants, crops, timber yielding plants were important to human, thus Manusmriti imposed various punishments for destroying such plants and their parts. It also stated that killing of animals is a sin. The book Arthasastra written by Kautilya (also known as Chanakya) a treatise on the protection and management of forests, gardens, orchards, wild life (321-297 BCE). Even in the affairs of the state, the administration and the ruler were directed to preserve and promote environmental welfare.

Kautilya suggests the need to develop Abhayāranya or Abhayavana, forest and animal sanctuaries, where trees and animals would both reside free from the fear of slaughter. The 10th Century treatise, Vrukshayurveda contended with various species of trees and their growth which pointed out how spiritual beliefs and conservation of nature was inter-linked. There were three types of forests namely, Mahavana, Tapovana and Srivana in ancient India. The tapovana is the forests of prosperity, consists of dense forests and groves. The tapovanas abounded in wild life and people had access to these forests, but only for peaceful purposes and no one was allowed to kill animals. Upanishads and Aranakas were written in these forests. The Srivana (Sri means beauty) was actually the village or town forests. The people dependent on Srivana for their food, wood, fruits, medicine and many days to day necessities. It was mandatory to grow five trees popularly called, “panchavaṭī in Srivana namely, Banyan, Peepal, Ashoka, Bela and Harad. Thus the modern holistic methods of sustainable development of biodiversity are replicated in many ancient Indian literatures. In modern times, the policies implemented for conservation of forest and biodiversity are directly or indirectly acquired from the traditional knowledge cultivated in the ancient Indian culture.





Bio Diversity in *Gladiolus*

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The modern gladiolus cultivars offer a diversity of colors, shapes and sizes. Its beautiful inflorescences have a long lasting blooming period and make it an important cut flower crop. It is used as border plant, pot plant, for bedding purpose in gardens and for display and as a cut flower. Mostly corms and cormlets are used as plant propagation material. Seed propagation is used in hybridization programmed only. Its cultivation is more paying particularly around big cities because of its ready market. In India farmers raise gladiolus during March-April in the hills, Sept-October in the plains and throughout the year in Bangalore region of Karnataka. Owing to the increase in trade related to tourism, rapid industrialization, developing trends for social and business gathering, improved economy and change in taste, urge for modern and sophisticated living, use of these attractive but flowers has become an integral part of living. Thus, there is an ever-increasing demand for gladiolus flower.

The improvement in gladiolus has remained more or less stationary in India in the recent past due to non-availability of germplasm of divergent forms. However, the universal approach in its breeding has been unidirectional in most of the countries. For making further improvement in number of florets per spike, there have been consistent efforts on the part of breeders and floriculturists in the cultivated gladiolus for the characters attributed to number of florets per spike. In starting and improvement therefore it is essential for plant breeder to assess the population available from this point of view, as there is no report on variability estimates over different environments. Improvement of plants depends upon the magnitude of genetic variability of different quantitative characters. Therefore, the measurement, evaluation and manipulation of genetic variability in desired direction become extremely important in any yield improvement programme. The extent of genetic variability in a specific breeding population depends upon the genotypes included in it. Heritability and genetic advance are important selection parameters and heritability estimates along with genetic advance are normally more helpful in predicting the gain under selection than heritability estimates alone. However, it is not necessary that a character showing high heritability will also exhibit high genetic advance.

The correlation coefficient gives ideas about the various associations, existing between yields and yield components. Path coefficient explores that relative distribution of both direct and indirect effects of yield contributing characters on number of florets per plant. Thus the knowledge of character association and path coefficient is essential for simultaneous improvement of yield and yield components. The occurrence of genotype environment interaction has long provided a major challenge for obtaining complete understanding of the genetic control of variability. The study of genotype environment interaction in its biometrical aspect is thus not only important from the genetically and evolutionary point of view but also very relevant to the production problems of agriculture in general and plant breeding in particular. Due to high genotype environment interaction plurilocal and





pluriannual experiments are required especially when the plants are grown under those conditions, which are different from the breeding area. The selection of stable varieties to be used as a parent is a prerequisite in a breeding programme. For planning and effective selection strategy understanding the inter relationship among yield and its components is of vital significance.

ENVIRONMENTAL HEALTH *Vis-à-vis* HUMAN HEALTH

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Excessive use of chemical fertilizers, biocides against pests, herbs, and weeds for enhancing agriculture production is leading to severe health hazards and therefore the process of using algae as bio-fertilizer and bio-inoculant for organic food production was explored. Cyanobacteria, the potential source of nitrogen fixation can be of great potential for soil reclamation and enhancement of agricultural productivity. Algae can transform solar energy into biomass. This biomass is stored in the form of carbohydrates, single cell proteins, fatty acids, vitamins, carotenoids, antioxidants, pigments, PUFAs and a large number of pharmaceutical and nutraceutical products.

Receding fossil fuel reserves can be compensated to some extent by algae biofuel. The need of environment friendly biodiesel extracted from high fatty acid algal strains will be used as green energy and will sequester carbon emission. For various industries who invest quantum of money for installing carbon sequester to meet NGT requirement can develop photo bioreactor to grow algal strains so as to channelize fluke gases and to generate feedstock for biodiesel production and other useful bi-products.

Besides green and ecofriendly fuel requirement, we are witnessing the biggest global catastrophe in the form of Covid-19 caused by Corona virus which is a threat to mankind all over the world. Persistent destruction and exploitation of natural resources, deforestation, increased pollutant, dangerously reduced air and water quality, deteriorated soil health and absolute negligence towards the health of our planet has led to this alarming global health emergency. Nature has decided to reclaim itself and the invisible virus has done it successfully by shutting down almost everything. Health of nature is directly associated with our health and we remain ignorant, similar will be the result.





Biodiversity Conservation Assessment and Environment

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Biodiversity or biological diversity refers to the levels of organization for living things. It is very rich in wild life and cultivated species, diverse in form and function but closely integrated in a system through multiple network of interdependence. According to Convention on Biological Diversity (1992), Art. 2, biodiversity may be defined as the variability among living organisms from all sources including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems. Species share a distinct and recognizable genome and genes are the basic building blocks of biodiversity. It is virtually synonymous with “Life on earth”. Biodiversity is the result of 3 billion 800 million years of evolution and is shaped by environmental selection. India has over 8% of the world's total biodiversity. This makes it one of the 12 (or 17) megadiversity countries in the world. India is also considered one of the world's eight centers of origin of cultivated plants. The huge diversity of India is due to the vast variety of landforms and climates, resulting in habitats ranging from tropical to temperate and from alpine to desert. *Ficus* spp. may be used to develop oxygen garden. Several species of different group may also be used to reduce indoor pollution. Today human activities are a severe threat for biodiversity and environment which jeopardize the existence of numerous species. IUCN and NatureServe Conservation Assessment have provided certain guidelines for assessment of threatened status and rarity of the species respectively.

Microfinance Systemic Impact on Ecology: Evidence from Jharkhand

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Although, Microfinance has received significant academic attention, the impact of Microfinance on the environment has recently started to appear in academic research. The novel phenomenon of Green Microfinance has been the center of analysis of some recent research work. However, most empirical work in this fledgling field has focused on the Micro Finance Institutions (MFIs) level. This study attempts to study the environmental impact of Microfinance loans by considering individual loanees as the unit of analysis. The study presents summarized findings of 214 microfinance beneficiaries from various districts of Jharkhand using Carbon Footprint calculations across rural and urban settings. The empirical analysis suggests that rural carbon footprint of agricultural activity is significantly more than urban micro-enterprises supported by Microfinance. The reason for this difference seems to be non-





environment friendly agricultural techniques and raw materials. Policy implications of the findings are also briefly discussed.

Fungal diversity: A Boon for Human Welfare

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Fungi are not only beautiful but play a significant role in various walks of life viz., agriculture, medicine, food, textiles, bioremediation etc. and have therefore become an integral part of the human welfare. The world of fungi provides a fascinating and almost endless source of biological diversity, which is a rich source for exploitation for eg: the housewife uses yeast to leaven her bread and the brewer uses these organisms to form alcohol in his beer wine or whisky. Thus, they form a major component of tropical ecosystems and are involved innumerable interactions with plants animals and man as saprophytes, parasites and symbionts. The variety of terrestrial habitats occupied by fungi is extremely large, since fungi are notorious versatile opportunists and almost anything that can decompose to yield energy will find some fungi able to colonize it. More than about 74,000 species of fungi have been named or recognized but new species and genera are still being described from all over the world, especially from the tropics including India. It is generally assumed that one third of fungal diversity of the globe exists in India. Out of 1.5 million fungi, only 50 % are identified and remaining 50 % to be identified. Unfortunately, around 5-10 % of fungi are cultured artificially. Many earlier describe species of fungi either at the verge of extinction or facing threat. Threats to fungi throughout the globe are of concern. Due to overexploitation, the diversity of living organisms including fungi is vanishing (UNEP, 1992). Fungi are very seldom legally protected. In the absence of legal protection, some effort needs to be made to have code of practice or suggestive documents stressing the importance of fungal conservation. Therefore, there is an urgent need to conserve the fungal diversity for the sustainable environment and human welfare.





Sacred Groves of Manipur-a community oriented conservation initiative

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Manipur state falling within Indo-Myanmar, one of the hotspots of biodiversity is a fragile zone inhabited by 29 tribal communities that practice shifting cultivation and depend heavily on biodiversity for survival. IN spite of these facts, traditionally the community protects biodiversity in forested patches of sacred groves. (S.G.) There are 365 umanglai (sylvan deity) groves in Manipur The majority of trees, shrubs and herbs were found to belong to Phanerophyte which is the major life form reported from sacred groves. A total of 125 species belonging to 52 families were recorded from the four groves. The trends in Margalef, Shannon diversity and evenness indices have been reported. Though the SGs have become fragmented, yet these habitats housing a variety of genetic pools have become the last refuge for many threatened, endangered and endemic plant and animal species. The regeneration study indicated that tree species like *Phoebe hainiana*(vulnerable), *Rhus lookeri* (endangered) and *Flacourtia cataphracta*(endangered) have been found to be well represented in, two sacred groves in Manipur valley. The sacred forests are also of great forestry interest as indicators of the natural productivity of the region. Ecologically valuable species like *Albizia lebbeck*and *Ficus glomerata*which conserve high amount of nitrogen, phosphorous, magnesium and calcium in their leaves, are found in several SGs of Manipur. The nutrient flux study in precipitation under canopy of two sacred groves indicated the influx of various nutrients in precipitation, through fall and stem flow from Nambol and Wangoi sacred grows .Estimation of leaching accounts and input-output ratios of various nutrients for understanding the conservation role of sacred groves reflected that flux of water under canopy is related to rainfall, its frequency, intensity and type of vegetation cover that mainly affected the accompanying materials and elements available for transfer. Nutrient concentration in precipitation in various months of the hydrological year (1999-2000) had the order: $Na > Ca > N > Mg > K > P$. The nutrient in precipitation accounted for 19.97 % of Total N, 1.98 % of P, 4.92 % of K, 23.74 % of Ca, 8.26 % of Mg and 41.12 % of Na of the total nutrient amounting to $53.37 \text{ Kg ha}^{-1} \text{ Yr}^{-1}$ of nutrient input in both the sacred groves.

A pronounced modification by forest canopy is noticed in both the groves. Amount of nutrient in the through fall showed 2 typical trends viz. a continuous increase for total N, Ca, Mg and Na and increase followed by decrease in P and K. Total N, K, Ca and Mg are found in leachates on the basis of leaching account for various elements was calculated to tree crown, catching aerosols and dust, which are washed away from branches and leaves during period of the rains. Input-output ratio reflected the trend in ability to conserve the nutrient under the forest canopy and revealed good retention of Nitrogen. Total nutrients accounted under canopy amounted to $70.339 \text{ kg ha}^{-1}$ and 72.45 kg ha^{-1} in the two groves in the studied hydrological year 1999-2000. Our ratios showed variation as to the effectiveness of ionic conservation mechanism control. Thus, soil-root system efficiently retains the nutrient brought to it in litter through through fall. In output, it was found that in case of cation this efficiency increased in order of calcium, potassium and magnesium. The highest output concentration was for sodium, calcium and nitrogen, these are also the nutrients with highest concentration in the input. Nutrient concentrations





may be diluted as a result of uptake by organisms, adsorption reactions, or inputs of low concentration waters in the form of direct precipitation. Annual gains and deficits of nutrient in the sacred groves were strongly correlated with the hydrological budget.

Keystone species have been identified from the sacred groves of Manipur that contribute to the maintenance and enhancement of biodiversity and they are also the species that are socially valued by local communities for cultural or religious reasons, and often found in SGs. There is a strong need to understand the scientific aspects of preserving biodiversity in sacred groves by knowing the ecological functions in terms of significant conservation and protection offered to valuable forest wealth. The role of natural sacred sites particularly sacred groves has been much emphasized and has significant relevance for the implementation of the article 8J of the conservation and sustainable use of scientifically the conservation aspects of biodiversity which have strong links to the community biodiversity conservation programme. Cultural aspect of management of sacred groves is to be linked with the traditional management of system in order to prevent the germplasm erosion of present and future. There is a strong need to understand the scientific aspects of preserving biodiversity in sacred groves by knowing the ecological functions in terms of significant conservation and protection offered to valuable forest wealth.

A critical reflection on Biological Diversity Law in India

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The first Indian Forest law & policy, 1894 by British rule sought to achieve custodial and timber driven management of forests to meet their commercial needs disturbing the traditional relationship between people and forests. However, the Constitution (42nd Amendment) Act, 1976 in Directive Principles of State Policy and Fundamental Duties of the citizens of India introduced duties on state and citizens to protect and improve the environment and to safeguard the forests and the wildlife of the country.

Complying with constitutional duty and obligations under Convention on Biological Diversity (CBD) 1993, the Govt of India enacted The Biological Diversity Act, 2002 to achieve three main objectives; the conservation of biodiversity, the sustainable use of biological resources and equity in sharing benefits from such use of resources. This act is administrated by three-tier bodies; National Biodiversity Authority (NBA), State Biodiversity Board (SBB) and Biodiversity Management Committee (BMC).

The BD Act, 2002 regulates the commercial and research activities by Indian and foreigners related to biodiversity resources in India. It also controls transfer the results of any research relating to any biological resources occurring in or obtained from, India for monetary consideration and registration and utilization of IPR based on any research or information on a biological resource obtained from India. The non-compliance of BD Act provisions invites civil and criminal penalties also.





The BD Act has been under critical views by scientist community that it makes collaborative research between Indian and foreign researchers much tougher because foreigners cannot access Indian biological resources without an elaborate set of permissions from the government and policy scholars argued that due to poor implementation of the Act, Govt is losing a minimum of Rs 30,000 crores annually, which has provisions for access and benefit-sharing for commercial utilisation of bio-resources.

This paper concluded that a balance is required to protect Bio-diversity in India and promoting global collaborative research and efficient implantation is required to provide benefits to all stakeholders; the researchers, companies and local tribal population.

HUMAN RIGHTS APPROACH TO SUSTAINABLE DEVELOPMENT

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The Present day consensus reflects three foundational aspirations. First, that human beings should be able to enjoy a decent quality of life, second, that humanity should become capable of respecting the finiteness of the biosphere, and third, that neither the aspiration for good life, nor the recognition of biophysical limits should preclude the search for greater justice in the world. In a planetary system of finite resources, human activities motivated by an attitude of rampant consumerism and unsustainable patterns of production and consumption have never been as inhuman and callous towards environment as in the modern era of scientific and technological innovations. Man's greed attacks nature, environment and ecology and wounded nature backlashes on the human future. During the past few decades numerous incredible and devastating events have focused the domestic and global attention to the impending danger of environmental devastation, the depletion of resources, and a massive extinction of species. Issues such as climate change, trends in global warming, ozone depletion, acid rain, deforestation, desertification, toxic wastes and loss of biological diversity have resulted in increasing global awareness of the problems facing the planet earth. An unprecedented rise in human population has overburdened ecological and social systems. The foundations of global security are threatened. The global concern has been aptly echoed in the preambular assertion made at the Earth Summit in the year 1992. Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. Earth's resources are finite and there are ecological limits to growth which, unless we alter our ways, will sooner rather than later be exhausted. Environmental crisis involves social, political and economic aspects and also poses a philosophical problem. The most vital task is to build an environmental ethics that constructs an adequate theory of intrinsic value of nature as a whole. Many theorists therefore suggested that environment management be approached from a human rights perspective. It is undeniable that the ecological balance is disturbed by human activity, yet humans are the ultimate





victims of such degradation and therefore approaching environment management from a human rights point of view would go a long way in tackling the ecological concerns. Additionally, such an approach would help solve the aforementioned problems as human rights represent a core space which the State is obliged to respect and help effectively realise. The concept of sustainable development was placed on the international agenda with the release of the report Our Common Future by World Commission on Environment and Development (Brundtland Report) in 1987, where it was envisaged that human survival and well-being depends on success in elevating sustainable development to a global ethic.

Role of Youth in Biodiversity Conservation

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Biodiversity encompass is all species of plants, animals and micro-organisms and the Ecosystem of which they are part.

Biodiversity is Lifeline for Human Welfare viz.

- Biodiversity is precondition for the Sustainable Development.
- World’s 40 percent economy is based on biological products and process.
- Poor people in low agricultural productivity depend heavily on genetic diversity.
- Word wide, ecosystem services and other non-marketed natural goods account for 57 to 89 percent of the GDP of the poor.
- India is one of the 12 Countries that account 60 to 70 percent of the World's Biodiversity.
- 70 percent India's population depend directly on natural ecosystems.

Factors responsible for loss of biodiversity are population growth and settlement, excessive resources consumption, habitat destruction, overfishing, flooding, drought, deforestation, monoculture, pollution, climate change etc.

Why Biodiversity Conservation is must?

- For maintaining ecological function, continuity of food chain, base for livelihoods, culture and economies for hundred millions of people.
- Biodiversity could be conserved both In- Situ I.e. Biosphere Reserves, National Parks, Sanctuaries, sacred grooves, reserved/ protected areas etc. and Ex-Situ i.e. Botanical gardens, Zoological gardens social/ community forestry, seed banks, agriculture etc.

Mass Awareness campaign for the Biodiversity Conservation is needed. It should be carried out through media, audio visual, traditional methods, modern methods, folk’s means, workshops/ seminars etc.





Loss of biodiversity: a threat to human life

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In current scenario, biodiversity is under serious threat due to the human unnatural activity. Many individuals do not think about the damage they are causing on biodiversity. The reason behind inequity in biodiversity is resource consumption, over-exploitation of natural framework, population growth, habitat conversion and urbanization. However, it is important as humans to realize the impact we have on biodiversity because without it, there would be no human existence. If no changes are made in the ways humans use resources on earth, there will continue to be a degradation of biodiversity until human lives can no longer be sustained. Humans affect biodiversity by their population numbers, use of land, and their lifestyles, causing damage to habitats for species. Exploitation in the exiting biodiversity system causing a natural disorder and pandemic disease (e.g. EBOLA, COVID-19). It is important for humans to realize how their direct and indirect actions affect biodiversity and the importance of maintaining what biodiversity is left on the earth. So there is need for proper education and clause by the government to make decision to preserve the biodiversity so that human life can be sustain his life on earth.

Impact of Sequential Cyclones on the inhabitants of Sundarbans.

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The Sundarbans comprise of about 10000 square Km. Three fifth in Bangladesh and the rest in West Bengal of India. The site was declared as UNESCO world heritage site in 1997 and is the residing site for the royal bengal tiger and marsh crocodiles. There are altogether 453 different animal species which include 290 bird, 120 fish, 42 mammals, 35 reptile and eight amphibian species. There are 102 deltaic islands of which around 54 are inhabited by human. The improvement of connectivity and roadways have actually resulted in increased tourism and shrinking of forest area. There are around 180 different plant species of which 22 are in true mangrove category. This forest act as a major protective shield against the tropical cyclones arising in the Bay of Bengal. In the last ten years there were a series of such cyclones like Aila in 2009, Bulbul on 2019 and of course the Amfan in 2020. With the





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improvement in weather forecasting devices, the Government gets enough time to evacuate people to shelter camps in the hinterlands, so there has been limited loss of lives. But most importantly there have been a substantial loss of property, and of course the livelihood. These storms are equally threatening for the flora and fauna but that is how they have survived and will continue to do that. But most interesting phenomenon is that every time there is a storm, human development not only suffer a setback but goes back by 10 years reducing the inherent threat to the flora and fauna of Sundarbans. So thus it can be concluded that nature has its own checks and balance through which human encroachment can be arrested and stability of that region is maintained.

Climate Change, Insect Pest and Food Security

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Indian economy is based on agriculture that is the major chunk of Indian revenue. Over 85% of rural households depend on agriculture as their principal means of livelihood. India has varied (6 major) climatic zones i.e. Humid sub tropical, Montane, Tropical Wet and Dry, Tropical Wet, Semi Arid and Arid where different types of crops cultivated. But most of the agro-products are damaged by lots of pests. From last several decades, out-breaks of insects have become more common and cropping system struggling with pests. Out of total 70,000 estimated pests destroying 35-40% crops, insects are contributing around 14%. According to a study by the Associated Chambers of Commerce and Industry of India, annual crop losses due to pests and diseases amount to Rs. 50,000 crore (\$500 billion), which is significant in a country where at least 200 million Indians go to bed hungry every night. The idea of the problems can easily be assessed with this example that the economic losses are to the tune of Rs, 1000 crore due to one of the pest, *Helicoverpa armigera* alone. It has been estimated that about Rs. 1200 crore worth of pesticides are being used in India to control the bollworm complex of cotton. Besides, there are five climatic disasters risks viz. Cyclone prone, Flood prone, Drought prone, Hot desert and Frigid desert which directly and indirectly affect the crop production.

Due to the climate change more than 1 million species are at risk of extinction by climate change. It has been estimated that dozens of species of plants and animals currently go extinct each day —nearly 1,000 times the natural rate and by mid-century, as many as 30 to 50 % of the total species found on Earth will have disappeared. Simultaneously the climate change can alter the activity of 38 of the world’s most-studied insect pests. There is an increase the activity of insect pests. The rising temperatures boost the rate at which insects can digest food – causing them to demolish crops at a faster rate and in temperate regions, warming temperatures can cause insects more active and, thus, more able to reproduce. Thus there are behavioral changes in insect and due to this some of the pests whose status has been changing from minor to major or secondary to primary i.e. *Bemisia tabaci*, *Helicoverpa armigera*, *Spodoptera*





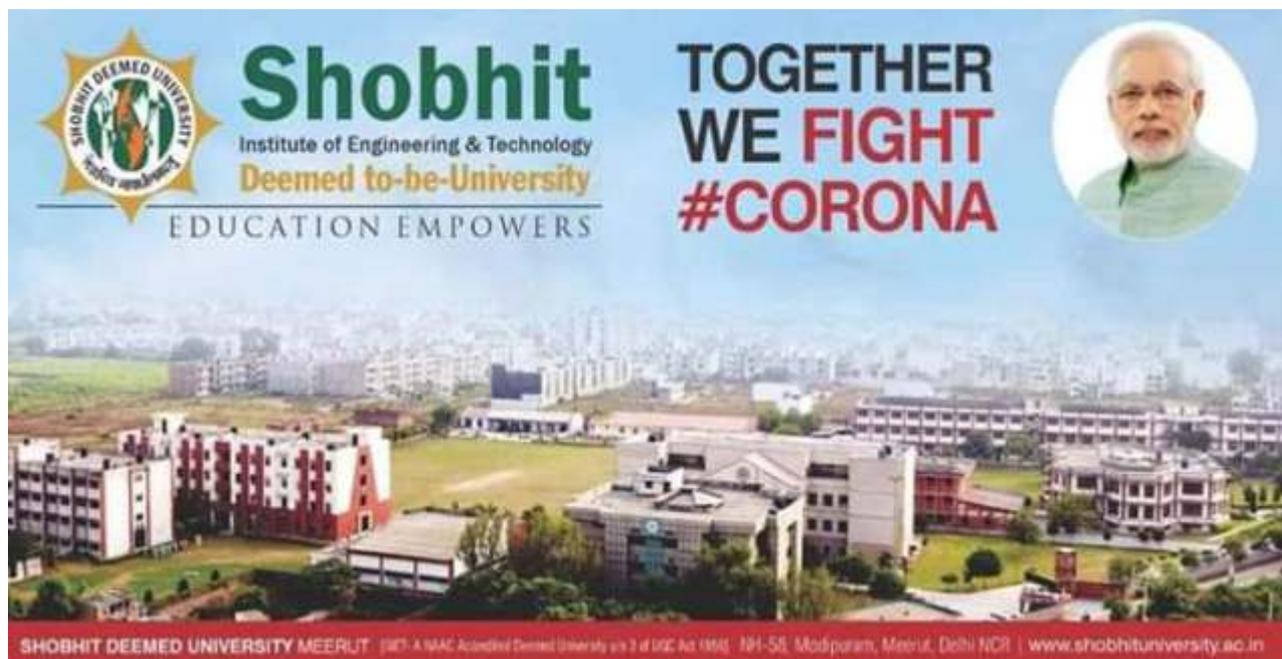
litura; Pieris brassicae Lepidoptera trifolij; Sitobion avenae Rhopalosiphum maidis Schizaphis graminum etc. Increased global trade in agriculture has increased the chances of the introduction of exotic pests too and hence the major challenges to humankind are threat to food security due to emerging and invasive pests.

Possible Negative effect of Climate Change on Agriculture-

- Yields of different crops and geographic limits can be altered by soil moisture, temperature, precipitation and increase in CO₂ concentration.
- Changes in soil properties viz. organic matter, leaching of soil nutrients, salinization and erosion.
- Risk of losses due to weeds, insects and diseases probably may increase.

Possible Positive effect of Climate Change on Agriculture-

- CO₂ fertilization can lead to some increases in agricultural productivity.
- Atmospheric CO₂ level has positive effect on growth rate and cutting transpiration rate.
- Crops plants may be able to use water more efficiently under higher CO₂ level.
- C₃ plants i.e. potato, rice, soybean, wheat and vegetables are benefitted from elevated CO₂ concentration.
- C₄ plants i.e. maize, millets, sorghum and sugarcane are not likely to be affected with increase CO₂.
- Increasing temperature may bring beneficial effects in some areas of the world.





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hindustantimes



Pvt varistry converts its hospital and hostel into isolation wards

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MEERUT: Lending its support to government's efforts in stemming the spread of coronavirus, a private university has converted its one hospital and a hostel, meant for international students, into isolation wards of 200 beds. Shobhit University, walking the extra mile, has also provided 1000 bottles of sanitizer and additional 5000 bottles of it are under preparation in its lab, which would be handed over to the administration.

While briefing media about the district's preparedness to deal with the situation, district magistrate Anil Dhingra appreciated the efforts and support, extended by Shobhit University.

ADM (city) Ajay Tiwari along with city magistrate visited the hostel for on-the-spot examination and gave their consent to convert it into isolation ward.

The university's chancellor Kunwar Vijendra Shekhar said that they feel university's premises in Ganjpur of Saharanpur district and also in NH 30 in Meerut. He said that Ganjpur was a rural area, adding that the university administration had converted the university's Ayurvedic Medical College into an isolation ward of 100 beds. He said five suspects were presently admitted there.

He further said that the hostel for international students in Meerut campus had also been converted into an isolation ward



One of hostel rooms converted as a Covid-19 isolation ward at Shobhit University in Meerut.

The hostel for international students in Meerut campus has been converted into an isolation ward of 100 beds. These rooms have separate bathrooms and comfortable beds.

KUNWAR VIJENDRA SHEKHAR,
chancellor, Shobhit University

of 100 beds.

"These rooms have separate bathrooms, comfortable beds and cleanliness", Shekhar said. He also appealed people to make their contributions to win the battle against the deadly virus. Meanwhile, university has provided 1000 bottles of sanitizer to officials and additional 5000 bot-

les of it are under preparation in the labs and soon would be handed over to the administration. "We have taken special permission from authorities for movement of a few lab staff, who are involved in making the sanitizer, to the lab", said Shekhar.

On the other hand, an isolation ward of 200 beds has been created in Lal Bahadur Shastri Memorial Medical College and Subharti Medical College has also developed facility of 200 beds isolation ward.

Similarly, Mulayam Singh Yadav Medical College has declared to create an isolation ward of 150 beds and KMC Cancer Hospital has also offered to prepare a 100-bed isolation ward. District magistrate Dhingra said that other locations were also being examined to create more isolation wards and would take care if everything needed to fight against this emergency situation, was available.

Initiative Taken by Shobhit University, Meerut to fight against COVID-19





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Shobhit University is full of diversity, proud students and alumni from more than twenty five countries.





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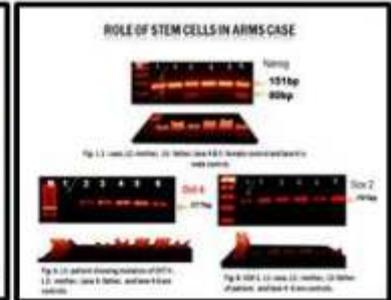
Environment influence Genetic diversity leading to Birth Defect

Dr Ajit Kumar Saxena

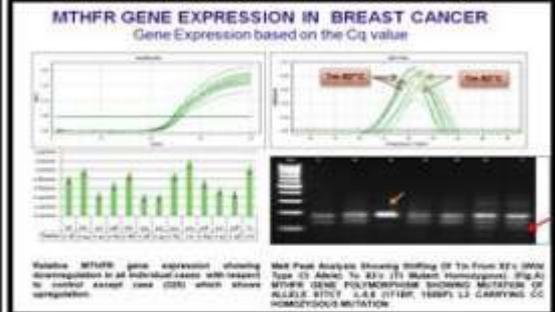
Professor and Head , All India Institute of Medical Sciences Patna

Globally, environmental factors such as contaminated air, soil, water and increasing temperature (global warming) are interfering with human life to thrive well. Genetics is one of the challenging fields in medicine for the clinicians and scientists for the management of genetic disorders. Such disorders are highly complex due to interactions between the environment and genes influencing “Birth defects”. During embryogenesis, large numbers of extrinsic & intrinsic factors are responsible to maintain the normal physiology of stem cells and later these factors have been characterized as stem cell markers Oct 4, Nanog 3 & Sox 2 also known as transcription factors. Stem cells have three distinct characteristics- self-renewal, ability to proliferate extensively and ability to transform in to multiple cell- lineages i.e. ectoderm, mesoderm and endoderm. Stem cell is one of the promising areas in the field of biotechnology for the management of various genetic disorders like neural tube defects and chronic wounds. Interestingly, if mutation occurs in Oct 4, Nanog 3 & Sox 2 large number of anomalies such anorectal malformations, congenital anomalies of central nervous system (i.e. neural tube defects), infertility, and cancer arises. Therefore, curiosity has been developed to characterize / identify stem cell markers (Oct 4, Nanog 3 & Sox 2) in preclinical diagnosed patients and their correlation has been made with MTHFR gene act as epigenetic factor to assess the “risk” factor using RT-PCR technique .

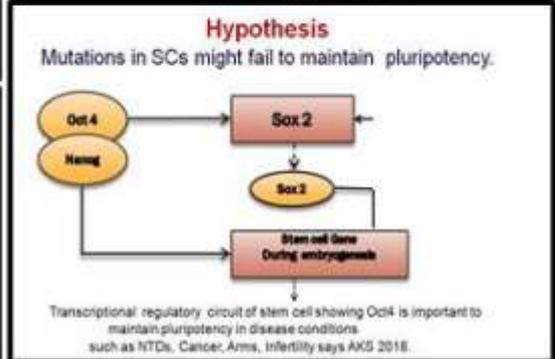
GENETIC DIVERSITY IN BIHAR



Results: Findings are characterized either up / down regulation of expression of Oct 4, Nanog 3 & Sox 2 or complete disappearance (null) of these markers. The most interesting findings are significant down-regulation and complete absence (null mutation) of Oct 4 band (577bp) in cancers of Pancreas suggesting play an important role during tumorigenesis. Furthermore, in case of NTD (anencephaly), expression of Oct 4 increases two folds. DNA sequencing analysis revealed novel **frame shift mutation** of a base pair at position 183 C →T in an isoforms of Oct 4. The epigenetic marker MTHFR showed genetic heterogeneity in cancer, infertility and neural tube defects (Saxena et al 2019, 2020).



Conclusion: These findings suggest a role of mutations of stem cells with epigenetic factors are responsible for abnormal differentiation and further development in human. The study also highlights the isoforms of Oct 4 which act as major player in maintenance of pluripotency during ontogenetically development. In conclusion, role of stem cells play a significant role in clinical conditions leading to “Birth Defects” and various genetic disorders.



AKS thankfully acknowledge to the Director, AIIMS Patna, the DBT for financial assistance, patients- their families.





Title: Agriculture Practice and Biodiversity Impact
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School of Biotechnology, Gautam Buddha University, Greater Noida
International e-seminar “Biodiversity & Human Welfare”, June 2020

Introduction:

Agriculture is the largest contributor to biodiversity loss with expanding aspects due to changing consumption patterns and growing populations. Agriculture destroys biodiversity by converting natural habitats to intensively managed systems and by releasing pollutants, including pesticides and herbicides.

Biodiversity is the basis of agriculture and our food systems. Agricultural biodiversity also performs ecosystem services such as soil and water conservation, maintenance of soil fertility, conservation of biota and pollination of plants, all of which are essential for food production and for human survival.

Ratoff often causes pesticides from farmers' fields that can damage aquatic ecosystems. A handful of farm dirt is rich in biodiversity. Soil biodiversity includes animals, bacteria, fungi, and even the roots of plants growing above these organisms can help farmers to reduce the negative effects of farming to the human welfare. The intensification has created a lot of irreversible loss of biodiversity in such lands where population booms happened, increased use of fertilizers, increased stocking densities and increased nutrient inputs through supplementary feeding. Due to these increases in fertilizers, stocking densities and nutrients there has been an increase in pollution of rivers leading to loss of biodiversity, especially in sensitive rivers such as NCR locate d River Yamuna and Hindon. conventional agriculture can create many problems in the environment. For example, it has a large contribution to water contamination, to soil erosion and to global warming. Use of pesticides, herbicides, and manure from farms can end up in the bodies of water close to farms. The situation has been observed in Hindon river bank at Ghaziabad, one study was to contribute a fungal bio fertilizer to the fields which is isolated from the agricultural land located there. The Biodiversity of lands in urban areas are totally depend on the use of biological fertilizers and pest control practices. The present condition of land is very toxic due to polluted water irrigation the biota of land and water is filled with heavy metals and aromatic hydrocarbons. Need of hour is to balance the habitat and minimize the use of chemical fertilizers.

Material and Methods



We collected soil samples from the fields to investigate the presence of microbial community in these, it was done by serial dilution. The soil sample of 100g were collected from five corners of field and compoiled to opt for 1g quantity, as shown in image.



After serial dilution 10 ml of 10 were taken to check the fungal species present in soil samples. The SDA and PDA media were prepared to get pure colonies and further study was done to identify fungal spp. We found *Trichoderma*, *Aspergillus*, *Penicillium*, *Alternaria*, *Monilia* and *Fusarium* fungi with few control fungi.

Our study was to check the biological importance of these fungi and to identify their role in degrading harmful heavy metals and PAHs.

Estimation of heavy metals were done by Flame-AAS/Atomic Absorption Spectroscopy) analysis, PAHs estimation was done by GC-MS (Gas Chromatography Mass Spectrophotometer) the maximum concentration of contaminants were selected to find out best fungal isolate. A 96 day analysis for PAHs and heavy metals degradation by fungal isolates were done, where 100ppm and 100g/gm of conc. Were maintained and run through UV-VIS Spectroscopy, isolates were named according to their appearance on the petri dish with 100ppm and 1000ppm of PAHs and heavy metals containing PDA and SDA media separately.

Results and discussion:



ANALYSIS	ST7	ST1	ST6	ST4	ST5
ST7	0.002	0.001	0.001	0.002	0.002
ST1	0.002	0.001	0.001	0.002	0.002
ST6	0.002	0.001	0.001	0.002	0.002

CONCENTRATION	ST7	ST1	ST6
ST7	0.018	0.020	0.004
ST1	0.018	0.018	0.008
ST6	0.018	0.018	0.008

But reselecting fungi for heavy metals were checked against lead and cadmium, found after AAS analysis against standard and SDA media/ heavy metals petri plates growth.

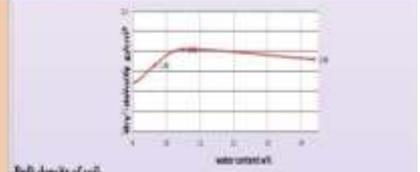
Fungal Isolate	Depth	Day 7	Day 14	Day 21	Day 28	Day 35	Final result of screening
ST7	0	+	+	+	+	+	Isolated
ST1	0	+	+	+	+	+	Isolated
ST6	0	+	+	+	+	+	Isolated
ST4	0	+	+	+	+	+	Isolated
ST5	0	+	+	+	+	+	Isolated
ST3	0	+	+	+	+	+	Isolated
ST2	0	+	+	+	+	+	Isolated
ST8	0	+	+	+	+	+	Isolated
ST9	0	+	+	+	+	+	Isolated
ST10	0	+	+	+	+	+	Isolated
ST11	0	+	+	+	+	+	Isolated
ST12	0	+	+	+	+	+	Isolated
ST13	0	+	+	+	+	+	Isolated
ST14	0	+	+	+	+	+	Isolated
ST15	0	+	+	+	+	+	Isolated
ST16	0	+	+	+	+	+	Isolated
ST17	0	+	+	+	+	+	Isolated
ST18	0	+	+	+	+	+	Isolated
ST19	0	+	+	+	+	+	Isolated
ST20	0	+	+	+	+	+	Isolated

Fungal Isolate	Depth	Day 7	Day 14	Day 21	Day 28	Day 35	Final result of screening
ST7	0	+	+	+	+	+	Isolated
ST1	0	+	+	+	+	+	Isolated
ST6	0	+	+	+	+	+	Isolated
ST4	0	+	+	+	+	+	Isolated
ST5	0	+	+	+	+	+	Isolated
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ST2	0	+	+	+	+	+	Isolated
ST8	0	+	+	+	+	+	Isolated
ST9	0	+	+	+	+	+	Isolated
ST10	0	+	+	+	+	+	Isolated
ST11	0	+	+	+	+	+	Isolated
ST12	0	+	+	+	+	+	Isolated
ST13	0	+	+	+	+	+	Isolated
ST14	0	+	+	+	+	+	Isolated
ST15	0	+	+	+	+	+	Isolated
ST16	0	+	+	+	+	+	Isolated
ST17	0	+	+	+	+	+	Isolated
ST18	0	+	+	+	+	+	Isolated
ST19	0	+	+	+	+	+	Isolated
ST20	0	+	+	+	+	+	Isolated

List of fungal colony and selection of best bio reselecting fungi against poly cyclic aromatic hydrocarbon Naphthalene and Benzofluoranthene, after GC-MS analysis against standard PDA media/ PAHs petri plates growth.

Fungal Isolate	Depth	Day 7	Day 14	Day 21	Day 28	Day 35	Final result of screening
ST7	0	+	+	+	+	+	Isolated
ST1	0	+	+	+	+	+	Isolated
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ST4	0	+	+	+	+	+	Isolated
ST5	0	+	+	+	+	+	Isolated
ST3	0	+	+	+	+	+	Isolated
ST2	0	+	+	+	+	+	Isolated
ST8	0	+	+	+	+	+	Isolated
ST9	0	+	+	+	+	+	Isolated
ST10	0	+	+	+	+	+	Isolated
ST11	0	+	+	+	+	+	Isolated
ST12	0	+	+	+	+	+	Isolated
ST13	0	+	+	+	+	+	Isolated
ST14	0	+	+	+	+	+	Isolated
ST15	0	+	+	+	+	+	Isolated
ST16	0	+	+	+	+	+	Isolated
ST17	0	+	+	+	+	+	Isolated
ST18	0	+	+	+	+	+	Isolated
ST19	0	+	+	+	+	+	Isolated
ST20	0	+	+	+	+	+	Isolated

Fungal Isolate	Depth	Day 7	Day 14	Day 21	Day 28	Day 35	Final result of screening
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ST1	0	+	+	+	+	+	Isolated
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ST4	0	+	+	+	+	+	Isolated
ST5	0	+	+	+	+	+	Isolated
ST3	0	+	+	+	+	+	Isolated
ST2	0	+	+	+	+	+	Isolated
ST8	0	+	+	+	+	+	Isolated
ST9	0	+	+	+	+	+	Isolated
ST10	0	+	+	+	+	+	Isolated
ST11	0	+	+	+	+	+	Isolated
ST12	0	+	+	+	+	+	Isolated
ST13	0	+	+	+	+	+	Isolated
ST14	0	+	+	+	+	+	Isolated
ST15	0	+	+	+	+	+	Isolated
ST16	0	+	+	+	+	+	Isolated
ST17	0	+	+	+	+	+	Isolated
ST18	0	+	+	+	+	+	Isolated
ST19	0	+	+	+	+	+	Isolated
ST20	0	+	+	+	+	+	Isolated



Bulk density of soil
The bulk density is the proportion of the weight of soil relative to its volume commonly measured as (g/cc) it is an indicator of the amount of pore space available within individual soil horizons, as it is inversely proportional to pore space.

Pore space=1-bulk density/particle density Soil moisture content
Result: the OMC is 2.95 at 10.49v

The total moisture content can easily be measured by using soil moisture content test, where this method covers the lab determination of the moisture content of a soil as a % of its oven dried weight/Standard Association of Australia AS 1288B11-197/Result: % water conc (w) % of sample= 3.230-3.009-2.965/0-3.071 is water content available in soil.

ST	ST1	ST2	ST3	ST4	ST5
ST1	1.148	1.148	1.110	1.208	1.208
ST2	1.188	1.188	1.110	1.208	1.208
ST3	1.117	1.117	1.110	1.208	1.208

Nutrients concentration: AAS were estimated for soil samples and it was found that and lacks few of them in table.

Available nutrient	Iron	zinc	Alph	Sample 1	Sample 2
Nitrate	270	270	100	233	193
Dinitrate	0.4	0.4	0.1	0.4	0.7
NO	0.7	1.555	0.7	0.2	0.8
NO	0.2	0.204	0.4	1.7	2.5
NO	0.2	0.244	0.4	0.8	0.8

Conclusion:

Our study was to find out a substitute, for the removal of toxicants from agricultural land and to maintain its ecological balance we found ST7 fungal isolate is best for the removal of heavy metals Pb and Cd, while for PAHs, Naphthalene and Benzofluoranthene ST7 and ST1 were best. Because the first thinks that make fungal overtake can spread over long distances, fungi can capture water and nutrients from far away and bring them back along the fine threads and close to plant roots. Due to their ability to produce a wide variety of extracellular enzymes, they are able to break down all kinds of organic matter. Decomposing soil components and thereby regulating the balance of carbon and nutrients. Soil health conditions have a tremendous impact on environmental sustainability including sustainability in agriculture, horticulture, and forestry. Moreover, soil health is directly connected with the production of healthy food which impacts public and animal health. More research is required to find the best way to maintain fungal biodiversity in soil, taking into consideration fungal functions and ecosystem services, including disease control, contamination detection, and bioremediation. Having the right tools, and being able to both identify species and discern their role in the environment is important. The ability to compare functional structures between ecosystems and predict responses to environmental changes and interventions would be a useful advance.





Poster presentation

on

Climate change and biodiversity effect on agriculture

Introduction: Climate change could make it more difficult to grow crops, raise animals, and catch fish in the same ways and same places as we have done in the past. The effects of climate change also need to be considered along with other evolving factors that affect agricultural production, such as changes in farming practices and technology.

Objective and methodology:

1) Impacts on Crops:

- ❖ Effect of increased temperature will depend on the crop's optimal temperature for growth and reproduction.
- ❖ If the higher temperature exceeds a crop's optimum temperature, yields will decline.
- ❖ Higher CO₂ levels can affect crop yields.
- ❖ Especially floods and droughts, can harm crops and reduce yields.
- ❖ Effect on natural enemies of crop pest
- ❖ Effect on Pollinators

2) Impacts on Livestock:

- ❖ Drought may threaten pasture and feed supplies.
- ❖ Climate change may increase the prevalence of parasites and diseases that affect livestock.
- ❖ Increases in carbon dioxide (CO₂) may increase the productivity of pastures, but may also decrease their quality.
- ❖ Potential changes in veterinary practices.

3) Impacts on Fisheries

- ❖ Many aquatic species can find colder areas of streams and lakes
- ❖ Some marine disease outbreaks have been linked with changing climate.
- ❖ Changes in temperature and seasons can affect the timing of reproduction and migration.

4) International Impacts



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❖ Internationally, these effects of climate change on agriculture and food supply are likely to be similar to those seen in the United States. However, other stressors such as population growth may magnify the effects of climate change on food security. In developing countries, adaptation options like changes in crop-management or ranching practices, or improvements to irrigation are more limited than in the India and other industrialized nations.

Conclusion: Impacts to the global food supply concern the India because food shortages can cause humanitarian crises and national security concerns. They also can increase domestic food prices.

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June 05-06, 2020

School of Biological Engineering & Life Sciences
Shobhit Institute of Engineering and Technology (Deemed-to-be-University)
Meerut, India



Organizer



THEME: BIODIVERSITY IN DIFFERENT ECOSYSTEMS

POLY EXTREMOPHILIC BACTERIAL BIODIVERSITY IN THE WATER ECOSYSTEM OF GANGOTRI, UTTARAKHAND AND THEIR POTENTIAL APPLICATIONS.

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INTRODUCTION

Gangotri, the origin of the river Ganges, is in Uttarakhand, India where the minimum temperatures range below 33°C throughout the year. The water from there when cultured, was found to contain certain bacteria, that are tolerant to high temperatures, pressure, areas of UV, sources of pH, high salt concentrations and even presence of heavy metals such as mercury, arsenic, etc. The isolated bacteria were new species of Bacilli identified as the basis of DNA sequencing, and has not yet been reported as Polyextremophilic strains.

In this investigation the extremophilic character of the three bacterial colonies were characterized as polyextremophiles and their capabilities of producing pharmaceutically industrially and agriculturally important enzymes were explored.

OBJECTIVES

- Isolation of bacteria from Samples collected from Gangotri with extremes of environmental conditions.
- Characterization of the isolated bacterial samples and their identification.
- Verification of their Polyextremophilic characteristics.
- Exploring their capacity of producing various industrially, pharmaceutically and agriculturally important enzymes.
- Exploring Polyextremophilicity as the only link to astro-terrestrial life.

MATERIALS AND METHODS

Isolation and characterization of the bacterial strains from the waters of Gangotri (river water bank) G1, G2 and G3.

Verification of their Polyextremophilic nature with respect to their tolerance to both high and low temperatures, pressure, salt concentrations, pH, stress of UV and heavy metal tolerance.

Qualitative analysis of the different enzyme producing capabilities of the bacterial strains that are pharmaceutically, agriculturally and industrially important.

Identification of the bacterial strains using 16S rRNA sequencing procedure.

CONCLUSIONS

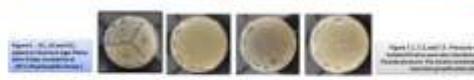
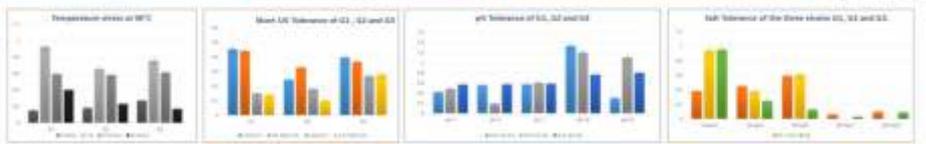
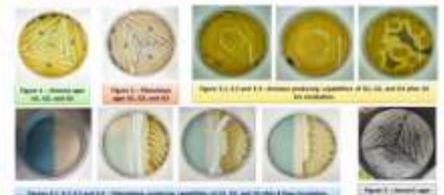
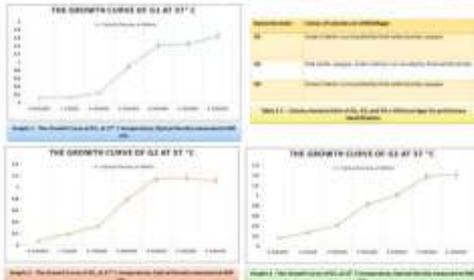
Isolated Bacteria were Polyextremophilic in nature. Many of them have till now never been reported before. Some of these strains can produce certain enzymes that have in pharmaceutical/industrial/ or agricultural importance, which can be stable in such extreme conditions.

FUTURE PROSPECTS

- As there has been very few works with respect to these three strains of Bacilli up even internationally, isolation of these bacteria from the waters of Gangotri remains. One time report. The study of their extremophilic characters opens up a new avenue for the study of their survival strategies in such extreme conditions where being isolated from a cold climate and high pressure being able to grow in such high temperatures and pressure.
- Extremophiles can be further used in the industry and the organisms can be directly used in agriculture in places of extreme climatic conditions.
- To explore the importance of these organisms as a link to life on earth and extra-terrestrial life.

RESULTS

Strain	Temperature	Pressure	pH	UV	Heavy Metal
G1	40°C	1000 psi	10	1000 hr	100 ppm
G2	40°C	1000 psi	10	1000 hr	100 ppm
G3	40°C	1000 psi	10	1000 hr	100 ppm



Strain	Name of Bacteria	Gene Name	Accession No.
G1	Bacillus pasteurii	CP001	MT000000
G2	Bacillus pasteurii	CP002	MT000000
G3	Bacillus pasteurii	CP003	MT000000

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Studies on the Composition and Potential as Biocontrol agent of *Citrus limetta* (Mousambi) Fruit Peel essential oil

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INTRODUCTION

- ◆ Citrus is an economically important fruit, but its peel is one of the major sources of agricultural waste and leads to pollution.
- ◆ About 50% of the weight of citrus fruits is discarded as waste peel, wastewater, juice vesicles and seeds.
- ◆ Juice recovery from citrus fruit is about 40-55%, with the processing residue consisting of peel and rag, poly seeds, seeds and citrus molasses.
- ◆ Citrus peel and rag are normally used either for pulp manufacturing, or they are dried and sold as cattle feed.
- ◆ In this study focus on potential of essential oil from its peel as biocontrol agents against plant pathogens.

EXPERIMENT

- 1. Extraction of essential oil:**
 - Sweet lime peels collected from juice centers, Delhi-NCR.
 - Fresh Citrus peels subjected to hydro-distillation for 3 hour (Clevenger-apparatus).
 - Extracted oil dried over anhydrous sodium sulfate, filtered and stored at -4°C.
- 2. Gas chromatography-mass spectrometry analysis:**

Analysis of the essential oil was performed on GC-MS-QP2010 Ultra benchtop at Advanced Instrumentation Research Facility (AIRF), IIT, Delhi.

3. Antifungal assay:

The antifungal activity of *C. limetta* peel essential oil was determined by petri plate method.

RESULTS

- ◆ Essential oil yield: between 0.5-0.3% on dry weight basis.
- ◆ A total of eighteen compounds, constituting 100% of the oil, were identified including the compounds in minor (<1-0.5%) and traces (less than 0.05%) using GC-MS (Table 2).
- ◆ The main ingredients were limonene (91.44%), 1,6-Octadien-3-ol, 3,7-Dimethyl- (2.22%), and Myrcene (2.89%).
- ◆ The oil was found to be rich in monoterpene derivatives mainly terpenes.
- ◆ The antagonistic activity of the essential oil was observed against fungus *Fusarium sp.*, and *Fusarium sp.*, while the fungi *Aspergillus niger* and *Penicillium sp.* were resistant to it (Table 1).
- ◆ On comparative chemical constituents identified in the oil analyzed with those earlier reports (Table 3), showed that the concentration of limonene was much higher (91.44%) in our sample as compared to other reported in the literature survey.
- ◆ The other constituents such as α, β-pinene, bornenol, linalool, sabinene, β-pinene, β-bisabolol, geranyl acetate, nerol, geraniol, α-terpineol, limonol, camphor as reported earlier were found to be absent in the present studies (Table 3).

Table 1: Antifungal activity of essential oil of Sweet lime (*Citrus limetta*) peel against plant selected pathogens

Fungus (Plant Pathogen)	Antagonistic activity
<i>Acromonium sp.</i> ,	+
<i>Fusarium sp.</i> ,	+
<i>Aspergillus niger</i>	-
<i>Penicillium sp.</i>	-

(+ = present) ; (-) = absent

OBSERVATION

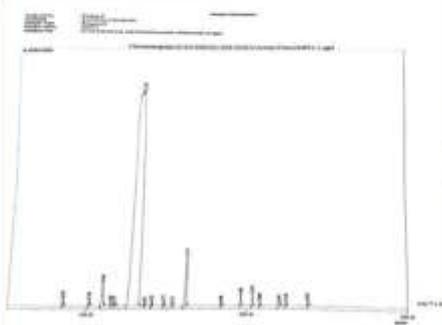


Fig 1: Chromatogram of Sweet lime (*Citrus limetta*) peel essential oil

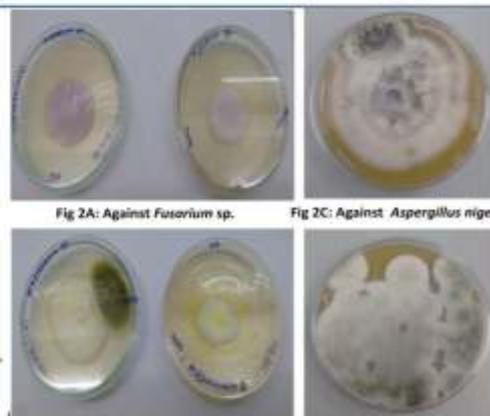


Fig 2A: Against *Fusarium sp.*

Fig 2C: Against *Aspergillus niger*

Fig 2B: Against *Acromonium sp.*

Fig 2D: Against *Penicillium sp.*

Figure 2: Antifungal activity of Sweet lime (*Citrus limetta*) peel essential oil against selected plant pathogens (MPO: Mousambi peel oil)

Table 2: Composition of essential oil of Sweet lime (*Citrus limetta*) peel

Peak	Retention time	Area %	Name
1	8.536	0.37	Bicyclo (3.1.1) hept-2-ene, 2,6,6-trimethyl-
2	10.150	0.32	Bicyclo (3.1.0) hexane, 4-methylene-1- (1-methyl)
3	10.948	2.05	Myrcene
4	11.482	0.21	Octanol
5	11.716	0.12	Z-beta-ocimene
6	13.218	91.44	Limonene
7	13.592	0.02	1,3,6-octatriene, 3,7-dimethyl- E-
8	14.022	0.09	Tricyclo [2.2.1.0 (2,6)] heptane, 1,7,7-trimethyl-
9	14.775	0.13	1-octanol
10	15.321	0.05	Terpinolene
11	16.175	2.22	1,6-Octadien-3-ol, 3,7-dimethyl-
12	18.398	0.09	6-Octenal, 3,7-dimethyl-
13	19.648	0.46	Terpinen-4-ol
14	20.392	0.58	Terpineol -alpha-
15	20.860	0.21	Decanal
16	22.099	0.21	6-Octadienal, 3,7-dimethyl-
17	22.530	0.19	2,6-Octadienal, 3,7-dimethyl-
18	23.905	0.23	2,6-Octadienal, 3,7-dimethyl-
		100	

Table 3: Comparison between *Citrus limetta* in present study and other authors (% area percent)

Compounds	¹ Wild lime	² Lime commercial oil	³ Lime aurantiifolia	⁴ Citrus aurantiifolia	⁵ Citrus aurantiifolia	⁶ Citrus limetta (seeds)	⁷ Present study Citrus limetta (peel)
Limonene	68.50	49.9	75.5	--	63.44	71.70	91.44
1,6-octadien-3-ol, 3,7-dimethyl-	--	--	--	--	--	--	3.22%
Myrcene	1.44	1.3	--	--	1.46	1.31	2.05
α-Terpinol	0.02	6.2	13.3	--	0.37	0.33	0.58
Terpinen-4-ol	--	--	6.8	--	0.19	0.07	0.46
BICYCLO[3.1.1]HEPT-2-ENE, 2,6,6-TRIMETHYL-	--	--	--	--	--	--	0.37
BICYCLO[3.1.0]HEXANE, 4-METHYLENE-1-(1-METHYL)-	--	--	--	--	--	--	0.32
2,6-OCTADIENAL, 3,7-DIMETHYL-	--	--	--	--	--	--	0.23
6-OCTEN-1-OL, 3,7-DIMETHYL-	--	--	--	--	--	--	0.21
OCTANAL	--	--	--	--	--	--	0.21
DECANAL	--	--	--	--	--	--	0.21
2,6-OCTADIENAL, 3,7-DIMETHYL-	--	--	--	--	--	--	0.19
1-Octanol	--	--	--	--	--	--	0.13

CONCLUSION

- ◆ It is concluded that peels of *Citrus limetta* (Sweet lime) growing in Western parts of India contain highest amount of limonene and thus could be utilized as source of limonene rich sweet lime oil.
- ◆ The essential oil showed antifungal activity against two common plant pathogens namely *Acromonium sp.*, and *Fusarium sp.*
- ◆ Thus the essential oil from *Citrus limetta* peels can also be used as a biocontrol agent in the management of plant diseases in the near future.

FUTURE PROSPECTS: Further studies on the analysis of different germplasm from different regions of India are required to identify the high yielding chemo-types of Sweet lime in India.

References:

- 1: Shaw et al., 2000; 2: Steuer et al., 2001; 3: Yadav et al., 2004; 4: Mahmud et al., 2009; 5: Bousbia et al., 2009; 6: Maria et al., 2012

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***Senna auriculata L.* flower petal biomass: a green biosorbent for the removal of fluoride from aqueous solutions**



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Introduction: Fluoride is an essential micronutrient in humans in preventing dental caries and in facilitating the mineralization of hard tissues if taken at a recommended range of concentration. But if it is greater than 1.5 mg / L, it is responsible for the dental and skeletal fluorosis. The Guideline for Drinking Water Quality of the World Health Organization (WHO) has recommended that fluoride be present in the range of 0.5-1.0 mg / L (WHO, World Health Organization, 2011). The removal of fluoride from groundwater can be accomplished by the conventional methods that are based on membrane technologies like reverse osmosis, nanofiltration, ion exchange, donan dialysis, electro coagulation, flotation, precipitation, and electro dialysis are expensive and consume energy. In the recent past, the use of adsorptive removal of fluoride from water by the use of bio-materials derived from various parts of plants as adsorbents is increasingly envisaged due to their availability in nature, eco-friendly, economically feasible and convenient.

A number of biomaterials derived from plants have been used as precursors for the preparation of biosorbents used for the removal of fluoride.

Objectives: The main objective of this study is:

- To evaluate the flower petal biomass of *Senna auriculata L.* for the removal of fluoride by batch experimental method.
- Characterisation studies of developed biomass
- Isothermal studies

Methodology:

Chemicals and Reagents:

The chemicals actually used in the study are analytical reagent grade, 99 per cent purity NaF was purchased from (HiMedia). All Other reagents used were also of good purity. All the solutions were prepared for the analysis, using double distilled water. 0.1 g / L fluoride stock solution was prepared from 0.221 g of anhydrous NaF to distilled water and dilute to 1L solution. The required concentrations of fluoride solutions were developed by diluting the stock solution.

Preparation of biosorbent:

Initially, *Senna auriculata L.* flowers obtained from nearby forest area and separated petals from the flowers. Separated flower petals were washed with tap water 2-3 times then by double distilled water to get rid of dust and other particles and kept for 2-3 days under sunlight for drying. The biomass was then dried by heating at 70 ° C in a hot air oven for 24 hours. The dry biomass was crushed to small particles and grounded into uniform size and stored in an air tight container for further studies.

Instrumental Techniques:

The concentration of fluoride was calculated using the UV-Vis spectrophotometer following SPADNS method. Digital pH meter was employed to measure pH of the aqueous solution. Biosorbent characterization studies performed using SEM in combination with EDX to study surface morphology and biosorbent mineral composition. The various functional groups were studied using FTIR along with the specific bonding mechanisms found in newly formed biosorbent.

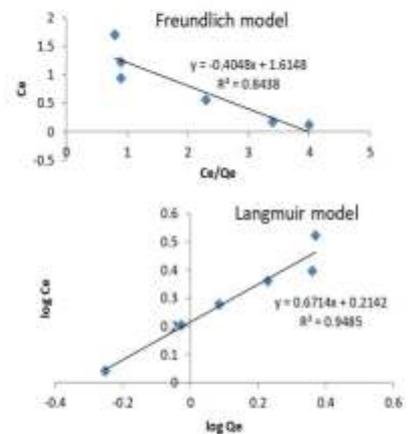
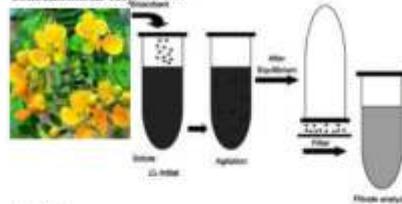
Batch biosorption experiments:

The whole experiment was carried out in batch mode. Exactly 50 ml of the required fluoride solution was taken into a conical flask of 250 ml and required quantity of biosorbent was added.

The pH of the solution was adjusted at the desired values by using 0.1M HCl or 0.1M NaOH. Digital pH meter was used to assess the pH of the solution. The solution was shook over a period of time at constant speed (150 rpm) with an orbital shaker then filtered using Whatman filter paper and the concentration of filtrate was analyzed using SPADNS procedure at 570 nm wavelength using UV-vis Spectrophotometer. Each experiment was carried out three times, and the mean values are reported. The percentage of fluoride removal was estimated by the following equation:

$$\text{Fluoride removal percentage (\%)} = \frac{(C_0 - C_e)}{C_0} \times 100$$

Where, C_0 and C_e are the initial and final fluoride concentrations respectively



Conclusion:

Based on the batch experimental results and isothermal studies it is concluded that *Senna auriculata L.* biomass can be used as an inexpensive, eco-friendly biosorbent for the removal of fluoride from the aqueous solutions as well as real field applications.

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MICROBIAL CONSORTIUM AGAINST POTENTIAL TEA PATHOGENS

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INTRODUCTION

Tea (*Camellia sinensis*) is the oldest known beverage made from tender leaves of the tea plant. Factors like climate change, heavy phyto-pathogenic infestations, heavy metal toxicity, and other abiotic stresses are largely responsible for this sharp decline in production of tea.

OBJECTIVES

- Isolation and characterization of two major foliar pathogens from tea leaves
- Characterization of bacterial isolates from tea rhizosphere
- Formulation of novel consortium
- In vitro analysis of said consortium against the phytopathogens

MATERIALS AND METHODS

Collection and characterization of major tea pathogens

Collection and characterization of some common PGPR isolates and isolates from tea rhizosphere

Testing the efficacy of PGPR isolates against foliar pathogens.

Development of novel consortium and in vitro testing for efficacy.

RESULTS

Fig1. Diseased leaf showing anthracnose and red rust of tea

Fig2. Cross section of infected tea leaves showing algal red rust symptoms and secondary necrosis for severe fungal anthracnose symptoms.

Fig3. Morphological study of red rust algae or *Cephelebotrys* sp. spores and *Gaelectrichium* sp. spores. Micrometry analysis shows the mean spore diameter to be around 6 – 88.8 µm. The micrometry study for *Colletotrichum* spores shows mean length to be around 14.52µm and mean breadth of spores be 3.63µm.

Fig4. Percentage infected area after red rust infection was calculated with 5% error range where percent infected area came to be around 16.95%.

Fig5. Microscopic study of tea rhizospheric isolate

For formulating novel consortium minimizing the negative rhizospheric root effect an active bacterial strain from tea rhizosphere was isolated and characterized along with 5 other common bio-control strains based on their PGPR activities

Fig6. Interaction studies were done amongst the selected strains with the strain isolated from tea rhizosphere to check their antagonistic effects on each other. Also in vitro analysis of interaction between phytopathogenic fungi and strains of interest was done to check the inhibitory effects.

Fig5. Various biochemical analysis of the selected bacterial strain was performed to characterize it, which includes chrome UFI agar tests, indole test, Citrate Utilisation Test, Methyl red and Voges Proskauer test.

Fig6. Fungal bacterial interaction in Nutrient agar plates at 5% error range.

Fig7. Fungal bacterial interaction on Potato dextrose agar at 5% error range.

Fig8. A comparative study in differences of algal biomass between liquid, solid and consortium based media was studied.

Fig9. An Oil-based consortium was formed with selected strains and it showed remarkable inhibition in fungal growth.

Fig7. Vigorous growth of the selected strain on nitrogen deficient media like YEMA and Jansen was observed proving it to be an extremely beneficial bio-control strain.

Fig10. Oil-based consortium was formed with selected strains and it showed remarkable inhibition in fungal growth.

Fig11. In detect the presence of volatile exudates of selected strains aerated plate assay was done against phytopathogenic fungi inhibition and disc diameter was recorded at 1, 2 and 4 days at 5% error range.

CONCLUSION

The study shows

- Development of two novel bio-formulations which have shown potent inhibition against two major foliar pathogens of cultivated tea varieties
- Presence of viable exudates from various PGPR bacterial strains used in consortium. Further in vitro analysis and statistical modelling in this respect holds a lot of future possibilities.

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Organizer

IMPORTANCE OF BIODIVERSITY, GREENING & GREEN ENERGY PROMOTION, IN THE CONTEXT OF GLOBAL WARMING & CLIMATE CHANGE
Debashis Banerji, Co-founder Samaj Pragati Sahayog & Baba Amte Centre for People's Empowerment,
Bagli, District Dewas, MP, India

1. GLOBAL WARMING

Arctic ice melting,
Changed air and ocean currents,
Sea level rise etc.,

CLIMATE CHANGE

Unpredictable Weather Pattern
(delayed monsoon, heat, untimely
downpours withdrawals, cold waves,
frost, hailstorms etc.,)



2. POSSIBLE MAIN REASONS :

- Deforestation**
- Coal/Fuel Wood Burning**
- Forest Fires**
- Fossil Fuels**
- Harmful Gas Emitting Industries**
- Etc., Specially halocarbons**
(Anthropogenic & Not Geological)

3. SOLUTIONS ????

**MAINLY
GREENING &
GREEN ENERGY**



ridge valley

Rain Water Harvesting In a watershed



trench



bund



dugout pond



gabion dam



farm bund

4. GREENING Linked Agro-Horti-Forestry



Forest linked nurseries



2002



2010

INCREASED OPPURTUNITIES OF LIVELIHOOD SECURITY HAVE LED TO

- 90 % REDUCTION IN OUTMIGRATION IN OUR AREA
- REVIVED PEOPLE'S INTEREST IN FOREST PROTECTION

WITH THE PEOPLE, THE VILLAGERS RETAINED AND CONSERVED IN THEIR OWN RURAL ECOSYSTEM BIODIVERSITY CONSERVATION BECOMES POSSIBLE AND A REALITY

5. GREEN ENERGY



Biogas use



Solar panels use

THANKS





Restoring Nature towards Fight against Climate Change and Biodiversity Equilibrium



Dipankar Ghosh, Ankita Mondal, Suvasree Fouzdar, Sayantani Paul, Sneha Mondal, Rumi Gharami, Debraj De, Somalia Saha, Diya Chatterjee, Dishanee Sen, Somashree Pradhan, Moumita Karmakar, Pamela Chakraborty, Arpan Roy Chowdhury, Payel Manna, Jayita Bhattacharya, Tanni Halder, Shrestha Debnath, Somnath Das, Kamalendu De and Palash Ghorai



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ABSTRACT

Global climate change and drastic imbalance in biodiversity are forcing nature to re-equilibrate or implement the restoration approaches. Anthropogenic activities are main culprit of these drastic alterations in climate, and biodiversity misbalance profile on globe. However, the issue of climate change and biodiversity are interconnected. Climate change rapidly increases diverse ranges of stresses on natural ecosystem and biodiversity. Therefore, a paradigm shift needs to be implemented to restore natural systems, restore biodiversity, and minimize climate changes to make our globe sustainable. Thus current study deals with different restoring approaches in nature to combat with climate changes and biodiversity equilibrium.

INTRODUCTION

Restoration of nature aims to recreate, initiate or accelerate the recovery of a bio-geo-chemical system that has been imbalanced. Climate change deals with the average long term changes over the entire Earth. These includes warming temperatures and changes in precipitation, as well as the effects on Earth's warming likely rising sea levels, shrinking mountain glaciers, polar ice melting at faster rate, changes in flower and plant blooming times etc. Biodiversity is the diversity and variability of living bodies on Earth. Biodiversity is typically a quantization of variation at the genetic, species and bio-geo-chemical cycle arena, it is most commonly used to substitute the more clearly defined and long established terms, species diversity and species richness time to time. At present massive urbanization and human malpractices i.e. environmental pollution, ocean acidification following marine bio ecosystem imbalance have been accelerating primitive naive biodiversity of nature on Earth. Climate change rapidly increases diverse ranges of stresses on natural ecosystem and biodiversity. Therefore, a paradigm shift needs to be implemented to restore natural systems, restore biodiversity, and minimize climate changes to make our globe sustainable.

OBJECTIVE

Major objective of this current study deals with different restoring approaches in nature to combat with climate changes and biodiversity equilibrium.

METHODOLOGY

Different approaches of Restoration of nature or ecosystem has been depicted below (Fig. 1)

- Revegetation** (The establishment of vegetation on sites where it has been previously lost)
- Habitat Enhancement** (The process of increasing the suitability of a site as habitat for some desired species)
- Remediation** (Improving an existing ecosystem or creating a new one with the aim of replacing another that has destroyed).
- Mitigation** (Legally mandated remediation for loss of protected species or ecosystem)

RESULTS

(1) Increased nutrient load and vegetation load which has been previously lost by various human malpractices; (2) Reduces deforestation which accelerates the restoration of naive species in different ecological niches; (3) Environmental biogeochemical cycle will be restored towards sustainable and greener Earth.



Fig. 1. Different approaches of restoration of nature.

CONCLUSION & FUTURE OUTLOOK

To attain sustainable restoration scheme for nature requires substantial changes in institutions and governance, economic policies and incentives, social and behavior factors, technology, and knowledge in various sectors (such as agriculture, forestry, finance, trade, and health) indulging greater transparency and accountability of Government and public.

ACKNOWLEDGEMENT

Authors would like to thank **Prof. B.C Mal** (Hon'ble VC, JIS University) and **JIS Group of Educational Initiatives** for moral support to carry out this extensive literature survey for preparing this e-poster.

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Eco-friendly method to control Root Knot Nematode in Cowpea

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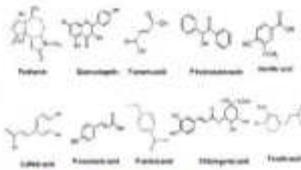


Noxious Weed



A fast maturing branching annual herb. Able to germinate, grow, mature and set seed in 20 days. Toxic to stock and can cause allergic reactions in people.
As much as 10 to 15 m high becoming widely with age, and a dense low root.
Foliage green, lobed leaves, covered with soft fine hairs.
Flowers grow on the stem tips, and are small, white and 8 mm across with five distinct segments. Each flower produces four or five seeds.
Seeds are black and wedge-shaped, 2 mm long, with thin white scales. Up to 100,000 seeds produced per plant.
Seeds spread easily by wind, vehicles, machinery, stock, grain and fodder.

Biochemicals in Parthenium



Allelopathy

INTRODUCTION

Allelopathy refers to all biochemical interactions, allelopathy or secondary-organic plants including in crop (Muller, 1937).
Ecological effect of others or molecules produced by one living plant on its partner, growth, form of other plant or its org. affecting some habitat. (Biswas, 1988)

Chemical interactions between (higher) plants.
Chemically mediated fight of plants for nutrients.
Allelopathic compounds (toxins) - secondary metabolites, structurally simple - terpenes or aromatics.
Allelopathy is common in trees and bushes, plants in desert (lack of water and nutrients) exists in all climatic zones.

Growth Stages of Cowpea

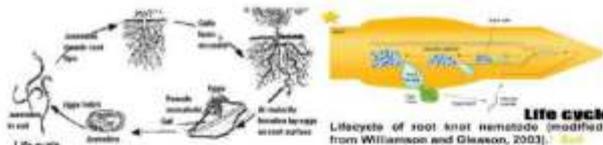


Materials And Methods

- The test crop- Cowpea (*Vigna unguiculata* L. Walp.).
- Root Knot-Disease
- Source of root- knot- infected seeds.
- Biochemical Used- Root- Extract (RE), Stem Extract (SE), Leaf Extract (LE) & Flower Extract (FE).
- Concentration- 10, 40 & 80%.
- Treatments- 20, 40 & 80 (mg) (Shot Experiment).
- Experiment- 20, 40 & 80 (mg).
- Experiment- 20, 40 & 80 (mg) (Shot Experiment).
- Statistical Analysis- Post and S.D. (F-test, 1985).

Objectives

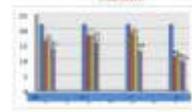
- To evaluate the allelopathic potential of different parts of weed.
- To find out the primary method for preparation of weed extracts.
- Evaluation of plant extracts in the management of root- knot disease (Nematode) in cowpea (*Vigna unguiculata* L. Walp.).



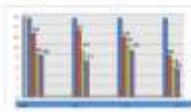
To assemble and set up a Baermann funnel to extract nematodes



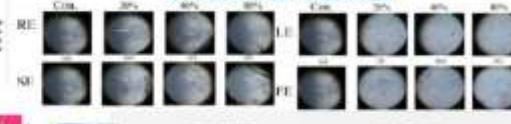
Number of Nematode Eggs per unit area of magnification (10x) after 24 hrs of incubation



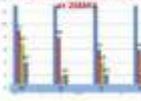
Number of Nematode Eggs per unit area of magnification (20x) after 48 hrs of incubation



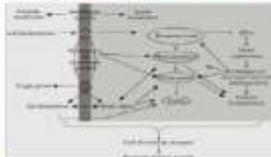
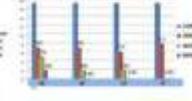
24 Hours After Treatment



Number of Root Knot Galls at 20x



Number of Root Knot Galls at 40x



Conclusion

There are many potential problems with attempting to use allelopathy as a practical tool until if we overcome them to some extent allelopathy is the best "Natural Nematocide". We can reduce the consumption of nematicides, mostly are highly toxic. This may lead to the efficient management of this Noxious weed.





Organizer



Use of Sustainable Resource Management in Agriculture

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Introduction: The connections between water and land resources, climate, and food production continue to receive considerable attention in the scientific literature [Foley et al., 2005, 2011; Godfray et al., 2010; Kearney, 2010] and in the popular press [Lomborg, 2001; Brown, 2006; Diamanti and Kotler, 2012]. Despite all this attention, there are still substantial disagreements about the current food situation and even more about prospects for the future. On a global scale, food production and quality of life measures such as per capita caloric intake, infant mortality, and life expectancy have improved substantially over the last few decades [United Nations, 2014]. Analysts suggest that the projected global population could be readily fed if yields everywhere were brought up to levels currently attained in the developed world [Maeller et al., 2012; West et al., 2014]. On the other hand, concerns about the sustainability of current production levels, stressed ecosystems, and climate change have prompted some observers to predict an impending crisis in food production [Schade and Pimentel, 2010; Ehrlich and Ehrlich, 2013]. At this end, farmers in all countries are now faced with a double challenge: to improve the productivity and yield of crops while preserving resources. Management of resources (soil, water, land and climate) in particular, will be a critical issue in the years to come. All scientists and researchers side by side try to help farmers for developing sustainable agriculture.

Concepts : Sustainable Development : Sustainable development is development that meets the need of the present without compromising the ability of the future generations to meet their own needs. It contains within it two key concepts:
 □ the concept of "needs", in particular the needs of the world's poor, to which overriding priority should be given; and
 □ the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs." (WCED 1987, p. 43).

Sustainable Agriculture: Sustainable agriculture is farming in sustainable ways, which means meeting society's present food and textile needs, without compromising the ability for current or future generations to meet their needs. It can be based on an understanding of ecosystem services. There are many methods to increase the sustainability of agriculture.

Resources:

1. Soil
2. Land
3. Water
4. Energy
5. Nutrients



Energy Resources

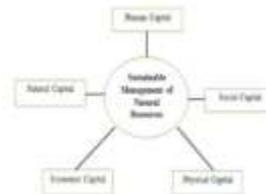
*In modern agriculture, energy is used in on-farm mechanisation, food processing, storage, and transportation processes.
 *Oil is also used as an input in agricultural chemicals. The International Energy Agency projects higher prices of non-renewable energy resources as a result of fossil fuel resources being depleted. It may therefore decrease global food security unless action is taken to 'decouple' fossil fuel energy from food production, with a move towards 'energy-smart' agricultural systems.

Energy Resources Management includes solar energy, wind energy, local resources for transportation, water generated electricity, tidal energy.

Soil Management

- Land degradation is becoming a severe global problem due to excessive use of inorganic fertilizers.
- According to the Intergovernmental Panel on Climate Change: "About a quarter of the Earth's ice-free land area is subject to human-induced degradation (medium confidence).
- Soil erosion from agricultural fields is estimated to be currently 10 to 20 times (no tillage) to more than 100 times (conventional tillage) higher than the soil formation rate (medium confidence)."
- Over a billion tonnes of soil are being lost to erosion annually, which if continued will result in halving of crop yields within thirty to fifty years. Improper soil management is threatening the ability to grow sufficient food.
- Intensive agriculture reduces the carbon level in soil, impairing soil structure, crop growth and ecosystem functioning and accelerating climate change.

Soil management techniques include no-till farming, keyline design and windbreaks to reduce wind erosion, reincorporation of organic matter into the soil, reducing soil salinization, and preventing water run-off.



Land Management

- As the global population increases and demand for food increases, there is pressure on land as a resource. In land use planning and management, considering the impacts of land use changes on factors such as soil erosion can support long-term agricultural sustainability.
- Currently, increased land degradation in developing countries may be connected with rural poverty among smallholder farmers when forced into unsustainable agricultural practices out of necessity. Land is a finite resource on Earth.
- Although expansion of agricultural land can decrease biodiversity and contribute to deforestation, the fine partitioning of land plots contributed more to soil erosion and degradation than grazing itself.
- The Food and Agriculture Organization of the United Nations estimates that in coming decades, cropland will continue to be lost to industrial and urban development, along with reclamation of wetlands, and conversion of forest to cultivation, resulting in the loss of biodiversity and increased soil erosion.

Land Management techniques include reclamation of degraded lands, forestation, cultivation and growing of different types of plants for promoting biodiversity, animal husbandry.

Water Management

- In some areas sufficient rainfall is available for crop growth, but many other areas require irrigation.
- For irrigation systems to be sustainable, they require proper management (to avoid salinization) and must not use more water from their source than is naturally replenishable.
- Improvements in water well drilling technology and submersible pumps, combined with the development of drip irrigation and low-pressure pivots.

According to the UC Davis Agricultural Sustainability Institute, several steps must be taken to develop drought-resistant farming systems even in "normal" years with average rainfall. These measures include both policy and management actions:
 >Improving water conservation and storage measures
 >Providing incentives for selection of drought-tolerant crop species
 >Using reduced-volume irrigation systems
 >Managing crops to reduce water loss
 >Not planting crops at all

Indicators for sustainable water resource development include the average annual flow of rivers from rainfall, flows from outside a country, the percentage of water coming from outside a country, and gross water withdrawal.

Nutrient Management

Sources of nitrates that would be available indefinitely, include:
 *recycling crop waste and livestock or treated human manure
 *growing legume crops and forages such as peanuts or alfalfa that form symbioses with nitrogen-fixing bacteria called rhizobia
 *industrial production of nitrogen by the Haber process uses hydrogen, which is currently derived from natural gas
 *genetically engineering (non-legume) crops to form nitrogen-fixing symbioses or fix nitrogen without microbial symbiont (Sustainable options for replacing other nutrient inputs such as phosphorus and potassium are more limited.)
 Options include long-term crop rotations, returning to natural cycles that annually flood cultivated lands (returning lost nutrients) such as the flooding of the Nile, the long-term use of biochar, and use of crop and livestock landraces that are adapted to less than ideal conditions such as pests, drought, or lack of nutrients. Crops that require high levels of soil nutrients can be cultivated in a more sustainable manner with appropriate fertilizer management practices.

Conclusion: In the context of development in agriculture sector the key elements of land, soil, water, energy provide the main backbone of sustainability. These factors at the same time play a vital role in sustainability of environment and biodiversity. Other important factors such as nutrient management, disease and pest management in the integrated form can help in not only increase in the yield of crops grown but also maintain the ecosystem of farming at present scenario and in future farming scenario.

SAVE EARTH
SAVE HUMAN





Impact of COVID-19 on environment

Miss Samiya Maqsood

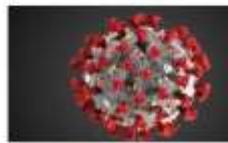
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Introduction:

- The coronavirus COVID-19 pandemic is the determining worldwide health catastrophe.
- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)** is the causal agent of this disease.
- Firstly, it was recognized in Wuhan, the capital of Hubei, China in 2019 and has since spread globally.
- From the time it has emerged, it is causing havoc everywhere it is spreading.



Positive Consequences:

Air Quality: It has increased significantly.

- Sharp drop in levels of Carbon dioxide (CO₂), Nitrogen dioxide (NO₂), other greenhouse gases particulate matter has been observed.
- Mountains** like Himalayas are clearly visible from Punjab, Mount Everest is visible from Bihar and other adjoining areas.



Water quality: Rivers water quality has got better significantly.

- Water of **Ganga and Yamuna** along with other water bodies has improved since industries are not releasing toxic effluents in the river bodies, people are not visiting, also because of melting snow coming.
- Images from world-famous canals in Venice, Italy shows that the murky water appears much clear now since sediments are settled at the bottom without the boat traffic, decreasing the water turbidity to much extent. Though, it is not necessarily a sign of improved water quality.
- Dolphins** were seen in the sea from Mumbai's southern coast.



Wildlife: It has also responded to the change.

- Many animals can also be seen wandering around e.g. Stag was seen scampering through Dehradun in India. Monkeys, dogs, cats etc. can be seen brawling over food in absence of people.
- More **birds** can be seen around in the locality, campus etc. because of the shutdown. Flamingo **migration** has also increased in Mumbai.
- Some aquariums have also set the animals free since they are shut e.g. Penguins can be seen exploring Chicago aquarium



Negative Consequences:

- Farmers are not able to access their **fields; natural reserves and ecosystems** are not getting maintained; no surveys are getting done.
- Environmental protection workers absence has resulted in a rise of **illegal deforestation, fishing and wildlife hunting**.
- Problem of **recycling of waste** is also occurring since quarantine is done.
- Because of cut in agricultural and fishery export levels, large quantities of **organic waste** is generated.
- Ecotourism** is affected and unemployment is increasing.
- Even **alternate energy sources** are also affected during this time due to travel ban because plants are not working.
- Environmental diplomacy efforts** by the governments are also disrupted like the postponement of the 2020 United Nations Climate Change Conference and the economic fallout from it is predicted to slow investment in green energy technologies.
- The **economy and emissions** are linked. Due to this lockdown, emissions are decreasing. Also, recession in economy is seen.

Conclusion:

- Covid-19 economic **rescue plans** should be green.
- Climate change is also a threat to all of us.
- Innovation** in technology and better policies are needed to explore use of renewable energy to much greater extent.
- Changes should be done for **low carbon future** and climate challenge sight should not be lost to counter economic damage.
- Reduced pollution level** can potentially save much more lives and increase its span.



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Organizer

Section: Biodiversity conservation and Sustainable human life



FT-IR Spectroscopic estimation of Bioactive metabolites in callus cultures of *Cissus quadrangularis* L. raised under different salt concentrations



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ABSTRACT

Plants act as a treasure house for several bioactive compounds. These bioactive compounds vary in their structural arrangements and properties. The Fourier Transform Infrared (FTIR) Spectroscopy is an established way to characterize and to identify the functional groups. The aim of this research work is to check the effect of Salt stress (50mM and 100mM) on the accumulation of bioactive compounds in callus of *Cissus quadrangularis* L. raised using leaf and stem explants on MS Medium supplemented with different concentrations of PGRs (NAA+ BAP). The results of the FTIR analysis confirmed the presence of Phenols, Aromatic compounds, Nitro compounds and Carboxylic acids in *Cissus quadrangularis* L. callus cultures.

INTRODUCTION

Human use of plants as medicinal agents predates recorded history (Graham *et al.*, 2000). Identification of the chemical nature of phytochemicals gives insight about the functional groups associated with the medicinal values. The plant *Cissus quadrangularis* L. belongs to Vitaceae and commonly found in tropical regions, usually called as 'Asthasamhan' Asthasamhan, Vajravalli, Asthasamkhala, Hadjod and well known for its medicinal values. As per review of Literature it was found that a little work was done *in vitro* using leaf and stem as explant. The present study not only focuses on optimization of tissue cultural needs of the plant but also aims to find out the effect of Salt concentration on the bioactive metabolite production in the 4 Week callus cultures as compared to control. For this a simple, cost effective and time saving method i.e. FT-IR Spectroscopy has been used.

MATERIAL AND METHODS

- ✓ For the callus induction leaf and stem of *Cissus quadrangularis* L. were used as explants over a range of hormonal combinations including MS Medium supplemented with (NAA+ BAP)
 - ✓ The plant part samples (Leaf and Stem) and 4 Week callus cultures (Leaf and Stem) with or without Salt Concentration (50mM and 100mM NaCl) were oven dried at 60°C and ground into fine powder using Mortar and Pesticle
 - ✓ 2mg of the samples were further mixed with 200mg KBr (FT-IR Grade) and pressed into a pellet.
 - ✓ The pellet was kept into the sample holder and FT-IR Spectra were recorded in the range of 4000-500cm⁻¹ for all the samples.
- All the investigations were carried out using IRAffinity-1 (Shimadzu) Model, FT-IR Spectrophotometer.

WORK PLAN



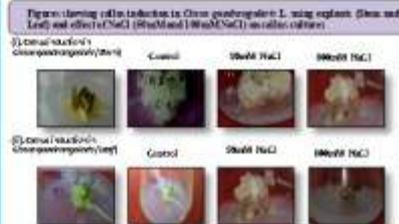
Figures showing FT-IR Spectrum of bioactive metabolites of *Cissus quadrangularis* L. callus cultures (A. Stem B. Leaf) treated with different NaCl (50mM and 100mM) concentrations.

OBSERVATIONS

Table 1: Effect of various concentrations and combinations of PGRs (mg/l) in callus induction/ formation in *Cissus quadrangularis* L. explants (stem and leaf)

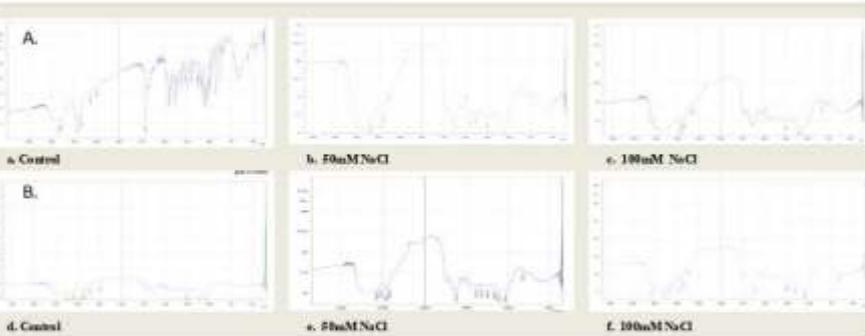
S. No.	MS Medium		Stem explants		Leaf explants	
	NAA	BAP	Callus growth	Colour of callus	Callus growth	Colour of callus
1.	1	0.1	-	-	-	-
2.	2	0.2	-	-	-	-
3.	2	0.5	++	Brown	-	-
4.	2	0.4	+++	Brown	+	Green
5.	2	0.5	+++	Light Green	++	Green

Where (-) no callus, (+) low callus, (++) moderate callus and (+++) high callus.



RESULTS AND DISCUSSION

- Out of several ranges of hormonal combinations for best growth of callus (Stem and Leaf) in *Cissus quadrangularis* L. were observed at MS+ 2mg/L NAA+0.5 mg/L BAP (Table-1).
- For estimating the effect of salt concentrations (50mM and 100mM NaCl) on the bioactive metabolites the 4 Week callus cultures (Leaf and Stem) were compared with their respective controls using FT-IR.
- The IR Spectrum of all the collected samples are shown in Figures. a, b, c, d, e and f).
- Presence of C-C, C-H bonding structures are responsible for the formation of Alkyl groups, methyl groups, alcohols, carboxylic acids, anhydrides (Draze, 2001; Solrahi *et al.*, 2003).
- The more intense bands occurring at 2925cm⁻¹, 2855cm⁻¹, 1346cm⁻¹, 1235cm⁻¹ corresponding to C-C, C-H stretching/bending vibrations respectively suggests the presence of Alkanes, Carbohydrates, Phenols in the callus samples (Mancj and Rogelshman, 1999).
- Using the reference Library Manual of IR Affinity-1 it was found that the callus cultures contain amino acids, xilophylls, steroids, lignans, carbohydrates, phenols and aromatic compounds along with other bioactive metabolites.
- The results also show that the bioactive metabolite production in *Cissus quadrangularis* L. is enhanced under 100mM NaCl treatment as compared to 50mM NaCl within 4 Weeks of callus induction.



ACKNOWLEDGEMENT

One of the Author (Juhi Dhillon) with IF 15045 is thankful to DST, New Delhi for the financial support under Inspire Fellowship Scheme for the present research work.

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CONCLUSIONS

The results clearly shows that MS medium supplemented with 2.0 mg/L NAA and 0.5 mg/L BAP is the suitable combination for developing callus in *Cissus quadrangularis* L. using leaf or stem as explant. The amount of bioactive metabolites in the callus cultures is influenced by the salt concentration (50mM and 100mM NaCl). The FT-IR analysis indicates that is necessary to control the bioactive metabolites (Aromatic compounds, phenols and Steroids) are present in 4 Week callus cultures of leaf and stem explants raised on 100mM NaCl supplemented medium. Further *in vivo* stress in spectroscopic studies are needed to elucidate the structure and identify some of active principles present in *Cissus quadrangularis* L.





Biodiversity: basis of a global-life support system



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INTRODUCTION

- ❑ Biodiversity – the constellation of plants, animals, fungi, and microorganisms on Earth; their genetic variation; and the communities and ecosystems of which they are a part – is a central component of Earth’s life support systems.
- ❑ Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems – and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.
- ❑ Biodiversity forms the foundation of the vast array of ecosystem services that critically contribute to human well-being.
- ❑ Biodiversity is important in human-managed as well as natural ecosystems.
- ❑ Decisions of humans make that influence biodiversity affect the well-being of themselves and others.

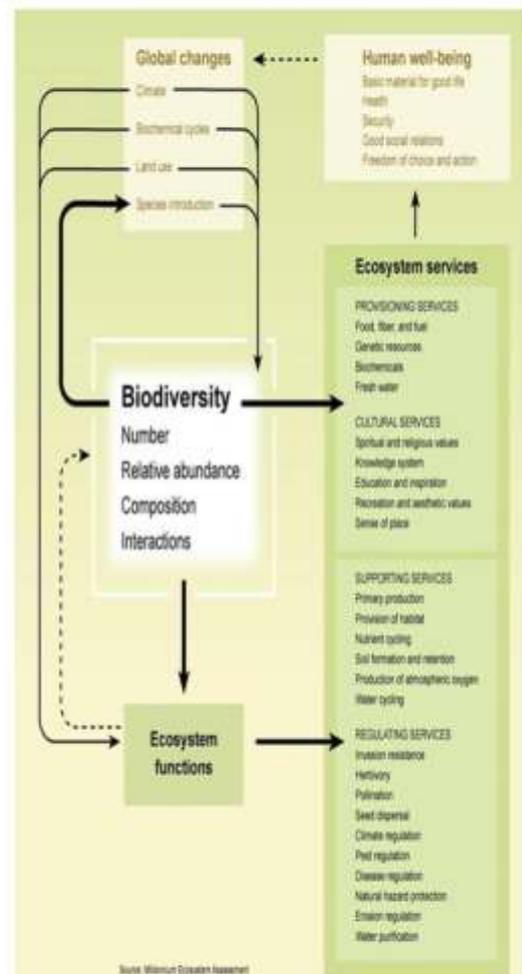
What are the main links between biodiversity and human well-being?

Biodiversity and the many ecosystem services that it provides are a key factor determining human well being . Biodiversity loss has-direct and indirect negative effects on several factors: Food security, Vulnerability, Health, energy, clean water, social relations, freedom of choice, basic materials like various goods - such as plants and animals - that individuals need in order to earn an income and secure sustainable livelihoods. In addition to agriculture, biodiversity contributes to a range of other sectors, including "ecotourism", pharmaceuticals, cosmetics, and fisheries. Losses of biodiversity, such as the collapse of the Newfoundland cod fishery can impose substantial costs at local and national level.

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Biodiversity, Ecosystem Functioning, and Ecosystem Services



CONCLUSION

- The biological diversity of organisms on Earth is not just something we enjoy when taking a walk through a blossoming meadow in spring; it is also the basis for countless products and services provided by nature, including food, building materials, and medicines as well as the self-purifying qualities of water and protection against erosion.
- Biodiversity contributes to many aspects of human well-being, for instance by providing raw materials and contributing to health.
- biodiversity includes all ecosystems—managed or unmanaged. Sometimes biodiversity is presumed to be a relevant feature of only unmanaged ecosystems, such as wild lands, nature preserves, or national parks.





Conversion of organic kitchen waste into natural fertilizer

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Introduction: India is second largest populated country in the world; it produces more than 100 tons of solid waste a day. It is the mixture of both organic food waste and inorganic waste. Around 78% is food waste, which can be recycled. Some of them is land filled but it is not segregated properly and it mixes organic and inorganic waste, which produces bad odor, and it will spoil the soil. To manage the solid waste, it should be properly segregated at the houses. The organic and inorganic waste needs to be separated, the organic waste can be treated to make compost, and inorganic waste can be segregated and given for garbage collection. Composting is the decomposition of organic waste by microorganisms under controlled conditions. The process of composting requires kitchen waste and dry leaves and waiting to break down into humus for a certain period. Organic waste, which forms a significant part of municipal solid waste, has caused increasing environmental concerns. It is estimated that around 50 percent it can be composted. Instead, most of it is landfilled and incinerated. By composting organic waste, we can preserve resources and produce a valuable by-product that can be used as locally produced fertilizer.

Materials and Methods:-

Raw Material for Composting:- Composting requires the presence of two types of materials (a) Nitrogenous (material rich in nitrogen) and (b) Carbonaceous (material rich in carbon) materials in a proportion. This proportion of carbonaceous or nitrogenous materials depends upon the quality of required compost. A ratio near 20-30:1 is usually preferred. For this study kitchen waste was used to meet the requirements of nitrogen while carbon requirement was met by the use of dry garden leaves. The kitchen waste for the study was collected in a container on daily basis from our own house. The kitchen waste consisted of vegetable and fruit peelings which are rich in nitrogen. The dry leaves were collected from the garden in a bag.

Collection of soil samples:- Soil samples were collected from decomposing pit, organic agricultural farm and the area dumped with vegetable market wastes. The soils were collected in sterile polythene zip lock covers and stored in the refrigerator without losing moisture content at 5°C. From these soil samples bacteria were isolated and identified using Berges's Manual of classification. We isolated and identified *Bacillus* sp. and *Pseudomonas* sp.

Standards values to be maintained during composting process which are as follows

Table -1: Composting Standards	
Factors	Standard Values
Temperature	50 °C to 60 °C
pH	6.5 to 7.5
C/N ratio	25 to 30
Moisture content	Beginning - 60% to 70% Later stages - 50% to 60%

Experimental set up:- The experiments were conducted in tap fitted earthen pot of 15 ltr capacity. The waste were chopped and dried for a day. 3 kg of the vegetable waste and 1 kg dried leaves were mixed with pure culture broth of *Bacillus* sp. and *Pseudomonas* sp. separately and filled in the pots and water was sprayed over it. The control was prepared without the addition of microbial culture. Both control and experimental setups were periodically mixed well. After about 25 to 30 days the volume of bed had dropped substantially and a sweet smelling white mould appear on the biomass. After that it was left undisturbed for 10 to 15 days. At this point the finished compost was collected after 50 days. The sample drawn from control and test were subjected to microbial and physio chemical analysis during different periods of composting. Samples were withdrawn from the 20cm depth of pits for every 10days interval up to 50 days. The microbial load was estimated by using serial dilution method

Table-2: Experimental setup			
Items	Quantity in kg	Percentage	
1. Kitchen waste	3	60	
2. Dry leaves	1	20	
3. News paper	0.5	10	
4. Saw dust	0.5	10	
5. Bacterial broth	10ml		

Table-3:Physiochemical analysis of the compost prepared using *Bacillus* sp.

Parameters	Compost Sample											
	Control		Test		Control		Test		Control		Test	
	0 day	10 days	10 days	30 days	40 days	50 days	0 day	10 days	10 days	30 days	40 days	50 days
Moisture	54	53	54	56	57	48	47	45	44	44	42	42
pH	6.4	6.7	6.4	6.2	6.0	5.8	6.2	6.0	5.8	5.8	5.4	5.4
C/N	46.22	46.27	43.19	42.13	34.31	17.25	28.26	36.28	27.12	32.11	25.08	25.08
Carbon	20.00	19.78	18.98	18.22	18.34	19.02	17.67	18.56	18.54	17.23	15.34	15.34
Nitrogen	6.8	6.88	7.34	7.54	9.30	7.65	14.56	9.75	16.98	12.87	21.80	21.80
Phosphorus	3.17	3.31	4.52	5.54	4.58	6.01	6.76	6.51	6.76	6.76	8.98	8.98
Potassium	4.22	5.81	7.34	5.78	11.02	7.34	13.61	7.67	14.52	9.01	16.77	16.77

Table-4:Phytochemical analysis of the compost prepared using *Pseudomonas* sp.

Parameter	Compost Sample											
	Control		Test		Control		Test		Control		Test	
	0 day	10 days	20 days	30 days	40 days	50 days	0 day	10 days	10 days	30 days	40 days	50 days
Moisture	56	52	53	51	46	45	37	42	42	38	30	30
pH	7.2	7.0	6.8	7.1	6.5	6.6	6.2	6.7	6.5	6.8	6.2	6.2
C/N	44.11	48.20	41.11	42.11	34.16	17.52	28.46	36.28	22.02	31.10	25.08	25.08
Carbon	19.34	19.02	18.12	18.82	17.94	18.82	17.43	18.33	18.34	17.12	14.53	14.53
Nitrogen	6.20	7.34	6.34	7.22	9.31	8.20	14.56	9.67	11.23	13.57	22.88	22.88
Phosphorus	3.21	3.80	4.33	4.08	4.21	6.01	6.21	6.41	6.51	6.76	8.98	8.98
Potassium	4.22	5.38	6.51	6.87	11.02	7.09	11.81	8.77	14.52	9.52	13.61	13.61

Result and discussion:- The time taken for the degradation of kitchen waste to form compost was 50 days. The decomposition process was visualized clearly after the 10 days of application by appearance of microbial growth. A sharp decrease in volume and colour change, development of pleasant odour, changes in texture and less water activity was seen after 20 days. The same observation was occurring rapidly in the successive days also. The complete decomposition was clearly observed after 50 days, which was clearly identified by sharp decrease in volume (3/4th of the volume) complete decolorization (dark brown), complete absence of water content and complete conversion of finely ground powder which reveal the decomposition of kitchen wastes into fine powder. The pH of the compost was lower in all the experimental set ups than their initial values (Tables 3 and 4). The decrease in pH value at the final stage of compost formation may be due to the production of CO₂ and organic acids by microbial metabolism during decomposition of different substrates in the kitchen waste. The C:N ratio has decreased drastically during compost formation. The C:N ratio considered as a parameter to determine the degree of maturity of compost. Below 20, C:N ratio is an indication of acceptable maturity. While a ratio of 15 or below being preferable. In this study, the C:N ratio of the compost prepared using microbial inoculum is also within the acceptable limit. Total organic carbon was probably utilized by the microbes and was decreased with time in experimental setups compared to control at the final stage of compost formation. According to Viel et al., (1987) loss in organic carbon might be responsible for nitrogen enhancement. In present study nitrogen content of the compost increased significantly with time and this could be probably due to mineralization of organic matter. Phosphorous and potassium was also increased in the experimental pot than the control, this increase probably due to the enzymatic activity of bacteria. Present study is the easiest method to convert the kitchen waste into the eco-friendly bio-fertilizer



Fig:- Final compost prepared by kitchen waste using microbes

Conclusion:- The aim of the present study was to convert kitchen waste into a useful bio fertilizer for better growth and quality of crops and thus this low cost technology has economic, environmental and societal relevance. No chemicals are used in the production process. It is not only environment friendly, but also protects the environment.





Search of Eco-friendly approach for control of obnoxious weed -*Parthenium hysterophorus* L.

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ABSTRACT

Parthenium hysterophorus L is responsible for causing health problems in men and animals. To control *Parthenium* in field pesticides may not be used. So eco-friendly biocontrol agents were searched. Mycological analysis of wilted plants revealed higher percent occurrence of *T. harzianum*. Pathogenicity testing revealed that this has potential to cause wilting in fresh *Parthenium* plants. The culture filtrate also reduced seed germination percentage up to 70-80% in comparison to control set.

INTRODUCTION

Parthenium hysterophorus is locally known as congress grass or *Gajar Ghans*. Contact with the plant causes dermatitis due to **PARTHENIN** which is dangerously toxic. This is believed to be introduced into India as a contaminant in PL 480 wheat. Two million hectares of land in India have been infested (Dwivedi et al., 2009). So its Eco-friendly management is necessary through Biocontrol agents.

OBJECTIVE

To search some ecofriendly biocontrol agents for Biological Control of *Parthenium hysterophorus*

EXPERIMENTAL

Collection of Natural Wilted plants

The naturally wilted plants of *Parthenium* were collected from AUH Campus and around Gurgaon (2014-2019). These were firstly showing yellow colouration in leaves then turning dry brown and necrotic.



Fig 1. a. Profuse growth and flowering in *Parthenium*; b. A patch of *Trichoderma* on natural habitat; c. A wilting plant of *Parthenium*; d, e, f. Stages of wilt induced upon inoculation

Isolation and identification of fungal pathogens

Infected samples of *Parthenium* plants were taken for observation of fungal growth on PDA. Microscopic examination and measurements of conidiophores and conidia were made from slide preparations stained with lactophenol-cotton blue.

On PDA, *T. harzianum* formed 1-2 concentric rings with green conidial production. The conidia production was denser in center. While examining the five days culture of *Trichoderma harzianum* grown on PDA the Conidia were globose to subglobose, and Phialides were flask shaped.

Pathogenicity Tests

For the pathogenicity test, *T. harzianum* was incubated for 2 weeks on PDA at 25°C. Conidial suspension was separated, adjusted to 1×10^6 spores/ml, and then 0.1 ml injected into the cortex region in the stem of 20 healthy *Parthenium* plants between the nodes. The *T. harzianum* was able to control *Parthenium* in open field at extent of 60-70%. Pathogen was constantly reisolated from artificially developed symptoms. Culture filtrate also reduced seed germination percentage up to 70-80% in comparison to control plants.



Fig 2. a. *Tharziaium* young culture on PDAMedium; b. Mature culture; c. Microscopic view

CONCLUSIONS

The wilt pathogen for *Parthenium* is *T. harzianum*. Chemical control is an effective method but has limits in use. Study proved that present strain of *Trichoderma harzianum* has the potential to control *Parthenium* in open field to the extent of 60-70%. Large scale field trials are needed to use it for biocontrol of *Parthenium*.

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Organizer



Analysis of Rooftop Rain Water Harvesting Potential using GIS

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Introduction

Roof top Rainwater Harvesting

- ◆ Rain water is pure and non polluted
- ◆ Improves groundwater situation
- ◆ Reduce the dependability of other sources of water
- ◆ Simple, cost-effective, easy to construct and maintain
- In areas with significant variations in the annual rainfall pattern, the matching of water supply and water demand may be difficult.
- Evaluating the quantity of water which can be harvested from available roof area from a given locality using GIS tools along with study of its economics will help community as well as policy makers decision making towards its adoption which will promote the roof water harvesting technique.

Objectives -
to estimate the roof water harvesting potential for JAU campus using QGIS and to analyze water demand - supply pattern based on estimated roof water harvesting potential.

Methodology

Location - Junagadh Agricultural University Campus, Junagadh, Gujarat

Rainfall - The availability of runoff from rooftops of campus buildings was estimated by using two design rainfall (i) rainfall at 66% probability of exceedance using Weibull's formula (ii) average monthly rainfall.

Roof water harvesting potential

$Q = C X A X I$, Gould and Nissen (1999)

Q = Potential, litre,
A = Area of roof top, m² (All Campus Buildings)
Digitized Polygons in Google earth Its Output in Quantum GIS Area Calculation

I = Design of rainfall, mm

(i) Monthly rainfall at 66% probability of exceedance calculated using Weibull's formula
(ii) Average monthly rainfall.

C = Runoff coefficient = 0.65, Rande (2000)

Sample calculation Demand supply analysis for College, Hostel and Multi Storey Office building

Methodology

Spatial Data

Google Earth

Digitization of different buildings rooftop area

Saved as kmz

Exported kmz Files in QGIS software

Calculation of each rooftop area in QGIS

Rainfall Data

Weibull Equation

Probability Exceedance of rainfall at 66% for each month

Runoff coefficient for different type of catchment

Potential of Roof Rain Water Harvesting (Cu. m) = Rainfall in mm. × Building Area in Sq. m × Coefficient of Runoff

Analysis of water demand that can be fulfilled

Results

Design Rainfall, mm

Month	June	July	August	September	Total
(i) 66% PE	94	229	111	78	502
(ii) Monthly Avg.	190	342	210	139	881




No. of Buildings - 81 No. of Polygons - 169
Rooftop Area - 1,04,012 sq. m

Total roof water harvesting potential of all campus buildings
For Design rainfall (i) = 444263 kilo liter
(ii) = 77890 kilo liter

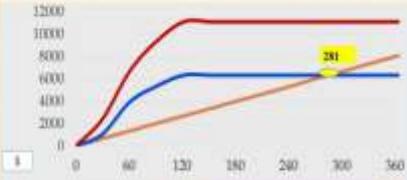
Sample calculation of Demand Supply Analysis

Graph showing Volume of water Vs Day of water year (i.e. year from June 1 to May 31*)

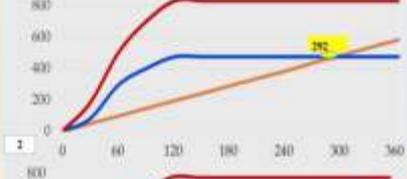
Graph 1 - For College Graph 2- For Hostel Graph 3- For Office

■ Cumulative Demand
■ Supply @ Design rainfall (i)
■ Supply @ Design rainfall (ii)

1



2



3



Building Type	Design Rainfall	
	(i)	(ii)
College	78 %	3016
Hotel	88 %	293
Office	99 %	27

Conclusion - The Size of storage required for roof water harvesting, water available for recharge, economics and demand supply analysis can be evaluated for institutes/ community using GIS which also helps in decision making towards its Adoption.

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Organizer



IDENTIFICATION OF DIATOMS DIVERSITY THROUGH SCANNING ELECTRON MICROSCOPE ON SURFACE OF ALGAE OF THE FRESH WATER BODIES

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ABSTRACT
The presents experiments was conducted to identify diversity in the algae produces in fresh water through scanning electron microscopy. There was numerous kinds of phytoplankton and diatoms are presents on the surface of algae. Our results indicated that out five sample viz., Paritalab 1a & b, FTL1, Paritalab-2, FTL2. In number of 13& 10.4 and 13 types of diatoms were observed respectively. The quality of water and change in environment can detected through diatoms populations in water. It is the only indicators that will detects change in quality as well as monitors the climate variation due to intrinsic and extrinsic factors of environmental pollution. The species variations morphologically were depicted in figures with their magnification in Xn. There was uniqueness in morphological structures. Our experiment suggested that the fresh water should be measured with classical examples of this sites in every village wells and water bodies of India. This study also indicated presence of toxic diatoms in some cases too. These special structural variation was detected through scanning electron microscopy with the nano particle size. of diatoms can also detected. Also we found that Diatoms having unique characteristic variations.

MATERIALS AND METHODS
Sample collection and identification:
There were five algal samples were collected from water bodies present in Junagadh agricultural university jurisdiction only, which was attached on well surface or flote on wells near rocks, In ponds it was at steps. The collected algae was initially washed thoroughly with same water and again with distilled water after that it was dried under hotair oven at 45 °C. Species was identified using standard of H.P. Gandhi and further confirmed by algae BASE (<https://www.algaebase.org/ssatrch/species>). ADIAC database publications.

Coating Process and examination of sample:
In order to examine the external structure, dried alge powder were attached to double-sided adhesive tape on SEM stubs, and For uniform thickness of the specimens we used automation of the coating process by fitting in chamber for dried seaweeds. Start chamber for gold coating for two minutes with two times were then sputter-coated with gold (20 to 40 nm) in an EMITECH, Model SC7620 sputter cutter. The specimens were kept in a desiccator until placement in the SEM chamber. The specimens were examined in a Zeiss model EVO-18 (13-04) Sanalyzed as per protocol derived in specification.

INTRODUCTION

- Diatoms are widely distributed in all water bodies where it shows active vegetative growth in throughout season depending upon environments. Experiments is based on identification and characterization of diatoms through scanning electron microscopy and This method provides high magnification images.
- Taxonomically identified both with available resources.

Empire: *Eukaryota*
Kingdom: *Chromista*
Phylum: *Bacillariophyta*
Subphylum: *Bacillariophytina*
Class: *Bacillariophyceae*
Subclass: *Bacillariophycidae*

OBJECTIVES:

- To identify the diversity among diatoms of the fresh water through Scanning Electron Microscope.
- To measures the qualitative and quantitative differences among the diatoms of water bodies
- To make a photographic cataloguing of Diatoms of fresh water

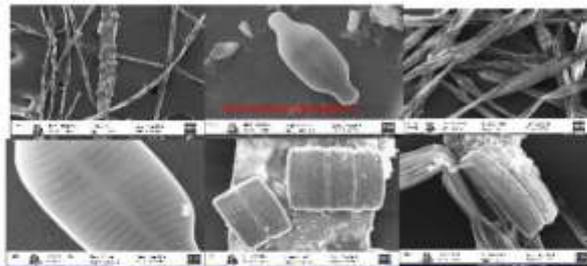
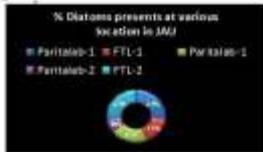


Figure 2: SEM image of Diatoms in FTL1

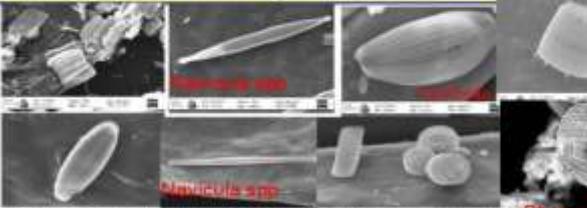


Figure 3: SEM image of Diatoms in Paritalab 1b

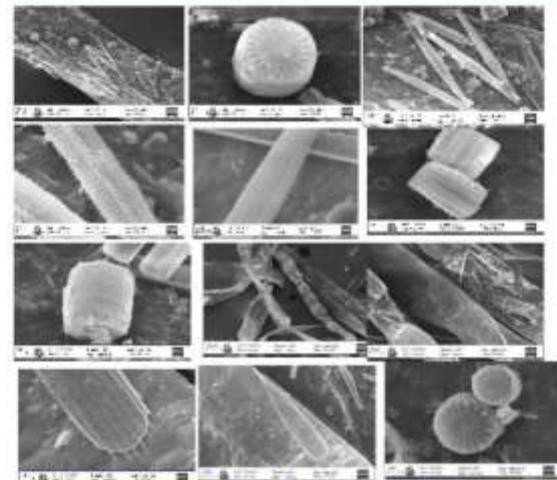


Figure 1: SEM image of Diatoms in Paritalab 1a

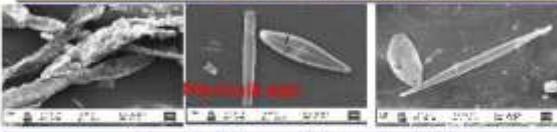


Figure 4: SEM image of Diatoms Paritalab2

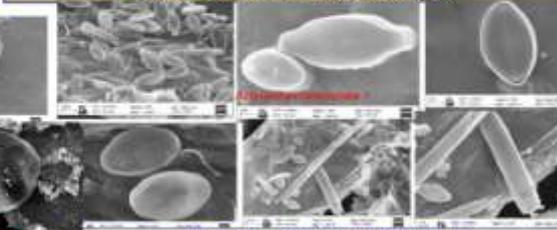


Fig 5: SEM image of Diatoms in FTL-2

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Conflict of interest:
There is no conflict of interest.
For published in: e-Seminar organized by Organizer: School of Biological Engineering and Life Sciences Shobhit Institute of Engineering & Technology (Deemed to be University) 101/49, Muzaffarnagar, Meerut 200110, Uttar Pradesh, INDIA

Results and Discussions
Results of this study showed variation in SEM images at various angles are depicted in Figure 1 to 5. Similarly in Figure 1) showed various diatoms identified at Paritalab 1, same was observed in all remaining samples but the variation in diatoms quantity and quality was observed in each samples. In general statements, there were significantly variation in quantity was observed in samples. As shown Figure with % diatoms quantitatively were in range of 5-13 numbers. The diatoms were found to be six members subphylum, phylum, class, order, suborder, and family. The diatoms were identified by sea, network site in different proportions. These results are in agreement with 1. critical (2006). Lichtenhan also described Nitidula spp. similar observation also observed by Gandhi, (2002).

CONCLUSION
The presents experiments suggested that many diatoms were present in different samples of fresh water green algae viz., the *Actinocyclus* subphylum, *Cocconeis* kinrossii, *Gomphonema*, *Phaeo* spp., *Thalassiosira* constricta, *Thalassiosira* spp., *Nitzschia* spp. were present in all species. Some new species also observed too. This study also indicated presence of toxic diatoms in some cases too. These special structural variation was detected through scanning electron microscope with the nano particle size. of diatoms.





Applications of nanoparticles in agriculture field and Synthesis of nanoparticles using plant resources

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Introduction

Nanotechnology is a new area of research with new possibilities. The area of nanotechnology based research is recent and needs further evaluation for its application in various fields of study. Crop protection is one of the possible approaches of nanotechnology but its use in crop protection is just in its infancy (Resham, *et al* 2015). Nanotechnology in each and every phase of science and technology has been booming at a tremendous rate. It's journey started from organic chemistry and reached to aeronautical research. Carrying forward the success of nanotechnology in field of physical, chemical and medical sciences. (Jain *et al.*, 2011). Nanoparticle is defined based on the bases of size at which fundamental characters different from those of the corresponding bulk material. Nanoparticles which ranges from 1 nm to 1 μm in diameter (Zhang H *et al.*, 2006). The present study focuses on the green synthesis of silver nanoparticles using plant extracts of *Bambusa vulgaris*, *Ocimum tenuiflorum*, *indica*, *Cassia filiformis* and *Tinospora cordifolia*. Aqueous silver ions when exposed to plant leaf extract were reduced and resulted in a colour change indicating the formation of silver nanoparticles. Further more in future the study will focus on the characterization of silver nanoparticles characterized by using different types of techniques such as UV-Vis Spectroscopy, Field Emission Scanning Electron Microscopy (FESEM), Energy Dispersive X-Ray (EDX), Dynamic Fourier Transform Infra Red (FTIR) and Atomic force microscope (AFM).

Abstract

The green synthesis of silver nanoparticles using plant extracts of *Bambusa vulgaris*, *Ocimum tenuiflorum*, *indica*, *Cassia filiformis* and *Tinospora cordifolia*. Aqueous silver ions when exposed to plant leaf extract were reduced and resulted in a colour change indicating the formation of silver nanoparticles. Further more in future the study will focus on the characterization of silver nanoparticles characterized by using different types of techniques such as UV-Vis Spectroscopy, Field Emission Scanning Electron Microscopy (FESEM), Energy Dispersive X-Ray (EDX), Dynamic Fourier Transform Infra Red (FTIR) and Atomic force microscope (AFM).

- > extracellular biosynthesis of silver nanoparticles through plants.
- > applications of nanoparticles in agriculture



MATERIALS AND METHODS

Biosynthesis of silver nanoparticles



RESULTS

Biosynthesis of silver nanoparticles using plant extract of *Bambusa vulgaris* (Bamboo), *Ocimum tenuiflorum* (Black Tulsi), *Azadirachta indica* (Neem), *Cassia filiformis* (Akash bael) and *Tinospora cordifolia* (Giloy),



Various Applications of nanoparticles Agriculture

- Crop improvement
- Increase efficient fertilizers and pesticides
- Soil management
- Plant disease detection
- Water management
- Analysis of gene expression and Regulation
- Post-Harvest Technology

DISCUSSION

The green synthesis method of the syntheses of silver nanoparticles is eco-friendly, this method is low cost and capable of producing AgNPs at room temperature. It may be concluded by the experiment that AgNPs may be improved to be potential fungicides in near future and it is an excellent alternative to chemical fungicides and other applications in agriculture.

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Organizer



ABSTRACT

In the current situation of crisis, it is the need of the hour to tackle the challenges of food security in a sustainable way, by technological intervention in agriculture. Nanotechnology is showing changing contour in modern agriculture and is foreseen to become a major thrust in near future by offering potential applications. This new approach of agri-nanotechnology has great heading impact to cope with global challenges of food production, security, sustainability and climate change.

Along with the already prevailing standard technologies supporting high yield crop production and protection, the stress is currently on the use of conventional technology; hence, emphasis needs to be on utilization of nanotechnology. Nanotechnology has been facilitating the transformations of traditional food and agriculture sectors, into completely smart and active high end based sectors. The new explorations and inventions for varied applications has achieved considerable acceptance in various fields of food, medicine, and other areas. It has enormous forthcoming in making agriculture more proficient and resourceful.

This review focuses on Researches that are been carried out for better, safer and non-harmful agro-nanotech based mechanisms to promote effective alternate agriculture processes in coming future. Hence in the present study attempts to suggest certain important points to be addressed in the current and future agri-nanotechnology researches.



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AGRI-NANOTECHNOLOGY

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INTRODUCTION

Agriculture is the art and method of cultivation of feedstock for the living organisms. It is the main building blocks for the development of the society by improving the national economy for developing countries such as India. It happens to be one of the most important sectors for economic development. There is been recorded increase in the production rate of the G.D.P.(Gross Domestic Product) of the country. It has the major amount of employers in this sector.

The production rate of food mostly depends upon quality of plants, pesticides and the organic feed given for nourishment, along with soil fertility. There varied causes of the quality of food or agriculture crops being different due to soil changes, climatic changes, availability of water and its quality as well. There has been a long periodic lapse since the quality achieved was superior. At present, the crop quality is very inferior and has resulted into a major crisis. This has resulted due to ever increasing demand by the human population for their survival. To handle and tackle the issues of such scarcity and adverseness, agriculture sectors and industries have now adopted new methods to remain sustainable, productive and remain competitive in the market. The agricultural sector has to join hands with the technology and innovation to form a proper amalgamation for combined high efficiency work with the help of machinery tools to get digitalized.

Nanotech is considered as one of the key enabled technology on the entire globe at present time. It is the kind of technique which is showing advancement in fields of energy, medicine as well as construction. It functions and processes in such way that it can be engaged in multiple operations at the same time without causing any harm or damaging the environment i.e. in an eco-friendly way. A numerous devices such as Nano sensors, Nano fertilizers, Nano seeds etc. have lead to tremendous increase and rate of agro production. The nanotech has a smart sense ability which makes it much ahead of the other technologies, which senses the requirement in the appropriate quantum and durations.

Usage of techniques based on nanotechnology improves the important characteristics in the agri-inputs as selected delivery, administered release, increasing solubility and long shelf-life. Thus, the characteristics not only make them more efficient but also reduce the risk of environmental contamination. Nanotechnology will reform agriculture and food industry by modern techniques innovation like Precision farming techniques. The application of nanomaterials in agriculture aims to lessen plant protection products, curtail nutrient losses in fertilization, and strengthen yield through advanced nutrient management.

CONCLUSION

Nanotechnology is the new forthcoming field in modern agriculture sector and is also anticipated to become a driving economic force in the near future. It is important in applications of agriculture for crops efficiency. Nanotechnology raises hope for new innovations in agriculture field of Soil management. It provides opportunities in use of protein efficiency, they have replace the conventional fertilizer with Nano fertilizer for improvement in soil field. Due to Nanotechnology agriculture based sources like soil monitoring, detection of soil quality, moisture, diseases, crop health and ground water. Nanotechnology also provides new agrochemical agents and new mechanisms to improve crop productivity, and it promises to reduce pesticide usage and make the crop healthy.

Indian Government is planning to establish National Institute of Nanotechnology in Agriculture to exploit the advantages of Nano-technology and to renovate Indian agriculture. India is an agri economy, the rate of agricultural growth is going through tough phase and there is need for improvement in productivity of agri based products. The present scenario of nanotechnology in India is not very inspiring and Indian agriculturists need further communication, information, guidance and counselling to understand Nano solutions. Still there is long way to go for understanding the health and safety researchers and consumers in Nano field.

APPLICATIONS OF NANO TECHNOLOGY

- The application of Nano sensors in crop protection for the identification of diseases and residues of agrochemicals. The Nano sensors can be utilized to detect the presence of insects or fungus accurately inside the stored grain bulk in storage rooms
- Agrochemicals Nano formulations is done for applying pesticides and fertilizers for crop improvement.
- Substituting Nano fertilizers for traditional methods of fertilizer application is a way to release nutrients into the soil.
- Nano devices for the genetic manipulation of plants, this is due to the fact that it enables nanoparticles, nanofibers, and Nano capsules to carry foreign DNA and chemicals that modify genes.
- Nanotechnology devices and tools, like Nano capsules are used in detection and treatment of disease.
- Nanotechnology is used in Soil improvement, Nanomaterials, Nanomaterials like Zeolites and Nano-clays are used for retention of water/liquid agrochemicals in the soil for their slow release to the plants.

Figure 1: Application of nano-tech devices in agriculture.
Retrieved from: Dasgupta, N., Ranjan, S., Mundekkad, D., Ramalingam, C., Shanker, R., & Kumar, A. (2015). Nanotechnology in agri-food: from field to plate. *Food Research International*, 69, 381-400.

Figure 2: Improvement in various sector of agriculture using Nano-technology
Retrieved from : Kaushal, M., & Wani, S. P. (2017). Nanosensors: frontiers in precision agriculture. In *Nanotechnology*(pp. 270-291). Springer, Singapore.

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Preparation of Vinegar from Lemon Juice

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❑ INTRODUCTION

- Lemon is species of *citrus limon*.
- Lemon juice contains 5 to 6% of citric acid.
- Excellent source of Vitamin C, B1, B9, potassium, calcium and good for immunity.
- Lemons are an excellent source of phenolic compounds like flavonoids, ascorbic acid, and reducing sugar which contribute to most of their antioxidant properties.
- Lemon vinegar is produced by fermentation of lemon juice with the help of acetic acid bacteria.
- These bacteria are gram negative, catalase-positive and oxidase negative

❑ SIGNIFICANCE

- ❖ Anti-diabetics property
- ❖ Antimicrobial activity
- ❖ Antioxidants property
- ❖ Boosting immunity.
- ❖ Food flavoring and preservatives.



❑ FUTURE ASPECTS

Experiments with *enteropathogens* are in process.

❑References

➤ Surana Yash P., Shende Prathamesh G., Suryawanshi Mahesh A., Mane Vijay B., Kumbhar G.B. A experimental study of a vinegar production from different fruit products. International Journal of Advance Engineering and Research Development volume 4, Issue 4, April 2017. Scientific journal of impact factor: 4.72.

❑ METHODS

Juices of lemon



Squeezed to extract juice diluted with distilled water to obtain 2-3% (w/v) free sugar concentration.



Incubated at room temperature for 3-4 weeks



Filtered through 4-layers of muslin cloth and the procedure was repeated 2-3 times until the clear supernatant was obtained.



The filtrate was incubated with mother culture of *Aceibacter* under aerobic conditions for further 3-4 months until sufficient smell of vinegar came out.





EDUCATION AND AWARENESS

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INTRODUCTION

Education is about learning skills and knowledge. It also means helping people to learn how to do things and support them to think about what they learn. Through education, the knowledge of society, country, and of the world is passed on from generation to generation.

Education gives us a knowledge of the world around us and changes it into something better. It develops in us a perspective of looking at life. It helps us build opinions and have points of view on things in life. People debate over the subject of whether education is the only thing that gives knowledge.

Types of Education. Education goes beyond what takes place within the four walls of the classroom. A child gets the education from his experiences outside the school as well as from those within on the basis of these factors. There are three main types of education, namely, Formal, Informal and Non-formal.

Awareness Through Education™ is an educational program that looks at disability (physical, intellectual, and medical) as part of the human experience and encourages accepting others who may look, learn, or behave differently from what is familiar to us. The program celebrates the ability of individuals who are labeled as having disabilities. It hopes to alleviate the essence of fear and awkwardness that most children have when they encounter someone who is different. The program aims to reach school children because the barriers and fears that separate people are more easily broken down in the student population than in later years.

KEY CONCEPTS

Public awareness = Informing, enlightening, drawing attention to... e.g. through seminars, awareness materials (posters, flyers).
 • Public education = imparting knowledge, know-how e.g. through workshops, educational materials. More interactive, 2-way communication; structured, clearly defined learning objectives. Outreach: two-way communication designed to reach-out to, build relationships, inspire the public to support...
 • Communication: Process of delivering and receiving messages or other information through various media.
 • Education: Sustained interaction with specific audiences to transfer technical knowledge or skills.

Means of awareness-raising

- Seminars
- Workshops/conferences
- Awareness materials (flyers, posters, videos, etc)
- Exhibitions
- Public awareness events: Visitors' days, Field days, International day (WFD, WED, etc)
- Media (newspapers, radio, TV) Websites and other internet-based tools (e.g. webinars)
- Social media (Facebook, Twitter, YouTube, LinkedIn, blogs)
- Dedicated campaigns on specific issues

Key concepts



Seminars and Conferences

- Discussions with stakeholders on specific themes - Develop common understanding - Develop strategy or plan of action - Improve interaction - Ensure participation in decision-making - Facilitate identification of problems.
- Hold a conference to transmit org's achievements to selected audience or deliver general info about the org
- Invite questions and discussion from audience.

Exhibitions

- Present and demonstrate the work/outputs of your organisations to mixed audience in various ways
- Allow interaction with public
- Inform and get instant feedback
- Different types of exhibitions: international, national and local exhibitions
- National exhibitions, e.g. at agricultural shows
- Create general public awareness, attract government and public support, providing info on org and its activities, promote networking, identify new clients/beneficiaries and potential partners

Visitors' / Field days

- Get people to come where you work: Office, laboratory, field experiments, etc.
- Deliver specific messages to meet the interests of your audience.
- Decide how to present message: Wall-mounted exhibits, posters, PowerPoint presentations, audio-visuals/computer displays, practical demonstrations, field tours.
- Provide comfortable environment; - space for face-to-face interaction - Seats for longer discussions.

Proactive Communication Planning

- Means thinking and planning AHEAD to:
- Provide strategic direction for communications work
 - Avoid being over-run by events, ready to deal with the unexpected - increase efficiency of your awareness-raising, communication and outreach activities.
 - Facilitate proper coordination within the agency
 - Maintain a good control of your internal and external audiences (journalists and the public)
 - Set up procedures to cope with challenges
 - Forecast and mobilise the necessary resources

Elements of a Communication Strategy

- A communication plan basically covers the 6 "W's"
- Who - the target audiences
 - What - the key messages to be articulated
 - When - timing, it will specify the appropriate time of delivery for each message
 - Why - the desired outcomes
 - How - the communication vehicle (how the message will be delivered)
 - By whom - the sender (who will deliver the information and how he/she is chosen)

Social media

- Powerful/effective means of communication (esp. with young generation)
- Good way to engage/maintain relationships with the public
- Use various tools to deliver targeted messages: Facebook, Twitter, YouTube, LinkedIn, Blogs
- Agree in your team what tools are to be used

Importance of Education and Awareness

Public awareness and education are essential to changing social and cultural norms which perpetuate harmful practices. Training religious and community leaders who are influential in the society is also necessary to incorporate them in the process of changing cultural beliefs and practices. Women and girls should be supported in their efforts to empower themselves and demand respect for their human rights. In addition, all members of society should be made aware of the negative consequences of harmful practices. It should be clarified that these harmful practices impact not just the women and girls but the larger community as well. Public awareness should focus on preventing further harm to the victims of harmful practices as well as discussions about the overall importance of equality and human rights for all, including women and girls.





“ENVIRONMENTAL LAWS”

RENU DIXIT (BOTANY PROFESSOR)

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- **INTRODUCTION:** Environmental law is the collection of laws, regulation, agreements, and common law that governs how humans interact with their environment. The purpose of environmental law is to protect the environment and create rules for how people use natural resources



Objectives:- (A) To preserve and protect the nature's gifts from pollution.

(B) To protect the man's fundamental rights of freedom, equality, and adequate conditions of life in an environment of quality that permits a life of dignity and well being



(C) To evaluate and discuss the possible realization of ecological sustainability.

- **Methodology:** The essence of studies method lies in its systematic approach, overarching control systems, composed of several multi-levelled, and interacting international and national legal system.
- The study demonstrate and assess their influenced in relation to the realisation of ecological sustainability with emphasis on international and national biodiversity laws.
- **Result and conclusions:-** Changing consumption pattern has led to rising demand for energy.
- The final outcomes of this are air pollution, global warming, climate change, water scarcity, and water pollution.
- The increasing environmental ruin and pollution are causing huge harm to all humans life on earth.
- The only way to control this is to follow all the national and international rules made to save earth.
- **References:-** (1) Akhatov, Aydar (1996), Ecology & International Law. Moscow: AST-PRESS. 512pp. ISBN 5-214-00225-4 (in English and Russian). (2) Bimal N. Patel, ed. (2015) mcq on environmental laws. ISBN 9789351452454. (3) Farber & Carlson, eds. (2013) cases & material on environmental law





Importance of Bioinformatics in the Conservation of Biodiversity and Databases

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Introduction: The first step in biodiversity conservation is documentation based on the availability of information about each species with data starting from its systematic position to molecular aspects. Bioinformatics is the application of information technology in storage, processing and application of biological data, biodiversity is not untouched of this. In case of biodiversity term used is “Biodiversity Informatics”. Biodiversity informatics is extending computer science in the context of biodiversity data.

Objective: Biodiversity informatics is the application of information technology in organizing, accessing, visualizing and analysing biodiversity data, that have to cope with many challenges e.g. managing information from unnamed taxa produced from environmental sampling and sequencing of mixed-field samples. Objective of this paper is to analyse and review the importance of informatics in biodiversity conservation.

Results and Conclusion: Biodiversity informatics is vital for the development of networks and databases which is playing, will play a crucial role in managing the vast and increasing information on biodiversity components all around the environment. Some examples of the developed databases are given in the Table-1.

However, biodiversity informatics have challenges to overcome such as scientific information on biodiversity is highly varied and includes quantitative and coded tables, time-series along with narrative and descriptive text. For that needed bioinformatics technology includes database management systems, GIS, image analysis, statistical analysis and modelling.

Table-1: Some of the Biodiversity Databases

Name	Website	Description
GBIF	www.gbif.org	Global biodiversity facility, Unit level records
OBIS	www.obis.org	Information on Ocean Biodiversity
Hotspot	www.biodiversityhotspots.org	Information on Global Hotspots
ETI-WBD	www.eti.uva.nl/tools/wbd.php	Global Taxonomic Database
IUCN SIS	www.iucn.org/themes/ssc/our_works/sis.htm	IUCN information service on species
IUCN Redlist	www.iucnredlist.org	IUCN information on conservation status of species
UNEP-WCMC	www.unep-wcmc.org	Information Centre with Multiple databases on conservation

In addition, there is a need to be able to locate an extract descriptive text, that usually involve large quantities in disparate locations which brings in the requirements for key wording, indexing, hypertext linking, distributed networking, and for meta-database technology to assist in locating appropriate data sources.

Today with advancement of information technology, we are in an excellent position to take up the challenge of developing robust information networks and databases.

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2. <http://www.biomedcentral.com/1471-2105/12/S15/S4>





Approach for Conservation of *Elaeocarpus ganitrus* (Roxb.) (Rudraksh)
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Introduction: *Elaeocarpus* is a genus of tropical and subtropical region. There are 29 species of *Elaeocarpus* in India 18 species are represented by North East India (Meitei and Khuraijam, 2019). According to Christenhusz and Byng (2016), *Elaeocarpaceae* belongs to angiosperm family and consists of 615 species in 12 genera. To safeguard the species, several propagation approach may be helpful, such as conventional (Air layering, seed germination) and non conventional like tissue culture, may be useful for clonal propagation of different species of *Elaeocarpus*. Being a tree species the micropropagation of *Elaeocarpus ganitrus* (Roxb.), is difficult, due to plant phenolics. In our study MS (Murashige and Skoog medium, 1962), was found best for Tissue culture of *E. ganitrus*. In some recent research studies attempts were made to produce tree species plantlets by tissue culture methodology. For the preservation of Biodiversity, Biological diversity act 2002 was enacted by the Parliament of India.



Rudraksh tree at SIET Modipuram, Meerut (UP)

Results: MS (Murashige and Skoog medium, 1962) was found best for Tissue culture (clonal propagation) of *E. ganitrus*.

Conclusion:

Study can boost the micropropagation of endangered species of *Elaeocarpus* through tissue culture.

Objective: To propose a Tissue culture strategy for Conservation of *Elaeocarpus ganitrus*



Map showing Geographical distribution of *Elaeocarpus* species in India (Source: Rudraksh: Documentation of Geographical distribution, Reason for decline, Measures to enhance propagation. INTACH May 2016)

Methodology



References:

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Variability Studies for Quantitative Traits in Upland Rice (*Oryza sativa* L.) under Water Stress Situation

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Introduction

- ✓ One third of the world population and two thirds of the Indian population is utilizing rice (*Oryza sativa* L.) as staple food.
- ✓ Yield is a complex character, which is highly influenced by the environment, hence direct selection for yield alone limit the selection efficiency and ultimately results in limited success in yield improvement.
- ✓ Genetic variability studies are important in selection of parents for hybridization because crop improvement depends upon magnitude of genetic variability in base population.
- ✓ Increasing total yield would be made easier by selecting for yield components because they are more often easily inherited than total yield itself.

Materials & Data

Genotypes : 23	Experimental site details:
Design : RBD	Place : ARS, Paramakudi
Replication : 3	Latitude : 9° 21' N
Season : Rabi 2018-19	Longitude : 78° 22' E
Plot size : 5 x 2 m ²	Altitude : 242 m above MSL
Spacing : 15 x 10 cm	Av. RF : 840 mm

Quantitative traits studied:

- ✓ Days to 50% flowering
- ✓ Plant height (cm)
- ✓ Number of productive tillers per plant
- ✓ Number of panicles per square metre plot area
- ✓ Panicle length (cm)
- ✓ Number of filled grains per panicle
- ✓ Grain yield per plot (kg)
- ✓ Straw yield per plot (kg)
- ✓ Harvest index (%)

Methods & Results

Components
Test of significance on ANOVA

Phenotypic coefficient of variation (PCV)

Genotypic coefficient of variation (GCV)

Heritability (h²) in broad sense

Genetic advance (GA)

Authors
Panse & Sukhatme (1967)

Burton (1952)

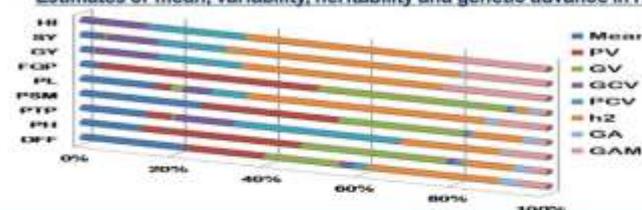
Johnson *et al.*, (1955)

Analysis of variance (ANOVA) for different traits in rice

SoV	Df	DFP	PH	PTP	PSM	PL	FGP	GY	SY	HI
Repl	2	7.06	12.88	3.99	180.91	4.05	897.26	0.69	0.40	0.002
Treat	22	167.29*	832.84*	5.23*	698.16*	11.48*	3983.62*	1.46*	1.90*	0.013*
Error	44	2.51	23.43	2.19	20.94	1.47	201.47	0.27	0.35	0.004

*significant at P=0.05 level

Estimates of mean, variability, heritability and genetic advance in rice



Discussion

- ✓ Selection on the basis of phenotype alone can be effective for the improvement of the traits due to presence of high GV for different traits and less influence of environment.
- ✓ The magnitude of PCV was higher than GCV for all the traits which may be due to higher degree of GxE.
- ✓ high broad sense heritability estimates were obtained for some of the traits indicating the major role of additive gene action in inheritance of these traits.
- ✓ High heritability coupled with high genetic advance was recorded for plant height and number of filled grains per panicle due to additive gene effects and selection may be effective.

Conclusion

- ✓ High heritability coupled with high genetic advance was recorded for plant height and number of filled grains per panicle.
- ✓ The major role of additive gene action involved in the inheritance of above said characters.
- ✓ Plant height and number of filled grains per panicle may serve as effective selection parameters during breeding programme in the upland rice ecosystem.

Acknowledgements: The authors acknowledge the continuous support of Tamil Nadu Agricultural University, Coimbatore – 641 003.





Nanofibrous scaffolds for cancer management



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Introduction

- According to WHO, cancer is the leading cause of mortality and morbidity worldwide, with 8.2 million cancer related deaths in 2012.



Scheme 1: Different treatment modalities for cancer

- Nanomedicine encompasses a wide range of smart nanomaterials which have proven to be effective cancer therapeutics.
- Nanofibers with diameters ranging from nanometer to submicrometer, hold special importance.
- Nanofibers have many special properties such as high encapsulation efficiency, ease of modification, low cost, large surface area etc.
- These features allow versatile application of nanofibers which include cancer detection, cancer therapy and *in vitro* 3D cancer models.

Fabrication of Nanofibrous scaffolds

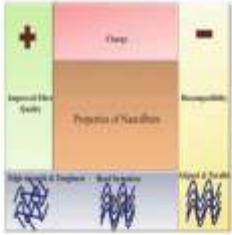


Figure 2: Properties of nanofibrous scaffolds

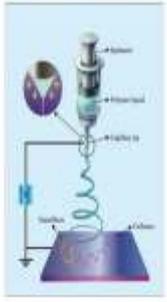


Figure 3: Typical schematic preparation procedure of electrospinning

Cancer therapy

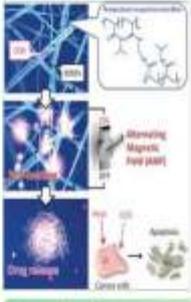


Figure 4: Temperature-responsive poly(SPL-co-BMALin) scaffolds with DOX and magnetic nanoparticles

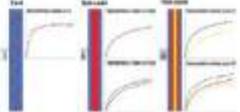


Figure 5: Multilayer drug-loaded nanofiber scaffold enable two-programmed drug release

Cancer diagnosis

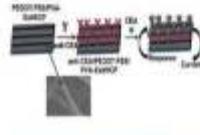


Figure 6: Schematic representation of the bifunctional electrospun PEDOT:PSS/PVA nanofiber for cancer diagnosis

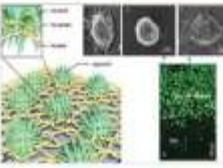


Figure 7: (a) Schematic of the DOX nanofiber for improved CTC capture through combining anti-EpCAM and cancer cells; (b) Fluorescence micrograph and SEM images of target cells captured on an (a) and patterned substrate (b)

Other applications

- Radio therapeutic scaffolds are keenly studied nowadays. For instance, Holmium 165 (Ho) containing gasox nanoparticles were embedded onto Polyacrylonitrile (PAN) nanofibers and used for radiotherapy, which helped to minimize harmful off-target effects of radiation.
- Electrospun nanofibers have also been shown capable of sustained long-term delivery of intact DNA (such as siRNA) for mediating anti-cancer effects.
- Thermostic nanofibers, incorporating both anti-cancer drugs and imaging agent allow real-time monitoring of drug delivery as well as simultaneous cancer diagnosis and therapy.

Objectives

- To highlight the significant applications of nanofibers in cancer management dealing with cancer diagnosis and therapy and also in developing *in vitro* 3D cancer model.

In vitro 3D tumor models

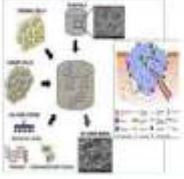


Figure 8: Generating a three-dimensional *in vitro* tumor model



Figure 9: Comparison of tumor cells morphology between 2D and 3D scaffold culture

Nanofibrous patch

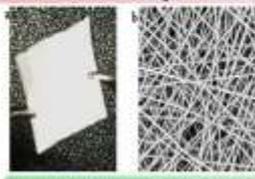


Figure 10: Electrospun nanofiber (b) TEM image of nanofiber

Future perspectives

- The numerous published data in this field clearly indicates the potential of these nanofibrous composite scaffolds in offering improved mode of cancer management.
- However, definite interaction between cells and functionalized nanofibrous scaffolds and bioactive component incorporation is poorly understood.
- To meet future demands, the applications of nanofibers need to be expanded to emerging alternatives like gene therapy and immunotherapy.
- In depth *in vivo* studies are necessary before clinical application and industrial production of nanofibrous scaffolds.

Acknowledgement:
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Key References:
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RELATION BETWEEN EDUCATION & HUMAN HEALTH

Theme: Education & Awareness

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Introduction

Health is condition of complete physical, mental & social well-being without any disease & infirmity. A good quality education is the foundation of health and well-being as well as good health of a person makes active physically and mentally that helps to achieve goal in education.

The relationship between education and health is a complex one. Poor health not only results lower educational attainment, it can also cause educational setbacks and interfere with schooling. People are not eating healthy foods due to absence proper knowledge about food and diet. Which lead to malnutrition related diseases.

Aims & Objectives

The amis & objectives of this presentation is:

- To find out relation between education & human health

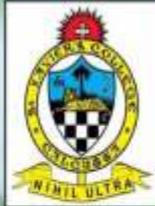
Conclusion

People should known about healthy foods. A good quality education is the foundation of health and well-being as well as good health of a person keeps active physically and mentally that helps to achieve goal in education.

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STEM CELLS: AN ADVANCED STEP TOWARDS BIODIVERSITY MANAGEMENT

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INTRODUCTION

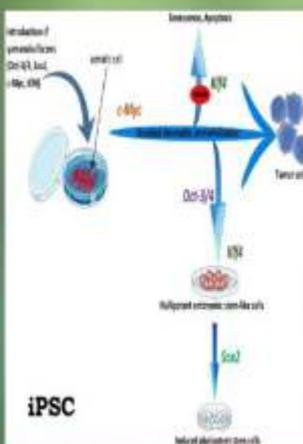
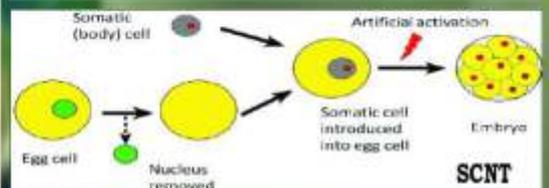
- ❑ Biodiversity is the variability among all living organisms from different niches of all the ecosystems present on Earth.
- ❑ It's biggest significance is that it maintains the environmental balances from all aspects: ratio between oxygen and carbon dioxide, the balance due to food web, as well as all the climatic conditions.
- ❑ With modernization the count of producers or the trees are decreasing at a great speed; similarly due to increasing pollution, population, destruction of forests and wild lives, as well as other climatic abnormalities, many species are becoming endangered with time. These directly or indirectly lead to the environmental imbalance.

OBJECTIVES

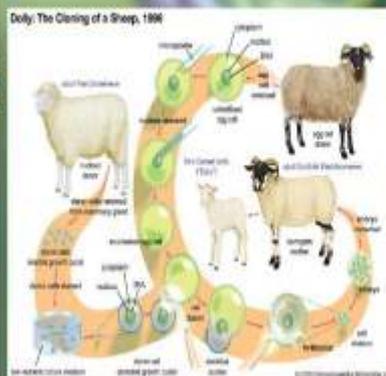
- Besides precautionary measures and afforestation, standing in this modern era of biotechnology, Regenerative technology can be a major break through.
- But absence of required in-vivo mating conditions and even one partner (in some cases) prevents scientists from reproductive regeneration processes.
- On the other hand absence of Embryonic Stem Cells of the endangered species leads to regeneration from the very little few existing individuals of those species.

PROPOSED MATERIALS & METHODS

- ❖ Non-invasive collection of Intestinal Epithelium Cells from the fecal matter or nasal passage of the target organism.
- ❖ Induction of pluripotency in the somatic cells by induced Pluripotent Stem Cells (iPSC) Technology by introduction of four Transcription factors. (*Yamanaka et al 2006*)
- ❖ Use of somatic cell nuclear transfer (SCNT) for creating a viable embryo from the collected body cell and an egg cell. The technique consists of taking an enucleated oocyte and implanting the target donor nucleus from it's somatic cell and regenerating a reproductive clone by surrogacy.



ONE OF THE FEW RESULTS



CONCLUSION & FUTURE PROSPECTS

With modifications of certain laws and ethical issues related to stem cells research, scientists can apply iPSC, SCNT and reproductive cloning in a broader spectrum to conserve, restore and finally manage biodiversity first in-vitro then in-vivo.

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- ✓ Song, Y., Hui, T., Wang, Y. et al. Epigenetic reprogramming, gene expression and in vitro development of porcine SCNT embryos are significantly improved by a histone deacetylase inhibitor—m-carboxycinnamic acid isobutyroxamide (CBAA). *Protein Cell* 5, 382–393 (2014). <https://doi.org/10.1007/s13238-014-0034-3>
- ✓ Marissa Ahlering, Kris Buidl, Stephanie Schaffter, Lon S. Eggert, Genetic Analyses of Non-invasively Collected Samples Aids in the Conservation of Elephants. *Conservation Genetics in Mammals*, 10.1007/978-3-030-33334-8, (229-248), (2020).







Environment Protection Act 1986

Presented by – *Sneha S. Ahare*
SNDT's C. U. Shah College Of Pharmacy, Santacruz- Mumbai.



<h3 style="background-color: #e91e63; color: white; padding: 2px;">Background</h3> <ul style="list-style-type: none"> • The environment protection act 1986 was introduced after Bhopal Gas Tragedy. • It was passed in march 1986, it came into force on 19 Nov 1986. • Decisions were taken at the United nation conference on the human environment held at Stockholm in June 1972. • Purpose of these act is to protect and improve environment and prevention of hazards. 	<h3 style="background-color: #e91e63; color: white; padding: 2px;">Scheme Of The Act</h3> <p>It has 26 sections and four chapters.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%; padding: 5px;"> <h4 style="text-align: center; color: #e91e63;">CHAPTER 1 <i>PRELIMINARY INFORMATION</i></h4> <p>It include Short title, Extent, Commencement.</p> <ol style="list-style-type: none"> 1) It extends to whole of the India. 2) This act is also known as Umbrella Act. <p>SHORT TITLES-</p> <ul style="list-style-type: none"> <input type="checkbox"/> Environment <input type="checkbox"/> Environmental Pollutant <input type="checkbox"/> Environmental Pollution <input type="checkbox"/> Hazardous Substance <input type="checkbox"/> Handling <input type="checkbox"/> Occupier </div> <div style="width: 48%; padding: 5px;"> <h4 style="text-align: center; color: #e91e63;">CHAPTER 2 <i>GENERAL POWER OF CENTRAL GOVERNMENT</i></h4> <ul style="list-style-type: none"> ➤ Make rules to regulate environment pollution. ➤ Notify standards and maximum limits of pollutants ➤ Restriction on the handling of hazardous substances ➤ Examination of manufacturing process, materials, substances ➤ Inspection of premises, plant, equipments </div> </div>	<h3 style="background-color: #e91e63; color: white; padding: 2px;">Penalties</h3> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;"> For failure or contravention </td> <td style="width: 50%; padding: 2px;"> <ul style="list-style-type: none"> • Imprisonment for a term which may extend to 5 years • Fine which may extend to Rs. one lakh • with both </td> </tr> <tr> <td style="padding: 2px;"> In case , failure or contravention continues after conviction of first failure or contravention </td> <td style="padding: 2px;"> Additional fine which may extend to five thousands for every day till failure or contravention continues </td> </tr> <tr> <td style="padding: 2px;"> If contravention continues beyond a period of one year </td> <td style="padding: 2px;"> Imprisonment for a term which may extend to seven years </td> </tr> </table>	For failure or contravention	<ul style="list-style-type: none"> • Imprisonment for a term which may extend to 5 years • Fine which may extend to Rs. one lakh • with both 	In case , failure or contravention continues after conviction of first failure or contravention	Additional fine which may extend to five thousands for every day till failure or contravention continues	If contravention continues beyond a period of one year	Imprisonment for a term which may extend to seven years
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If contravention continues beyond a period of one year	Imprisonment for a term which may extend to seven years							
<h3 style="background-color: #e91e63; color: white; padding: 2px;">Features Of The Act-</h3> <ul style="list-style-type: none"> ➤ Regulation of discharge ➤ Speedy response to accident threatening environment ➤ Determine punishment for those who endanger human environment safety & health ➤ Constitute an authority for exercising powers ➤ Establish environmental laboratories ➤ Plan and execute programs for prevention , control of environment pollution ➤ Determine procedures for handling of hazardous substances ➤ Take all necessary measures for protecting quality of environment 	<h3 style="background-color: #e91e63; color: white; padding: 2px;">CHAPTER 3 <i>PREVENTION, CONTROL AND ABATEMENT OF ENVIRONMENTAL POLLUTION</i></h3> <ul style="list-style-type: none"> ➤ Co-ordination of action by the State Government officers and other authorities. ➤ Determine standards for – <ol style="list-style-type: none"> 1. Quality of environment 2. Emission or discharge of environmental pollutants 3. Procedures and safeguards for handling of hazardous substances ➤ Government can make restriction on certain areas 	<h3 style="background-color: #e91e63; color: white; padding: 2px;">CHAPTER 4 <i>Miscellaneous Information</i></h3> <ul style="list-style-type: none"> <input type="checkbox"/> Offences <input type="checkbox"/> Penalties <input type="checkbox"/> Effects of other laws <input type="checkbox"/> Rules made under this act <input type="checkbox"/> Power to make rules <input type="checkbox"/> Power to delegate <input type="checkbox"/> Information , Reports, Returns <input type="checkbox"/> Bar of Jurisdiction <input type="checkbox"/> Members, Officers & Employees of the authority constituted under section 3. 						
<h3 style="background-color: #e91e63; color: white; padding: 2px;">Objectives</h3> <div style="text-align: center; margin-top: 10px;"> </div>	<h3 style="background-color: #e91e63; color: white; padding: 2px;">Offences</h3> <p>When any offence is committed by the company then the company is responsible for punishment & company in-charge is directly or indirectly responsible for punishment. e.g.- Discharge of pollutants beyond maximum limits</p> 	<h3 style="background-color: #e91e63; color: white; padding: 2px;">Conclusion</h3> <p>It is not only duty of central government and state government but also the responsibility of everyone to save and protect our environment .</p>						
<h3 style="background-color: #e91e63; color: white; padding: 2px;">References</h3> <p>1) "Environmental Studies" by Dr. J.A. Patil, Tech-Max Publication, page no - 4.1- 4.12.</p> <p>2) "Industrial Chemicals & Environment" by Joyes Jacob, Vishal Publishing Co., page no.- 78-84.</p>								







ANTIMICROBIAL ACTION OF SUNDARBAN MANGROVE PLANTS- *Bruguiera gymnorhiza* AND *Excoecaria agallocha*

IN *IN VITRO* CONDITIONS AND DETECTING ITS BIOACTIVE COMPOUNDS

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¹Department Of Microbiology, St. Xavier's College (Autonomous), Kolkata, West Bengal. ² Peerless Hospital & B. K. Roy Research Centre, Kolkata, West Bengal.




OBJECTIVES:

- In the present investigation, antimicrobial activity of the leaves of some mangrove plants, *Bruguiera gymnorhiza*, *Excoecaria agallocha*, *Avicennia alba* and *Agalalis rotundifolia* were evaluated against a few reference and multidrug resistant bacterial strains, namely, *Pseudomonas aeruginosa* ATCC 27853, *E. coli* ATCC 25922, *Staphylococcus aureus* ATCC 29213 and *E. coli* ESBL strain.
- The antimicrobial activities of the organic solvent extracts on the various test microorganisms were monitored using agar well diffusion technique followed by determination of MIC values by serial dilution in microtitre plate.
- TLC and LC-MS was performed to detect the novel bioactive compounds present in the extracts.



Plant	% of DPPH scavenged	Plant	% of DPPH scavenged
<i>Bruguiera gymnorhiza</i>		<i>Excoecaria agallocha</i>	
Aqueous extract	62.84	Aqueous extract	57.34
Ethanoic extract	75.55	Ethanoic extract	64.53
Methanoic extract	67.62	Methanoic extract	72.45

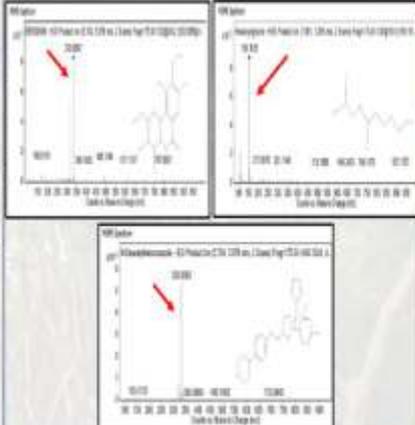
ANTIBACTERIAL ASSAY-

Plant	PE	<i>E. coli</i>	<i>Staphylococcus aureus</i>	<i>Pseudomonas</i> spp.	<i>E. coli</i>
<i>Bruguiera gymnorhiza</i>	A	0.1481	0.2482	0.8	0.21
	E	0.5482	0.6485	0.1485	0.54
	M	2.2481	0.7485	0.8	0.8
<i>Excoecaria agallocha</i>	A	0.8	0.6485	0.5485	1.21
	E	0.7481	1.1485	1.2482	0.75
	M	1.2481	1.2482	0.9485	0.44

RESULTS & CONCLUSION:

- B. gymnorhiza* extract in ethanol and DMSO were the most effective extract studied so far in this experiment in relation to their antimicrobial activities.
- Ethanoic extract of *B. gymnorhiza* has promising antibacterial activity against *P. aeruginosa* ATCC 27853 and *E. coli* ESBL strain with an MIC value of around 8µg/mL and 32µg/mL, respectively. Both the extracts have potent antioxidant activities.
- A novel finding is that the ethanoic extract of *E. agallocha* inhibits the formation of biofilm by *Pseudomonas aeruginosa* in vitro.
- LC-MS study revealed the presence of unique bioactive compounds like Benzoin, Hexanoylglycine and N-Deacetylkanonazole in the ethanoic plant extracts that might be responsible for conferring antimicrobial properties.

COMPOUNDS DETECTED BY LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY (LC-MS) IN ETHANOLIC EXTRACTS OF *E. agallocha* AND *B. gymnorhiza*



ANTIFUNGAL ASSAY-

Plant	Plant extracts	<i>Penicillium</i> spp.	<i>Aspergillus</i> spp.
<i>Bruguiera gymnorhiza</i>	Aqueous	0.4481	0.2482
	Ethanoic	0.8482	0.2485
	Methanoic	1.6481	1.2485
<i>Excoecaria agallocha</i>	Aqueous	0.4482	0.2481
	Ethanoic	1.2483	1.2481
	Methanoic	1.4481	1.5482

ANTIDIABETIC ASSAY-

SAMPLES	OD 540nm
CONTROL	0.171
ETHANOL (<i>Bruguiera</i>)	1.241
METHANOL (<i>Bruguiera</i>)	1.562
ETHANOL (<i>Excoecaria</i>)	0.349
METHANOL (<i>Excoecaria</i>)	0.488

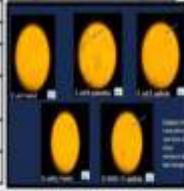


Figure: Determination of MIC of mangrove plant extracts in 96-well plate



Figure: TLC plates after derivatization with Vanillin spray reagent (Mobile phase- Toluene Ethyl acetate-9:1). Rf values indicating presence of terpenoids



Effect of methanoic extract of *Excoecaria* on *Candida parapsilosis*

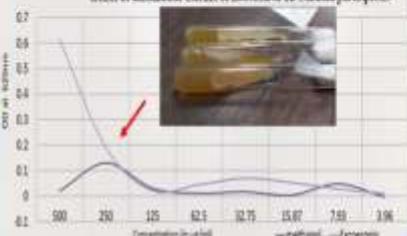


Figure - Test for antifungal activity in the plant extracts



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EMPATHETIC VALUE AND PARAMETERS OF NATURAL SOLUTIONS TO ENVIRONMENT REVOLUTION AND OTHER GLOBAL CHALLENGES



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Natural Solution

NS involve working with and enhancing nature to help address societal challenges. They encompass a wide range of actions, such as the protection and management of natural and semi-natural ecosystems, the incorporation of green and blue infrastructure in urban areas, and the application of ecosystem-based principles to agricultural systems.

Natural Solutions for climate change adaptation

The World Economic Forum Global Risks Report lists extreme weather events and natural disasters as the top two greatest risks to the global economy and human wellbeing, both in terms of severity of impact and likelihood of occurrence. It also ranks the failure to mitigate and adapt to climate change, which exacerbates both extreme weather and natural disasters as one of the most impactful risks.

Social-Economic System

ECOSYSTEM

Sensitivity

Adaptive capacity

}

Potential Impact

}

Exposure

Flow of ecosystem services

+

-

+

-

Nature-based Solutions

↻

Social-ecological vulnerability

↻

Use and management of ecosystem services

SOCIOECONOMIC SYSTEM

Adaptive capacity

Exposure

}

Potential Impact

}

Sensitivity

Challenges to Governing NS

NS often involve multiple actions-taking place over broad landscapes and seascapes, crossing jurisdictional boundaries. For example, effective management of storm-water drainage across watersheds using nature-based approaches requires joint decision-making across different local, regional or even national governments and among multiple ministries (agriculture, forestry, environment, finance, development, transport). Therefore, to be successful, governance of NS requires (indeed enables) active cooperation and coordinated action between stakeholders whose priorities, interest, or values may not align, or may even conflict.

Conclusion

NS are gaining traction in international policy and business discourse. They offer huge potential to address both causes and consequences of climate change whilst supporting biodiversity and thereby securing the flow of ecosystem services on which human wellbeing depends. Yet three barriers hinder the evidence-based integration of NS into international, national and local climate and development policy and practice.

Financing and governing NS

To translate our understanding of the socioeconomic effectiveness of NS into action on the ground, we need to consider the political processes that shape which interventions are adopted and why, and understand how to effectively finance, implement and govern those interventions.

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- Seddon N *et al.* 2019b Global recognition of the importance of nature-based solutions to climate change impacts *Global Sustainability* (in rev)
- World Economic Forum. 2019 *The Global Risks Report 2019*, 14th Edition.

Acknowledgement

The authors express their sincere gratitude C.C.S. University campus Meerut-250004 (U.P.) for their remarkable support.





Isolation & Characterization of Noval Alkaliphilic Bacteria from Industrial Soil
Charu Sharma, Pallavi Mittal



Introduction

Microbial enzymes having more advantages over the enzymes derived from animals and plants sources. Several industrial applications demand that industrial enzymes should be stable at extreme conditions. Alkaliphiles is a type of extremophilic microbes which are capable of survival in alkaline conditions, growing optimally second pH range above 9 to pH 12 and high salinity for optimal growth. The potential alkaliphilic bacteria for neutralization of alkaline textile industrial wastewater. To isolate alkaliphiles, alkaline media must be used. Sodium carbonate is generally used to adjust the pH to around 10, because alkaliphiles usually require at least some sodium ions. The major goal of microbial ecology is to understand microbial activity in natural habitats, consequently, understanding of both micro-organisms and habitats is essential. Alkaliphiles have clearly gained large amounts of genetic information by evolutionary processes and exhibit an ability in their genes to cope with particular environments; therefore their genes are a potentially valuable source of information waiting to be explored and exploited by the biotechnologists. Such organisms are very important in the field of biotechnology and for basic research to clarify the physiology for adaptation to extreme environments and to study the antiporter system of bacteria in extreme environment and try to isolate and characterize novel bacterial species and also to determine the ability of bacteria in decolorizing the industrial textile effluent. In the present study we have isolated alkaliphilic bacteria, performed their biochemical analysis & finally study their antiporter proteins system.

Material and Methods

Industrial wastes samples (Soil) for isolation of pure culture were collected in sterilized glass bottles from industrial area near Ghazabad and stored at -200C. The culture media is composed of different nutrients that are essential for the growth of micro-organisms. It may be liquid or solid prepared according to the support for the growth of micro-organisms. Serial dilutions of water and soil samples were prepared. Isolation and Screening: Various types of bacterial colonies were isolated from the soil sample through serial dilution method. The soil sample with pH were considered as a sample for isolation of bacteria through dissolving soil in distilled water and diluted till 10⁻⁷, 10⁻⁸ and 10⁻⁹ and then dilution was spread on the petri plates that were filled with NAM media and then kept in incubator at 37°C. After 24 hrs various colonies were obtained from different plates. Sub-culture method was used to screen and to isolate the bacterial colonies in which 5 different bacterial strains were collected.

Isolation and Screening of 5 different Bacterial strains

S.No	pH of subculture	Mark no. of colony	Slant name /mark no.
1	10	1	P1
2	10	2	P2
3	7	3	P3
4	10	1	P4
5	10	2	P5

Morphological and Physical Characterization

Selected isolates were characterized by colony morphology on nutrient agar, gram staining and morphological characteristics it was carried out in terms of colour and morphology of bacterial colonies on LB agar plates, motility, endospore formation and Gram staining reaction. Tests for growth on nutrient agar, nutrient broth, E.M.B media on 5%NaCl, McCotkey test for gram negative enterobacteria was also performed.

Morphological Characteristics Of Isolated Bacterial Strains.

Bacterial Strain	Gram stain	Shape
P1	Purple(+ve)	Vibrio
P2	Pink(-ve)	Vibrio+cocci
P3	Purple(+ve)	Rod
P4	Purple(+ve)	Rod
P5	Purple(+ve)	Rod

IMVIC TEST

A. INDOLE TEST:

The bacterial strain form a red/cherry color ring at the top of media are considered as positive either the strains that not formed any color of ring are considered as negative the result are presented.



P1+ P2+ P3+ P4+ P5+

Fig 1: Indole test result of isolated bacterial strains which shows the test is positive in all strains of isolated bacteria.

B.MR TEST (The Methyl Red):

In MR test the strains were shows positive, change the media colour to red/cherry, the another bacterial strains shows negative test in which no colour change appeared in media, the result presented as:



P1- P2- P3+ P4+ P5+

Fig 2: The Methyl Red test result of isolated bacterial strains which shows the test is positive in all strains of isolated bacteria except P1, P2, P5.

C.VP TEST (Voges Proskauer):

The positive of VP test formed a white colour PPT ring at the top of broth culture and also shows brown colour and negative strains did not shows any PPT at the top of broth culture.

D.THE CITRATE TEST:

All the Bacterial strains shows negative result (the citrate media colour remain as such)



P1- P2- P3- P4- P5-

Fig 3: The Citrate test result of isolated bacterial strains which shows the test is negative in all strains of isolated bacteria

IMVIC test of 5 Isolated Bacterial Strains

Bacterial Strain	Indole Test	Citrate Test	Methyl Red Test
P1	+	-	-
P2	+	-	-
P3	+	-	+
P4	+	-	-
P5	+	-	-

Effect Of PH

The effect of pH on the growth of in NAM medium was evaluated. The maximum growth was observed by at pH 10 and pH 11 with after 24 hrs. Good growth was observed by at pH 10 and pH 11.

Antiporter System Of Bacteria

S.No	Na ⁺ /H ⁺	Antiporter Protein	Accession No
1	E.coli	Nha A-383 aa	AAA23448
		Nha B-366 aa	AAA 24218
		Clat A-366 aa	AAC74300
2	Bacillus Pseudofe rum	OPY Nha C	AAAC45432
3	Vitropar laemlytic us	Nha D-477 aa	AAG48354
4	Pseudomonas Aeriginos a	Nha P	BAA31695

Result & Conclusion

Alkaliphilic bacteria have the capability to survive in high pH mostly 8.5-11. Potential applications describing about bioremediation through extremophilic organism mainly alkaliphilic organisms and their enzymes have become attractive, because they may provide environmentally friendly technologies for textile industry. Alkaliphilic bacteria are used for bio-decolorization of many textile dyes and textile effluent. As studies till now, alkaliphilic bacteria degrade the colour at pH9.

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Organizer



Biodiversity-

A boon for Existence of Life

Biodiversity:- *The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species between species and of ecosystems.*

Healthy Biosphere Services

- Solar Energy
- Production of Oxygen
- Climate Regulation
- Purifies water and air
- Stores and distributes freshwater
- Food Production
- Nursery Habitats for wildlife
- Detoxifies human and Industrial waste
- Natural Pest and disease control
- Manages soil Erosion and run off

Degraded Biosphere effects

- Habit Loss
- Invasive Species
- Over Exploitation
- Pollution
- Climate Change associated with Global Warming

Influencers

- Human Population growth
- Increasing Consumption
- Reduced Resource Efficiency

The Earth is the only world known so far to harbor life. There is nowhere else, at least in the near future, to which our species could migrate. Visit, yes. Settle, not yet. Like it or not, for the moment the Earth is where we make our stand.

By J. Dabryngodbur Titik Student & Dr. P. Mubosudbuo Risky, HOD- Microbiology dept, Palangora University, Mababobompa, Indonesia





Development of dual resistance rice variety for drought and submergence by marker assisted selection

Dr.sonamsingh eklavya mahavidyalaya jhukiya bahraich (drsonamsingh0716@gmail.com)

Introduction

- Rice is one of the most important food crop of India and many parts of the world .It is the primary source of food for one third of the world population .In India ,rice occupied major area contributing up to 43% of total food grains food production (Arause *et al* 2002).
- Rice crop faces any problem in the abiotic stresses. Submergence AND drought are the major on in areas having low land.(Ansari *et al*2015).Submergence is a type of flooding stress and it is condition where entire plant is fully immersed in water.
- DNA based Markers can be derived from quantitative trait loci(QTL) and allow selection at the Seedling stage .The developing dual resistance rice for submergence and drought are the need of the hour especially the farmers of the low land areas.

Objective Development of dual resistance rice for submergence at vegetative stage and drought at reproductive stage .

Methodology :The following methodology was adopted :

- 1.Screening BC₃F₁ population of Swarna sub 1 individually by phenotyping and genotyping .
- 2.Advancing targeted plants to BC₃F₂
- 3.Selection of plants (BC₃F₂) related to submergence and drought by SSR markers
 - ❖ 4.Identification of good genotypes to submerge field with fertilized soil (0: 25:25).Seedling from each pot was transplanted and maintained.
 - ❖ 30 days old plant were exposed for 14 days submergence . Control was irrigated with tap water .
- for tolerance to submergence and drought

Result :

- ❖ Five rice varieties namely Swarna sub 1, Nagina 22, NDR 9830 102 ,NDR 97, Shuk Samrat and BC₃F₁(Swarna sub 1 x Nagina 22) were grown at submergence tank of crop physiology in dept during 2015-16 & 2016—17 (fig 1)
- ❖ Based on morphological screening at vegetative stage 100 plant from BC₃F₂ were selected and scored for various characters. Just after Submergence against control .Survival percentage of plant after 20 days was recorded .(table 1)
- ❖ The surviving plants were subjected to drought situation and submergence
- ❖ These plants were screen for various and morphological character and also using SSR markers
- ❖ Finally 23 selected plants of mapping population showed the presence by dual character i.e drought tolerance and submergence tolerance.(fig 2)



Sl. No.	Genotype	Survival % after 20 days submergence	Survival % after 20 days drought
1	Swarna sub 1	100	100
2	NDR 97	100	100
3	NDR 9830	100	100
4	NDR 102	100	100
5	Shuk Samrat	100	100
6	BC ₃ F ₁ (Swarna sub 1 x Nagina 22)	100	100
7	BC ₃ F ₂ 1	100	100
8	BC ₃ F ₂ 2	100	100
9	BC ₃ F ₂ 3	100	100
10	BC ₃ F ₂ 4	100	100
11	BC ₃ F ₂ 5	100	100
12	BC ₃ F ₂ 6	100	100
13	BC ₃ F ₂ 7	100	100
14	BC ₃ F ₂ 8	100	100
15	BC ₃ F ₂ 9	100	100
16	BC ₃ F ₂ 10	100	100
17	BC ₃ F ₂ 11	100	100
18	BC ₃ F ₂ 12	100	100
19	BC ₃ F ₂ 13	100	100
20	BC ₃ F ₂ 14	100	100
21	BC ₃ F ₂ 15	100	100
22	BC ₃ F ₂ 16	100	100
23	BC ₃ F ₂ 17	100	100
24	BC ₃ F ₂ 18	100	100
25	BC ₃ F ₂ 19	100	100
26	BC ₃ F ₂ 20	100	100
27	BC ₃ F ₂ 21	100	100
28	BC ₃ F ₂ 22	100	100
29	BC ₃ F ₂ 23	100	100
30	BC ₃ F ₂ 24	100	100
31	BC ₃ F ₂ 25	100	100
32	BC ₃ F ₂ 26	100	100
33	BC ₃ F ₂ 27	100	100
34	BC ₃ F ₂ 28	100	100
35	BC ₃ F ₂ 29	100	100
36	BC ₃ F ₂ 30	100	100
37	BC ₃ F ₂ 31	100	100
38	BC ₃ F ₂ 32	100	100
39	BC ₃ F ₂ 33	100	100
40	BC ₃ F ₂ 34	100	100
41	BC ₃ F ₂ 35	100	100
42	BC ₃ F ₂ 36	100	100
43	BC ₃ F ₂ 37	100	100
44	BC ₃ F ₂ 38	100	100
45	BC ₃ F ₂ 39	100	100
46	BC ₃ F ₂ 40	100	100
47	BC ₃ F ₂ 41	100	100
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49	BC ₃ F ₂ 43	100	100
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85	BC ₃ F ₂ 79	100	100
86	BC ₃ F ₂ 80	100	100
87	BC ₃ F ₂ 81	100	100
88	BC ₃ F ₂ 82	100	100
89	BC ₃ F ₂ 83	100	100
90	BC ₃ F ₂ 84	100	100
91	BC ₃ F ₂ 85	100	100
92	BC ₃ F ₂ 86	100	100
93	BC ₃ F ₂ 87	100	100
94	BC ₃ F ₂ 88	100	100
95	BC ₃ F ₂ 89	100	100
96	BC ₃ F ₂ 90	100	100
97	BC ₃ F ₂ 91	100	100
98	BC ₃ F ₂ 92	100	100
99	BC ₃ F ₂ 93	100	100
100	BC ₃ F ₂ 94	100	100



- **Conclusion**
- By using prevailing breeding and Molecular technique the Rice plants tolerance to submergence and drought has been developed .

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Organizer



GIS- GPS Mapping & Water Sampling of East Kali River

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INTRODUCTION:

The Kali River East, a tributary of the Ganges, originating in Antwada village in Muzaffarnagar District flows through eight Districts of Uttar Pradesh before its confluence with Ganga River near Kannauj. The river has over 1,200 villages situated on its bank and the highly populated and predominantly rural catchment is entirely dependent on the Kali River as a water resource for domestic, agricultural and industrial use while the untreated groundwater is the primary source of drinking water.

But, since last two decades the river is being used as a dumping ground with substantial quantities of contaminants and untreated effluents from numerous sources disposed into it along its course. The major factors are industrial untreated effluents, domestic sewages, agricultural runoff, indiscriminate use of polythene etc. Key industries including sugar processing unit and their associated alcohol manufacture distilleries, paper mills, dairies, tanneries are situated adjacent to the river. The sugar mills and paper mills are enlisted in the 17 most toxic waste releasing industries.

OBJECTIVE:

To Study:

- The quality of the Kali River throughout its catchment.
- Extent and movement of pollutants in aquifer due to intense contamination of surface water.
- The water quality analysis data on the GIS platform.
- Comparing the deterioration of the river water quality and groundwater quality, within the span of twelve months.



Location & Condition of Samples

The first river water sample was taken from the river at Khatauli – Jaansath road, after the Khatauli Sugar mill releases its waters in the river and first private hand pump sample taken from Antwada village.

The eight sample of the river water was taken before it merges in the Ganga.

Bottling of the samples was done with labels as mentioned in the table.

The bottles were kept completely air tight with target to reach them at testing center PSI Dehradun.



Sampling & labelling at various spots

These samples have been sent for testing at laboratory of People's Science Institute, Dehradun

DETAILS OF COLLECTED SAMPLES						DETAILS OF ANALYSIS						GIS Locations						
Sl. No.	Station	Sample Location	Sample Date	Time of Sample Collection	Time of Sample Processing	Sl. No.	Parameter	Unit	Value	Sl. No.	Parameter	Unit	Value	Sl. No.	Station	Latitude	Longitude	Altitude
1	Meerut	East Kali River, Khatauli (Before Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	1	Lead	ppm	0.15	1	Lead	ppm	0.15	1	Meerut	28.46°N	77.49°E	190m
2	Meerut	Meerut (After Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	2	Chromium	ppm	0.05	2	Chromium	ppm	0.05	2	Meerut	28.46°N	77.49°E	190m
3	Meerut	Meerut (Before Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	3	Iron	ppm	1.2	3	Iron	ppm	1.2	3	Meerut	28.46°N	77.49°E	190m
4	Meerut	Meerut (After Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	4	Zinc	ppm	0.08	4	Zinc	ppm	0.08	4	Meerut	28.46°N	77.49°E	190m
5	Meerut	Meerut (Before Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	5	Copper	ppm	0.02	5	Copper	ppm	0.02	5	Meerut	28.46°N	77.49°E	190m
6	Meerut	Meerut (After Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	6	Manganese	ppm	0.03	6	Manganese	ppm	0.03	6	Meerut	28.46°N	77.49°E	190m
7	Meerut	Meerut (Before Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	7	Nitrate	ppm	15	7	Nitrate	ppm	15	7	Meerut	28.46°N	77.49°E	190m
8	Meerut	Meerut (After Sugar Mill)	21/06/2019	08:00 AM	09:00 AM	8	Ammonia	ppm	0.05	8	Ammonia	ppm	0.05	8	Meerut	28.46°N	77.49°E	190m

REPORTS

In these samples, lead, chromium, iron, zinc, along with other elements were found to be present. According to the report, upto the depth of 30-35 m at Meerut and Ghaziabad as well as its surrounding areas, heavy metals have been found in large limits exceeding the standards

CONCLUSION

- The untreated effluents of chemical plants, sugar mills, distilleries and slaughter houses etc. have made this river almost dead. The water has turned black with hardly any oxygen in it. Like all other rivers the **Kali Nadi** is also considered as pious and aesthetic.
- The river which once gave life to people and nature is now so polluted that it has turned into **flowing death**.

FINALLY after 5 Years :

- On November 21, 2019, the villagers of Antwada scaled up their efforts from sporadic cleaning of plastic waste and plantation activities, to digging at large scale and cleaning the Kali river themselves with voluntary labor.
- Hence, a people's campaign to 'Clean River Kali' was launched.
- Representatives from various civil society organizations and students are being involved in the campaign on a mass level. International organizations working on river conservation such as **FIAN** International, **FANSA**, International River Foundation, **World Environment Federation**, **India Water Partnership**, **WWF**, Government of India, World River Forum, International Water Association and Earth Day Network are being involved in the campaign. A coordinator has been appointed in each of the eight districts through which the Kali River flows, who are working to save the river.
- The villagers of Antwada gathered and formed Nadi Raksha Samities (River Protection Committees).
- The Planning Department of the Uttar Pradesh government has now prepared a scheme worth **₹88 crores** to make the Kali river pollution-free.



Looking at the unique approach adopted in Antwada village, Earth Day Network conferred the "Star Village" certificate on February 2, 2020, to the village. The day marked the commemoration of **World Wetland Day**





Biological Degradation of Polythene

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INTRODUCTION

- One of the major environmental threats is the very slow degradation or the non-biodegradability of the organic materials under natural conditions e.g. plastics.
- The plastics of various forms such as nylon, polythene, teraphelate, polythene, polypropylene polystyrene polyterafouro ethylene polyurethane and polyvinyl chloride are being continuously used in our day to day life.
- The worldwide utility of polythene is expanding @12% per annum and approximately 140 million tons of synthetic polymers are produced worldwide each year such huge amount of polythene getting accumulated in the environment and their disposal evokes a big ecological issue.
- Biological degradation is generally considered as a phenomenon of biological transformation of organic compounds by living organisms particularly microbes.



Sample collection

OBJECTIVES

- To collect fragmented / half degraded polythene from natural habitats
- To isolate potential polythene degrading microbes from above collected pieces using Petri dish moist chamber technique.
- To identify the above degrading microbes using standard identification techniques
- To assess the decomposition potential of selected microbes for degradation of polythene and liquid state fermentation conditions.

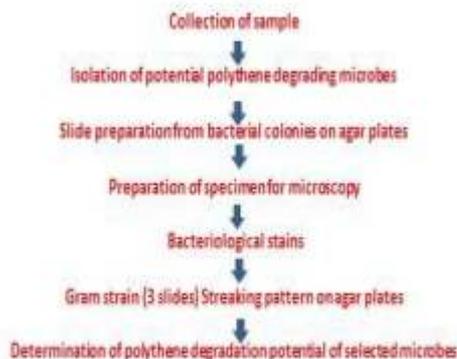


Plate streaking



Microscopic view of bacteria

MATERIAL AND METHOD



References

- Biodegradation of Polythene Bag Using Bacteria Isolation from Soil, (M. Ariba Begum et al. 2015, 674-680).
- Plastic Degradation and its Environmental Implication with Special Reference to Poly(ethylene teraphelate).





Study on cytotaxonomy and stomata of two varieties of *Allium sativum* L. and their role in improving soil fertility and yield via relay intercropping with *Solanum melongena* L.

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INTRODUCTION

Allium sativum L. belongs to family Liliaceae. It is underground bulbous plant growing upto 1 meter in height. It is grown both in tropical and temperate regions of the world. *Allium sativum* is known to be originated in china. The chromosome number of *Allium* sp. is reported as $2n=16$.

Solanum melongena L. belongs to family Solanaceae. It is a versatile crop adopted to different agro climatic regions and can be grown throughout the year.

Continuous cropping of *Solanum melongena* L. on same land for longer period results in decreased soil fertility. To cope up with this problem the concept of relay inter cropping has been developed, in which garlic and eggplant are grown together. Study on intercropping of these two plants has shown positive results, a significant increase in soil fertility was recorded and ultimately higher yield

METHODS

Mitotic studies

Studies were done on two varieties of *Allium sativum* L.

(a) *Allium sativum* L. var single clove

(b) *Allium sativum* L. var multi clove Bulbs were dried properly in sunlight for 3-4 days. Bulbs were placed in glass of water just touching root disc under indirect sunlight. Roots of 1-1.5cm were cut between 1:30 to 2:00pm. Roots were pretreated in 1,4-Paradiichlorobenzene for 4hrs then washed and transfd to fixative 1:3 acetoalcohol for 24hrs. Then roots were transferred to 70% ethanol for preservation. Mitotic slides were prepared by squash technique. Root tips were warmed in 2% acetocarmine for 1hr. Squash preparations were made with 45% glacial aceticacid. Three plates with well separated chromosomes were taken for study.

Mitotic index

$$= \frac{\text{Total no. of dividing cell}}{\text{Total no. of cells observed}} \times 100$$

Stomatal studies

Fresh leaves were taken and kept in water in petriplates. Slides were prepared with scratch method. Epidermal layer obtained were stained in saffranin and mounted with glycerin and coverslip.

Slides were prepared of ventral and dorsal surface with its apex, middle and base region. Dimensions were measured using ocular.

$$\text{Stomatal index} = \frac{S}{S+E} \times 100$$

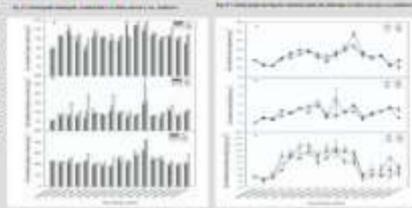
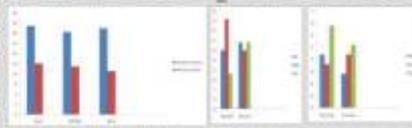
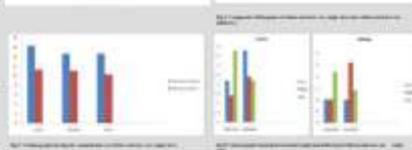
S = stomatal cell

E = epidermal cell

Intercropping studies

Some relevant research papers were reviewed.

RESULTS



CYTOTAXONOMIC STUDIES
MITOTIC STUDIES

Two varieties of *Allium sativum* L. var. single clove and *Allium sativum* L. var. multiclove were recorded with chromosome number $2n=2x=16$ as shown in Fig.2 and Fig. 4. The chromatin length of *Allium sativum* L. var. single clove observed was 53.76 μ with 7 nearly median and 1 nearly sub median and *Allium sativum* L. var. multiclove observed was 63.48 μ with 7 nearly median and nearly sub median (Fig.2 & 4, Table1). Among the two varieties of *Allium sativum* L., mitotic index of *Allium sativum* L. var. single clove was recorded 55.273, whereas in *Allium sativum* L. var. multiclove was recorded 54.419 (Table 2&3).

STOMATAL STUDIES

In this investigation, stomata observed were of anocytic type of stomata. In *Allium sativum* L. var. single clove, maximum stomatal index was observed in apex region of ventral side i.e. 16.316 \pm 0.34. And the lowest stomatal index was observed in base region of dorsal side i.e. 10.26 \pm 1.75. The longest and widest stomata were reported on basal region of ventral surface with 4.48 \pm 0.14 and 2.64 \pm 0.16 respectively

In *Allium sativum* L. var. multiclove, maximum stomatal index was observed in apex region of ventral surface i.e. 17.394 \pm 1.05 and the lowest stomatal index was observed in base region of dorsal side i.e. 8.534 \pm 1.04. The longest and widest stomata were observed on middle region of ventral surface with 4.72 \pm 0.19 and 2.64 \pm 0.16 respectively.

CONCLUSION

The analytical data of karyotype of two varieties of *A. sativum* L. were compared on the basis of total chromatin length and karyotype formula.

Chromosome number was recorded $2n=2X=16$. On the basis of Idiogram prepared chromosomes varied in size and were nearly median and nearly sub median, it indicates symmetrical nature of karyotype. *A. sativum* L. var single clove was considered advance due to its smaller chromatin length and *A. sativum* L. var multi clove was considered primitive on the basis of its larger chromatin length.

Maximum number of stomatal index was observed on ventral (adaxial) surface, which can be correlated with non-xerophytic nature of plant.

It has been concluded from the study that the pattern of eggplant relay intercropping with garlic can increase soil enzyme activities and available nutrient content and change soil pH, thus improve soil quality. They are expected to help overcome soil sickness and continuous cropping obstacles

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ROLE OF TECHNOLOGY IN SMART HEALTHCARE SERVICES



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Abstract: In order to provide better healthcare services to the countrymen, medical and pharmaceutical companies, health care professionals, researchers and city managers need to work on solutions and IoT devices that can minimize response time, offer quick emergency services, reduce overcrowding in hospitals and give remote treatment and collaborate with doctors around the globe. This poster provides a look on Smart Healthcare services in smart cities that include latest digital and mobile devices. They are smart in the sense they are not only curing a disease but also confronting it at the right time.



Figure 1: Smart City Components

1. INTRODUCTION: The conceptualization of Smart City varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. A smart city would have a different inference in India than other countries. Even in India, there is no one way of defining a smart city [1].

Healthcare refers to the organized provision of medical care to people and communities. Healthcare careers do not just include doctors, nurses and other frontline clinicians. It also include administrators, therapists, chiropractors, paramedics and technology professionals. Due to its size and diversity, healthcare welcomes new professionals with many different skills, interests, and personalities. In general, people who work in this sector have hearts to serve others and intellectual interests in math and science. [3].

The major problems of health services in India are as follows[6]:-

- Neglect of Rural Population
- Emphasis on Culture Method
- Inadequate Outlay for Health
- Social Inequality
- Shortage of Medical Personnel
- Medical Research
- Expensive Health Service

Digital technologies are not only creating new health products, but smart is facilitating a change in how we manage our health. Smart is shifting from a focus on cure towards a broader view of wellness management and healthy living.

2. DEALING WITH HEALTH ISSUES THROUGH SMART TECHNOLOGY

One of the key elements of the proposed smart cities includes state of the art health facilities for everyone. The potential applications of technology to improve efficiency, safety, and quality of health care in India are truly enormous.

'Smart Health Technology' combines Smart Technology and latest mobile device with health. Nowadays, numerous initiatives have been designed to encourage a broader view of health and wellbeing thus smart wearables devices like fitness tracker or fitness bands and even health assessment apps in smartphones have gained grand attention amongst fitness enthusiasts. These devices are smart in the sense as they not only just monitor health but also provide solutions if needed at the right time. Smart devices act as the base of smart healthcare. Smart Health technology interacts

and engages with data produced by those devices which can be analyzed by doctors, researchers and health care professionals for better-personalized diagnosis and solutions. These digital records save cost and time of both patients and hospitals as they not only offer personalized treatments and medications but also give preventive measures through real-time data collection.

Connectivity provides the foundation of smart city services and it acts as an enabler of smart healthcare as well. Citizens are able to communicate with authorities easily and it helps authorities as well to gather more health data of its citizens which in return can be used to inform further city and service planning that makes public healthcare a priority. Here Internet of Things (IoT) plays an important role.

The scope of IoT is expanding rapidly and healthcare is an area of application that is emerging at a fast pace. Smart cities will take medical care to the next level enabling connectivity across devices and remote monitoring of patients. IoT in healthcare allows connecting data collected from smart devices and sensors to extract valuable insights. The technology can play a foremost role in healthcare observation and help in early detection of health issues. It would also help in assimilating the data collected from tests instantly, monitor the condition of the patient, and then convey that information to the doctors and staff in real-time, thus improving the effectiveness in the overall healthcare system. In the near future personal IoT-based health checking devices will change the way, we track the health of individuals.

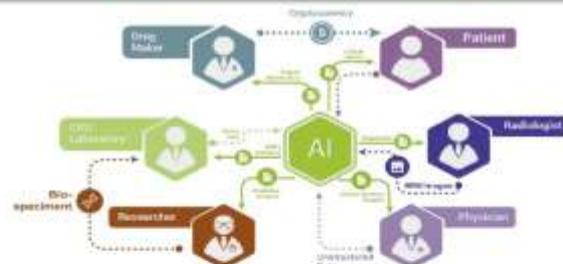


Figure 2: Components of Smart Healthcare

3. CONCLUSION: The healthcare industry is in a position to take advantage of the digital revolution. These advanced technologies are very critical in making healthcare a more determinate process, with concrete results, with a service that is more pertinent to the lifestyle of the modern citizen. Continuing innovation and improved data analysis will also help make it an area of constant enhancement that will continue to invent new ways of keeping people fitter and healthier.

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2. <https://theblockchainland.com/2019/03/05/blockchain-role-developing-smart-cities/>
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5. <https://www.economicdiscussion.net/articles/7-major-problems-of-health-services-in-india/2305>
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INFORMATION TECHNOLOGY: BUILDING BLOCK OF SMART CITY

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ABSTRACT

The upcoming transformation in technologies are making the life of people smarter and comfortable. Various technologies like IoT, Big Data, Cloud Computing, Artificial Intelligence and many more are in use now days. The cities need complete makeover or need to be smarter, so that it can face the new challenges due to rapid changing of environment. Thus, new methods and concepts can be employed in order to manage the different activities in a city in a smarter way.

INTRODUCTION

SMART CITY
The interpretation of smart city varies based on the development of different cities and countries. Although there is smart-city trend globally, the definition is not clearly defined. Though, urban planners define smart city as a modern city with the intention of utilizing digital information and to improve quality of life, effectiveness of urban operation and services, and competitiveness, without compromising the requirements of present and future generations with respect to economic, social and environmental aspects.



ADVANTAGES

- Efficient resource utilization
- Better quality of life.
- High level of transparency.
- Security.

CHARACTERISTICS



BASIC BUILDING BLOCKS

Smart Living	Smart Mobility	Smart Government	Smart Environment	Smart People	Smart Economy
<div style="border: 1px solid white; border-radius: 50%; padding: 5px; display: inline-block;">Smart Services and Applications</div>					
<div style="border: 1px solid white; padding: 5px; display: inline-block;">3- Data Management – Autonomous Decisions</div>					
<div style="border: 1px solid white; padding: 5px; display: inline-block;">2- High Speed Network Infrastructure</div>					
<div style="border: 1px solid white; padding: 5px; display: inline-block;">1- Large-Scale Instrumentation – Widespread Sensors</div>					

FIGURE 2: Building Blocks of a Smart City

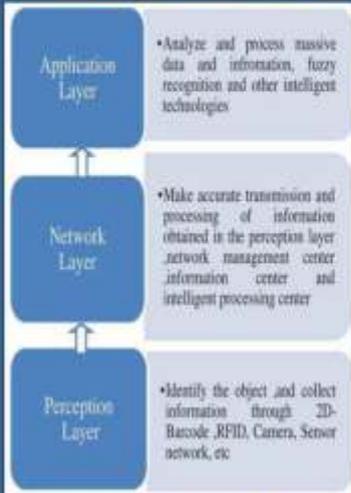
LIMITATIONS

- Capital.
- Existing Cities.
- Socio-economic differences.
- Less Awareness.

CONCLUSION

The ICT, IoT and Big data analytics are very useful in urban planning and management. There are various applications of new technology in modern cities, which can help to achieve a smart city.

SMART CITY ARCHITECTURE



APPLICATIONS

- Smart Water Management
- Smart Waste Management
- Smart Energy
- Traffic Congestion Management

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Change in Environment during Lockdown



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Introduction :- An Environment is everything that is around us, which includes both living and nonliving things such as soil, water, animals and plants, which adapt themselves to their surroundings. It is nature's gift that helps in nourishing the life on the earth.

Description :-World Environment Day is celebrated on **5 June** every year, and is the United Nations' principal vehicle for encouraging awareness and action for the protection of our environment.

Environment :-Is a place where different things are such as a swampy or hot environment. It can be living (biotic) or non-living (a-biotic) things. It includes physical, chemical and other natural forces. They constantly interact with it and adapt themselves to conditions in their environment.

Save Trees :- Trees are the source of rain on the earth as they attract clouds which ultimately bring rain, They also help in soil erosion and keep environment fresh by prevention from pollution.

Save water :-Turn off the tap when you brush your teeth - this can save 6 lit. water per minute, Place a cistern displacement device in your toilet cistern to reduce the volume of water used in each flush. You can get one of these from your water provider. Take a shorter shower and save rain water.



Before lockdown



After lockdown

Effect of COVID - 19 in Environment :- The environment is benefiting greatly from the lockdown caused by the corona virus. Due to this, The industries of the world have been shut down due to which the ozone layer seems to be improving and decrease the air pollution. March 22 was the 'Janata Curfew', following which, a significant dip in air pollution levels was measured across the country.

Happy World Environment Day

“Time spent among trees is never time wasted.”





Organizer



Study of Microbial Diversity in Rhizosphere soils of different crops from Nizamabad district, Telangana, India

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Introduction: The soil micro-organisms constitute world's largest reservoir of biological diversity and are crucial to the functioning of terrestrial ecosystems. Rhizosphere is the narrow zone of soil specifically influenced by the root system. Soil microorganisms play a significant role in plant productivity in terrestrial ecosystems. Soil type and different crops influence the diversity and composition of the rhizospheric microbial communities. Microorganisms are beneficial in increasing the soil fertility and plant growth as they are involved in several biochemical transformation and mineralization activities in soil. These are essential indicators for evaluating soil health. Soil microbial community and diversity can reflect changes in the soil environmental quality and reveal differences in microbial ecological functions, which are critical for maintaining soil quality and ecosystem stability (Gertin 2005). The conservation of diversity of microflora in agricultural fields becomes very essential for the development of sustainable agriculture. This is why the study of interactions in the rhizosphere is a topic of current concern. Continuous cropping can decrease soil pH, changing the soil from neutral to acidic. This benefits the growth of fungi and inhibits the reproduction of bacteria and actinomycetes, resulting in a soil microbial community in which fungi predominate (Vargas-Gil et al., 2011).

Objective: The present experimental study is aimed at finding the microbial diversity and population dynamics in the rhizosphere soil samples of kharif (July-October) (wet) and rabi (Dec-May) (dry) season crops which were collected from different areas of the agricultural field located at Nizamabad district, Telangana state, India by culture dependent techniques (traditional cultivation techniques) and to assess the percentage contribution and diversity of different microbial species.

Methodology:

Sample site description

The soil samples were collected from an agricultural farm of about 2 acres located at Bodhan mandal, Nizamabad district, Telangana. The soil is sandy loam with average soil pH 8.0 to 8.2. Two distinct cropping seasons are recognized in a year as kharif (July-October) and rabi (Dec-May) dry season. The summer temperature ranges between 25 to 48°C and winter temperatures from 10°C to 30°C.

Collection of Rhizosphere soil samples

The rhizosphere soil samples were collected from eight different squares of the same agricultural field where kharif season crop namely: soybean (*Glycine max*) and rabi season crop namely: sunflower (*Helianthus annuus*) were cultivated.

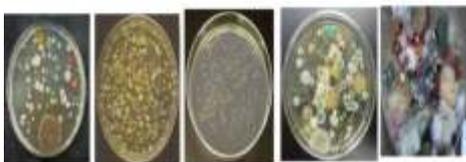
Isolation of microbial communities (Bacteria & Fungi) by culture dependent technique:

The soybean and sunflower plants were carefully uprooted from the field and upto one gram of rhizosphere soil samples were collected. Dilution agar plate technique (Waksman, 1922) was used to isolate both bacteria and fungi from soil samples.

Bacteria: The serially diluted suspension of soil suspension was spread on pre-poured nutrient agar and nitrogen free media (Ashby's Jensen medium & Sodium Molate medium) for cultivation of bacteria & nitrogen fixing bacteria respectively. After incubation of 24-48 hr, the isolated colonies that developed on the plate are sub-cultured onto fresh media plates for isolation of pure cultures.

Fungi: Serially diluted sample is inoculated and spread on petri plates containing sterilized potato dextrose agar (PDA) medium. One percent of streptomycin solution was added to the medium before pouring into petri plates for preventing bacterial growth. The plates were incubated at room temperature (26 ± 2°C) for 3-5 days. Each isolate of fungal species was sub-cultured by transferring onto fresh PDA slant.

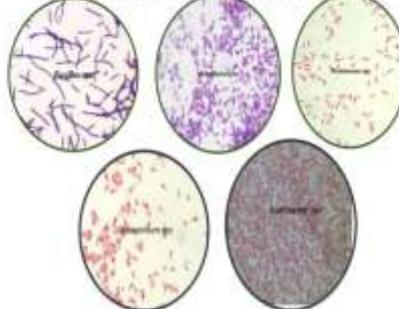
Bacterial & Fungal Plates from Rhizosphere Soil Samples of Soybean & Sunflower crops



Identification of Bacteria & Fungi



Microscopic Observations of major Bacterial genera identified



Microscopic Observations of major Fungal genera identified

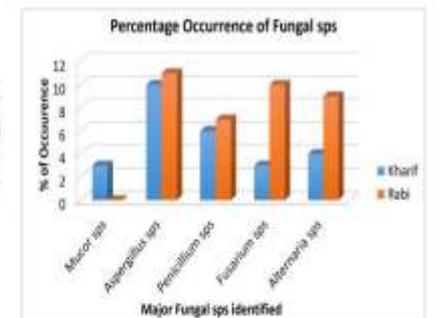
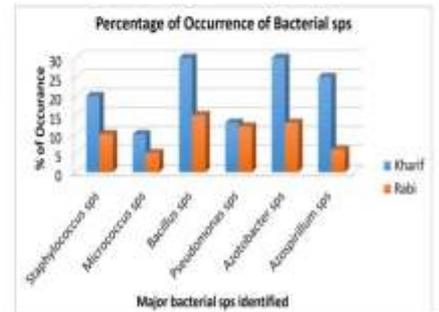


Enumeration of bacteria in rhizosphere soils of kharif & rabi season crops

Bacterial sps	Rhizosphere Soil	
	Kharif Season Soybean Crop	Rabi Season Sunflower Crop
Staphylococcus sps	15X 10 ⁶	10X10 ⁶
Micrococcus sps	5X10 ⁶	Nil
Bacillus sps	25X10 ⁶	20 X10 ⁶
Pseudomonas sps	12X10 ⁶	9X10 ⁶
Azotobacter sps	30X10 ⁶	5X10 ⁶
Aspergillus sps	28X10 ⁶	8X10 ⁶

Enumeration of fungi in rhizosphere soils of kharif & rabi season crops

Fungal sps	Rhizosphere soil-CFU/g-1 soil	
	Kharif Season Soybean Crop	Rabi Season Sunflower Crop
Mucor sps	1X 10 ⁷	Nil
Aspergillus sps	3X10 ⁷	4X10 ⁷
Penicillium sps	2.2X10 ⁶	2X10 ⁶
Fusarium sps	1.8X10 ⁶	3.5 x10 ⁶
Alternaria sps	1.5X10 ⁶	4X 10 ⁶



Results: The data on rhizosphere soil analysis of kharif and rabi seasons of an agricultural field indicates that during Kharif season the bacterial population was significantly higher as compared with rabi season crop and major culturable bacteria were identified as *Bacillus*, *Azotobacter*, *Aspergillus*, *Micrococcus* and *Pseudomonas* genera based on microscopic observations & biochemical characterization. Among mycoflora *Aspergillus* is observed to be an important component. *Fusarium* sps and *Alternaria* sps were identified to be the dominant fungal genera in rhizosphere soil from continuously cropped fields.

Conclusion: Soil microbial community diversities were decreased in rhizosphere soils under long-term continuous cropping and this might be the main cause of decrease of crop yield. In conclusion, different microflora present in rhizosphere soil are requisite to maintain soil health, increased yield rate and is good indicator of fertile soil.

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Organizer

A note on plant biodiversity and its conservation in a gorge of Sitamata Wildlife Sanctuary, Udaipur (Rajasthan)

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Introduction:

Biodiversity is the variety and variability of life on earth. This includes all the plants and animals that live and grow on the earth. Sitamata Wildlife Sanctuary lies in the districts of Chittorgarh and Udaipur in the South-west region of Rajasthan. It extends to 423 sq. km and is situated between 24°04'-24°23'N latitude and 74°25'-74°40'E longitude. Biodiversity of Sitamata WLS located at the trijunction of Aravalli & Vindhyon Hill Ranges and Malwa Plateau, which harbours its unique and diverse biodiversity. 105 angiospermic plant species belonging to 46 families have been reported in gorges and surrounding area of the Menal which is a gorge of Vindhyon hills (Sharma, 2008). 1041 species belonging to 564 genera and 124 families have been reported from the Aravalli range (Ongthani *et al.*, 2015). Of them dicotyledons were represented by 838 species belonging to 455 genera and 105 families while monocots by 203 species belonging to 109 genera and 19 families.

Sitamata WLS includes 360 sq. km Reserved forest and 63 sq. km Protected forest. Sitamata Wildlife Sanctuary has exceptional diversity and interspersed habitats which includes area of teak stands, wetlands, perennial streams, gentle undulating mountains, natural deep gorges and fine groves of mixed woodlands. Gorges are geographical structure having deep and narrow valleys result of fluvial erosion and recession of waterfall. They have undisturbed ecology, native and endemic flora and fauna, water streams and carved stones. In the gorge of Sitamata WLS, extends to 700-800 meter, not only threatened plants viz. *Sterculia arora*, *Bachanania lucasii*, *Croton sponax* but also those plant species present which have medicinal values like *Terminalia bellirica*, *Moringa parviflora* etc. To conserve this biodiversity different strategies should be used like greater community involvement through volunteering, implement education campaigns on priority issues, encourage the involvement of youth in nature conservation, support appropriate recreational and tourism use of natural areas and enhance key partnerships across government, community and the private sector.

Objective:

This systematic survey was used to improve current knowledge of flora, status of endemic, forested, important floral species and identifying their role in conservation of biodiversity.

Methodology:

Species have been determined by field survey, visual estimation and literature. Preliminary information has been made at the spot and the information about plants has been noted in the field site book. During the field visits, photographs of plant species and specimens were collected. Forest department personnel's away from field was also concerned.

Result:

Many sanctuary of South & South-east Rajasthan house a number of endemic and endangered species (Bans & Sharma). As a result of present study 95 species belonging to 70 families occurs in the gorge of Sitamata Wildlife Sanctuary (Figures: A-J). Of these some plant species were endemic like *Bachanania lucasii*, *Sterculia arora* etc. Lower plants *Asplenium prolifera* and *Cheilanthes farinosa* also reported. *Asplenium prolifera* fern was high in Moist Deciduous Forest in narrow region (Figures: K-L). Both ferns were reported in rocks as Chlorophyte. Species protection measures are needed to ensure the long-term survival in the area. Critically endangered species of the study are needed protection by all concerned.

Conclusion:

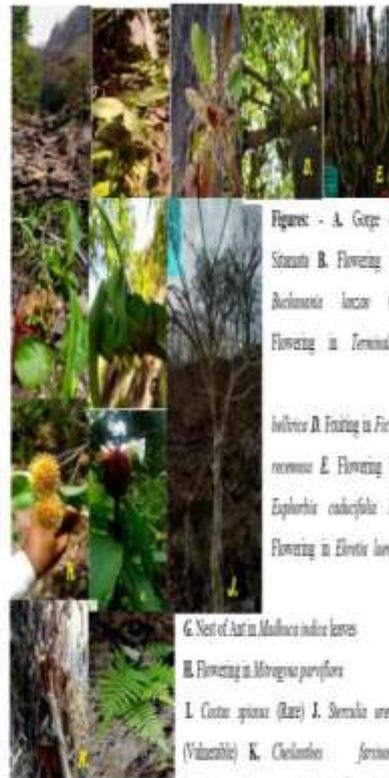
The present study improves knowledge and conservation of plant diversity. This study is also helpful to know about the status of endemic and endangered plant species.

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Figures - A. Gorge of Sitamata B. Flowering in *Bachanania lucasii* C. Flowering in *Terminalia bellirica* D. Feeding in *Ficus racemosa* E. Flowering in *Exporbia caducifolia* F. Flowering in *Eleusine indica*

G. Nest of Ant in *Madhuca indica* leaves
H. Flowering in *Moringa parviflora*
I. *Croton sponax* (Rare) J. *Sterculia arora* (Vulnerable) K. *Cheilanthes farinosa* and *Asplenium prolifera* respectively (Chlorophyte)





Organizer

Stress on Biodiversity and its Effects due to the Burdensome Construction of NH-54 in Dima Hasao District, Assam
Kapil Kumar Kemprai

Introduction:

The inception of construction of NH-54 across the district of Dima Hasao, Assam, began back then in 2011. While 9 yrs later today in 2020, the construction has not been very successful, given the current condition of the roads that run through the hills and rivers of the district. The timeline of its construction has now revealed its pros and cons and yet little could be done by the modern ways in order to combat the forces of nature that has been a great hindrance in this matter, hence, the term-burdensome construction. Adverse effects can be seen by anyone plying on the highway roads constructed till date. Major landslide, Sliding retaining walls, Blockage of drainage system due to landslides, loss of forest cover, emerging pollution in dry season etc. are a few issues that has become major causes of concern for the inhabitants of the district. The NH-54 is however a very important linkage road that connects the district of Nagao and Cachar via Dima Hasao both for commercial and personal matters. It is important to combat this issue at the earliest possible keeping in mind the Sustainable Development Goals for a safe future.

Objective of Study:

- Loss in natural habitat and thus, establishment of stress on the survival of plants and animals along the stretch of Rural range.
- Major landslide in multiple locations along the stretch of the NH-54, causing immense troubles for the people.
- Understanding the changing course of flow of water via formation of small streams around the construction area.
- Increasing levels of water pollution and air pollution due to the construction works.
- Decreasing influx of migratory birds in Jaitinga, one of the hotspots for studying the migratory birds during the winter months.
- Loss of cultivable agricultural land.

Methodology:

- 01 • The first is to study the challenges that is faced by the geography of the place.
- 02 • To study the weather conditions and challenges that has been faced due to weather while construction of NH-54.
- 03 • To assess how the constructed highway, the retaining walls built, the efficiency of drainage system.
- 04 • To gather insights on the affected and non-affected.
- 05 • To register data that can show the affected plant species and that to understand the stress on biodiversity.
- 06 • To establish a valid relation between the loss of agricultural land and productivity by the inhabitants.
- 07 • To suggest possible remedies based on study made by the above mentioned strategies.



Fig 1: NH-54, 2-lane road, left lane in repaired condition and right lane in approved condition
Location: Dima Hasao Dist, Assam

Assertion:

•The NH-54 is in a pitiable condition. The process of cutting soil off the hills have not only caused loss in mass and volume of the soil, but has also decreased the forest cover by a large extent. The decrease in forest habitat has been a concern for the local inhabitants as they are dependent on the forest for natural resources like food, firewood, etc. Presently, many resources has reduced and also the habitat for wildlife has been reduced to a great extent. Availability of *Achyranthes aspera*, *Besella alba*, *Besleria surrusa*, many species of bamboo, orchids etc has been reduced considerably and the villagers than has to move deeper in the forest to look for these plants.

•Landslide: The process of cutting the soil off the hills has resulted in the sliding of large amount of top soil from the hills, which resulted in major landslide. This has also been a major factor for endangering the various life-forms(both plants and animals). The landslide prone areas has been found to have running underwater systems which made the soil loose and slide down despite of the retaining walls constructed. This is the major cause of endangering loss of habitat in those areas and also has badly affected the condition of the roadways and other forms of transportation such as the railways.



Fig 2: Landslide, destroying the retaining wall built
Location: Jaitinga, Dima Hasao Dist, Assam



Fig 3: Landslide, blocking the drainage system and spilling soil on the road
Location: Dima Hasao Dist, Assam

•Continuous landsliding has affected the human habitation at large. During many seasons, the issue has always been a hindrance to the people. Such activities of the humans coupled with natural conditions has always been an issue in the last few years. The drainage system constructed along the stretch of the highway in most of the places are blocked due to landslide and hence the water flows around the roads and creates pit-holes which ultimately degrades the condition of roads. Dry-season also provokes issues of dust pollution which is another problem associated with NH-54.



Fig 4: Cut hill portion as a temporary roadway constructed due to road blockade by major landslides
Location: Dima Hasao Dist, Assam

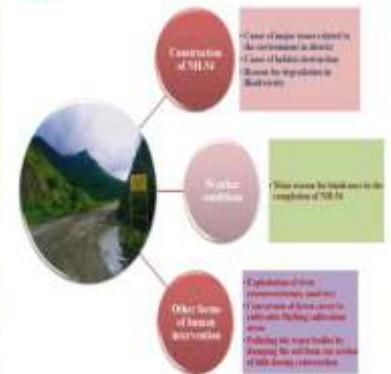
•One of the major effects seen due to the NH-54 construction is the decrease in the number of migratory birds landing in Jaitinga, which was considered as one of the unique and unusual events in the district. As during the winter seasons as late as September, every year migratory birds arrive at the place and take shelter in the forest cover at Jaitinga and is also responsible for the phenomenon of suicide by these birds, which is a mystery. Thus, loss in forest cover has reduced the number of birds in the area and as such is a matter of concern and also indicates the adverse effect incurred in the biodiversity of the district.



Fig 5: Human habitation by the highway
Location: Jaitinga, Dima Hasao Dist, Assam

•Loss of cultivable agricultural lands has been a major concern apart from imbalance in biodiversity in the district. The construction of NH-54 has its route across the hills and rivers but also across many areas of agricultural land. Thus, largely affecting the productivity and income of many villagers. Though many people has been compensated by the govt, yet the overall production and economic effects cannot be neglected. The low-lying lands has been used for laying down the highway but the effect can be seen on the higher grounds as well. Areas of Shifting cultivation(also called Jhum cultivation) has also been induced in many places, which in future may pose threat to biodiversity as shortage of cultivable fertile soil may lead to crisis in quality and quantity of food production.

Results:



•It is evident from the damage seen that the issues relating to the change in biodiversity around the area of the construction can be regarded as an expanding factor.

•The rate of completion of work is also very slow as compared to the damage incurred.

•Recovery of forest cover in the constructed region is not possible because of the increasing human habitation and colonization, as such it shows competition for occupancy of land mass by wild-life and humans.

•Many species of plants and animals might become endangered in near future from the forests of Dima Hasao District, Assam.

Conclusion:

The overall survey gives an overview of the already done damages due to the construction works of NH-54. It is time that the government along the local people work together towards completion of the project so that implementations can be made for recovery of the loss in land mass and biological cover during the construction. The retaining walls and drainage system constructed in the landslide prone area must be revised and alternative construction methods must be made. Expanding the study on the landslide prone areas is a must to be able to solve this issue. The weather of the district is always a hindrance in this process and it is a natural and independent factor and hence, properly targeted season must be chosen for an effective and productive result.

Referencer:

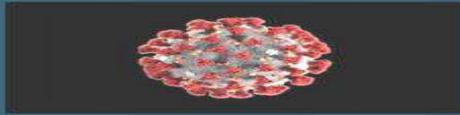
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Organizer

➤ Impact of lockdown on biological diversity



The COVID-19 pandemic is a reminder of the close relationship between human and planetary health. It is estimated that 75 per cent of all emerging infectious diseases in humans are zoonotic (those transferred from animals to humans). Pathogens thrive where there are changes in the environment, like deforestation, and when natural ecosystems are under stress from human activity and climate change.

Covid-19 is an infectious disease caused by a newly discovered coronavirus. People infected with this covid-19 virus experience respiratory illness.



Biodiversity is an essential element of life, the very fabric of "natural capital". The enormous variety and complex interactions between species, no matter how small or insignificant they might seem, keep our ecosystems functional and make our economies productive. Nature provides nutritious food, supplies clean air and water, sustains livelihoods, acts as a buffer against extreme weather events and regulates the climate.

PATNA: As the air and noise pollution levels have dropped significantly and residents remain indoors due to the nationwide lockdown, birds chirping and fluttering their wings are enjoying freedom unbound.



The Ganges River Dolphin is an endangered breed of freshwater dolphins. The two dolphins were seen enjoying a swim in the Ganges river in Meerut.

Yamuna River's Water "Looking Cleaner" Amid Lockdown: Delhi Jal Board The stoppage of industrial pollutants and industrial waste has definitely had a positive effect on water quality the Yamuna River, says vice-chairman of Delhi Jal Board Raghav Chadha.



Conclusion: Nature is sending message with coronavirus pandemic and the ongoing climate crisis and also warned that failing to take care of the planet meant not taking care of ourselves. To prevent further outbreaks both global heating and the destruction of the natural world for farming, mining and housing have to end.

Prepared by:-
Neha Yadav
Research Scholar





Organizer

THEME Biodiversity Conservation And Sustainable Human Life

Objective

- CONCEPT OF BIODIVERSITY
- IMPORTANCE OF BIODIVERSITY TO HUMAN WELFARE AND ECONOMIC DEVELOPMENT
- EFFORTS TAKEN TO CONSERVE BIODIVERSITY

Methodology.....

- PROVIDE INCENTIVES TO CONSERVE BIODIVERSITY
- MANAGE USE OF GENETIC RESOURCES
- PROMOTE BIODIVERSITY EDUCATION AND AWARENESS
- PROVIDE FUNDING FOR CRITICAL ACTIVITIES

WAYS TO BE AN EVERYDAY ACTIVIST

1. Be Well Educated 	2. Create actions taken everyday 	3. Inspire others 	4. Plant trees 
5. Have Carbon footprint 	6. Protest 	7. Donate 	8. Volunteer 

9. Believe you can make difference
Believe

Results.....

→ **Healthy and Rich Biodiversity**

- INCREASES ECOSYSTEM PRODUCTIVITY
- PROTECTS FRESH WATER RESOURCES
- PROMOTES SOIL FORMATION AND PROTECTION
- PROVIDES FOR NUTRIENT STORAGE AND RECYCLING

Each and every creature is a part of Biodiversity

LET'S PROTECT OUR FAMILY

Conserve Biodiversity now.

email: tyaginidhi799@gmail.com
contact no: 8445168093







Method of pollination in sesamum (*Sesamum indicum* L.) for different temperature during hot summer condition in Amreli

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Introduction : Sesamum (*Sesamum indicum* L.) is one of the ancient and important oilseed crops grown next to cotton and groundnut in Gujarat. Sesamum can grow well in Amreli, Gujarat ecological regions of sub-tropical climates, its cultivation in 21°35' N latitude and Longitude 71° 12' E. Two alternative centers of origin have been proposed namely east Africa (Ethiopia) or Asia (Indian sub continent or further east upper central Asia). The Sesamum is a self-pollinated crop and the genus sesamum belongs to Pedaliaceae family. The genus Sesamum consists of many species but, only *Sesamum indicum* L. has been recognized as a cultivated species (Ashri, 1998). According to Kobayashi *et al.* (1990), 36 species have been identified of which 22 species have been found in Africa, five in Asia, seven in both Africa and Asia and one species each in Crete and Brazil. There are three cytogenetic groups of which 2n=26 consist of the cultivated *S. indicum* along with *S. alatum*, *S. capense*, *S. schenckii*, *S. malabaricum*; 2n=32 consist of *S. prostratum*, *S. laciniatum*, *S. angulosum*, *S. anguifolium*; while *S. radiatum*, *S. occidentale*, *S. schizocarpum* belong to 2n=64. Mainly due to the differences in chromosomal numbers across the three cytogenetic groups, there is limited cross compatibility among the species. Therefore, it has been difficult to transfer desirable characteristics such as drought tolerance and resistance to diseases and pest, from wild relatives into cultivated Sesamum (Carlsson *et al.*, 2008).

Sesamum has mechanism like hemaphrodite in which male consists of four stamens its tetradynamous condition, two long (1.5-2.0 mm) and two short (1.0-1.5 mm) and the pistil has superior ovary, multicarpelar and a long style (1.5 - 2.0 mm). The flower produces nectar in a nectary which attract honey bee like pollinating agent. Opening flower occurs early in the morning when the stigma becomes receptive and lead to wither can occur six to 12 hours later, it's depending on the using genotype and $\mu \times e$ interaction. (FREE, 1993). These peculiar characteristics of morphology refer to genotype especially in hot environments, but proved that varieties adapted to tropical conditions behave somewhat differently. In this context to pollination in Sesamum, there is no fix type of any pollination. According to Weiss (1983), this species is predominantly self pollinated in nature.

Materials and Methods: The research was carried out at the Agricultural Research Station, JAU, Amreli, Gujarat with the Sesamum 4 female line namely, AF-205 /G TIL-1 /G TIL-10 and R-T-54. The experiments were developed from February to June-15. The predominant climate in the region is Amreli (hot sub tropical climate), according to the North Saurashtra Agro-climatic zone-VI classification, and the average annual temperature is 38°C and highest 45 °C. Soil pH is 7.5 to 8.3 and Average rainfall 580 mm., with the rainy season from June to October.

Objective : The main objective of this experiment is based on temperate during early morning time. In which the covering aspects: the different flowering period, flower biology and color of the flower, time of dehiscence, flower longevity, period of stigma receptivity, number of anther and anther characteristics of male and female parent of sesame during summer condition. The observations was on flower biology, color of corolla, anther number and anther characteristics were performed on basis of 4 female in which 200 randomly tagged flowers / one female entry, while flower buds were monitored every hour from the time of opening of flower until they fall from the plant in morning time.

Table 1. Number and percentage of capsule set in Sesamum flowers (*Sesamum indicum* L.) for different times of hand cross-pollination in Agricultural Research Station, JAU,Amreli, Gujarat,2015-16

Time of pollination (h)	Number of tagged flowers	Number and percentage (%) of capsule set	Name of parents highest stigma receptivity
7:00 – 7:30	30	24 (80.0%)ab	4T-205
7:30 – 8:00	30	26 (86.6%)ab	G-TIL 10
8:00 – 8:30	20	19 (95%)a	G-TIL 10
8:30 – 9:00	20	18 (90%)a	G-TIL 10
9:00-9:30	20	12(60%)b	R-T-54
9:30 – 10:00	20	10(50%)c	G-TIL-5
10:00 – 10:30	10	4 (40%)bc	G-TIL 10
10:30 – 11:00	10	2(20%)c	G-TIL 10
Values followed	by the same letter in the column are not significantly different at		

p < 0.05, Tukey's test

Table 2. Initial capsule set and persistence of Sesamum capsule (*Sesamum indicum*) according to the type of pollination, Amreli April -2015.

Type of pollination	Number of flower	Number of capsules Set at 5 days	Number of capsules Harvested
Free pollination	150	144 (96.0%) a	120 (80.0%) a
Hand pollination (genetangari)	100	84 (80.0%) b	78 (75%) a
Hand cross pollination	300	275 (91.6%) c	248 (89.3%) b
Pollination restricted with small paper bag	20	13 (65.0%) d	11 (55%) ab

Table 3. Temperature during March to May -2015-16 Amreli Gujarat

Week No.	Date	Month	Temperature (°C)	
			Max.	Min.
10	05-11	March	36.2	28.1
11	12-18		35.8	23.8
12	19-25		39.4	22.7
13	26-01		39.8	21.5
14	02-08	Apr.	39.0	23.1
15	09-15		39.5	24.3
16	16-22		40.8	24.3
17	23-29		39.5	25.0
18	30-06		41.7	24.8
19	07-13	May	41.7	24.3
20	14-20		44.8	27.2
21	21-27		40.2	27.9
22	28-03		40.0	27.6

Results:

In hand pollination, there was initial seed setting of flowers at all times tested (7:00 – 7:30, 7:30 – 8:00, 8:00 – 8:30, 8:30 – 9:00, 9:00-9:30, 9:30 – 10:00, 10:00 – 10:30, 10:30 – 11:00). However, a significant difference (p < 0.05) was found in the comparison of seed setting rates at different times. At 7:00 – 7:30, when the flower opens, the rate of seed set was (80.00%) not different (p > 0.05) from 8 hours, which was 95%, with the highest percentage of capsule set when compared to other times (7, 9 and 10h), suggesting a apex of receptivity, and therefore of capsule set at that time. Then there was a drop at 9h, onward time like at 10h, although these two times were not significantly different to each other. The last pollination was held at 10:30 to 11:00h, showing the lowest number of capsule set and significantly different (p < 0.05) from the time of 8h. After 10:30h, pollen grains become withered. In this condition highest stigma receptivity was observed for G-TIL 10 which capsule seed setting highest observed in different stage of morning time.

In Sesamum pollination can occur at any time from flower open to 10h, but is most effective between 7 and 9h in Amreli summer condition for female parents. Abdel All *et al.* (1976) have suggested that it is receptive before flower opening, remaining viable for 24 hours after anthesis. After 10:00 am, it was observed a marked decrease in the number of pollen grains available in anthers and, at 11 hours, lose viability by pollen in anthers of flowers. The receptivity of the stigma of the Sesamum flower is lost within 4 to 6 hours after flower opening. The number of capsule set, five days after anthesis of flowers and harvested showed significant differences (p < 0.05) between treatments of different pollination in Amreli (Table 2). In Table 3 showed that in May temperature rise above 40 °C so it effect plant pollen viability and reduce seed yield.

Conclusion:

In summer hot season of Amreli, the total lifespan of Sesamum flower presents of 3 to 3.30 hours, and pollination must occur between 7 and 9.30 hours to ensure more seed setting and getting more multiplication seed production in summer hot condition. Sesamum is a self pollinated crop and often pollinated crop, and reach levels above 50% seed set, but with in present of biotic pollinators that promote often cross-pollination and increase seed production at appropriate level. In sesame crop temperature rise above 40 °C so it effect plant pollen viability and make fallen flower with wither condition and ultimately reduce seed yield.

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Role of antioxidants in response to environmental stresses in plants

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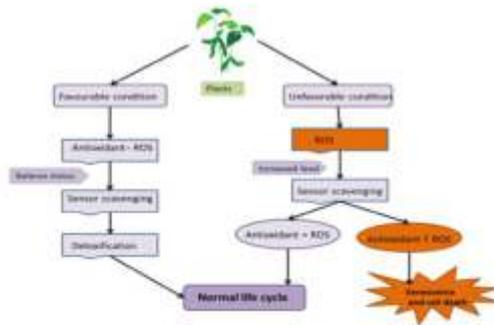


Abstract

Antioxidants are important for the vigour of plants and protect them from climatic fluctuations and environmental stresses. They have the ability to scavenge the reactive oxygen species (ROS) which are chemically unstable forms of oxygen and its derivatives. At nixious concentrations, ROS damage the integrity of biological macromolecules such as DNA, RNA, and proteins. Conversely, they also act as signalling molecules at low concentrations within the cells. So, the balance between the production and foraging of ROS has to be maintained with the help of antioxidants. These antioxidants consist of various enzymatic proteins such as superoxide dismutases (SODs), ascorbate peroxidases (APXs), glutathione peroxidases (GPXs) and catalases (CATs), etc. and non-enzymatic proteins such as flavonoids, carotenoids, reduced glutathione, etc. They directly or indirectly scavenge the harmful ROS in different subcellular compartments of the cell. They play an important role in abiotic stresses caused by different climatic and environmental factors such as drought, heat, salinity, metal stresses, or stress caused by any kind of chemical. These stresses are rising every year due to increasing anthropogenic activities and global warming effects. Therefore, this study has focused on the diverse function of antioxidants in plants in response to different environmental stresses.

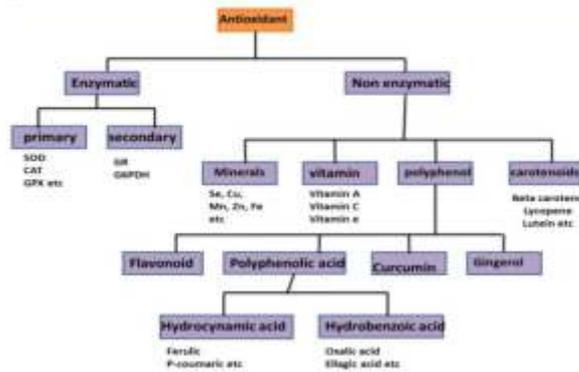
Introduction

- The formation of cellular reactive oxygen species (ROS) as a by-product of metabolism is an unavoidable process. However, stress factors either biotic or abiotic are known to be linked with an increased level of ROS.
- These are generated by the partial reduction of molecular oxygen which are highly reactive and damage macromolecules such as nucleic acids, proteins and lipids.



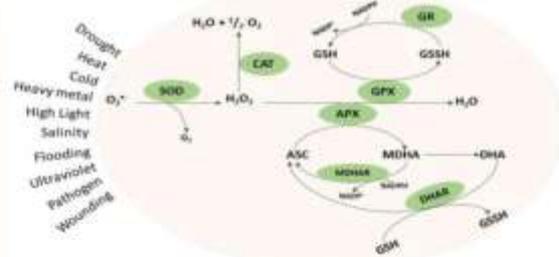
- At lower concentrations, ROS could activate signalling pathways, but a higher concentration can trigger cell death events.
- To detoxify the harmful concentrations of ROS, cells possess vast network of antioxidants.
- Antioxidants significantly delay or prevent oxidation of oxidizable substrates such DNA, RNA, proteins, etc. and protect the plants from oxidative stress.
- Antioxidants can be synthesized in the plants by various gene families and classified into enzymatic and non-enzymatic types.

Types of antioxidants



Acknowledgment Author is grateful to Panjab University, Chandigarh.

ROS scavenging pathways



Different antioxidant enzymes involved in ROS scavenging pathways under various stresses

Antioxidant regulation for environmental stress tolerance

- In most plants studied, those cultivars more resistant/tolerant to abiotic stress showed an enhanced SOD activity after abiotic stress treatment.
- There are numerous studies reporting the induction of oxidative stress by water deficit, and the activity of antioxidative enzymes, like SOD, peroxidase and catalase, is correlated with tolerance to drought stress.
- Evidence indicates that both cold and heat stress can induce cross-tolerance to other abiotic stresses such as drought, salt and heavy metal stress via the activation of the antioxidant machinery, including GR activity.
- Studies carried out in wheat seedlings showed that multiple heat priming enhanced thermo-tolerance to a further high temperature stress by improving the expression of chloroplast Cu,Zn-SOD and mitochondrial Mn-SOD genes.
- In different plant species, it has been reported that high activities of SOD and other antioxidant enzymes contribute to enhancing resistance to high light intensities.

Conclusion

Plants activate antioxidant defense mechanisms under various stresses, which helps in the maintenance of the structural integrity of the cell components and presumably alleviates oxidative damage.

Future perspective

The manipulation of antioxidant systems is a worthwhile approach to produce transgenic plants with enhanced tolerance to a wide range of stress conditions.

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***Antelope cervicapra*: An endangered species in India**

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ABSTRACT

A species is considered to be endangered if it is facing a very high risk of extinction in the wild. According to PETA, blackbucks are on the endangered list in India, afforded the highest protection under the Wildlife Protection Act 1972.

Key Words:-

PETA(People for the Ethical Treatment of Animals)
IUCN(International Union of Conservation of Nature

INTRODUCTION

Also known as Indian Antelope, are declared regionally extinct in Pakistan and Bangladesh. They now mainly occur in India with a small population in Nepal.

Scientific name:- *Antelope cervicapra*
Class:- Mammalia
Order:- Cetartiodactyla
Family:- Bovidae
IUCN Red list status:- Near Threatened

TREATS AND CONSERVATION

- Stray dogs kills of young fawns that need to hide among the tall grass till they are nursed.
 - The native grass, herbs etc are destroyed, the animals depending upon these flora get endangered.
 - Some of them are shot illegally and are hunted for skin, meat etc.
- Many national parks have taken steps for conservation of this species. These are:-
- Vallanadu Wildlife Sanctuary
 - Gir Forest National Park
 - National Chambal Sanctuary
 - Ranthambhore National Park
 - Guindy National Park

REFERENCE

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MEASURES BY THE INDIAN GOVERNMENT

- National parks, sanctuaries has been created as per the provisions of the Wildlife (Protection) Act, 1972 for providing better protection to wildlife and also for the endangered species.
- Other acts include: Forest protection Act 1980-88, Anti Poaching Agencies, State Wildlife Department etc.

Plan to save blackbucks & turtles



SHUBANESWAR: Odisha government has sanctioned Rs 2.25 crore for conservation of blackbucks and freshwater turtles under a state plan scheme of wildlife conservation and protection. The wildlife wing will implement it, said sources.

ACKNOWLEDGEMENTS

I would like to express my deep and sincere gratitude to Shobhit Institute of Engineering and technology for giving me the opportunity to present this poster.





Enhancing the Capacity of Optical Switch Design with Less Power Consumption



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Introduction: Due to the emergence of high speed applications, demand for more bandwidth has increased exponentially in last a few years. To serve each user for his demand very fast processing and propagation of data is desired. These two requirements of high speed communication can be fulfilled using optical fiber technology. In the same view in past many optical switch designs have emerged with their respective advantages and dis-advantages, electronic RAMs have speed limitations in comparison to the speed of light, which will limits the speed and capacity and performance of photonic packet switching system. Moreover, this approach requires optical cloud to electronic (O/E) conversion, when packets are written into and E/O conversion, when packets read out of electronic RAMs. All-optical cloud RAM suitable for photonic packet switching does not exist.

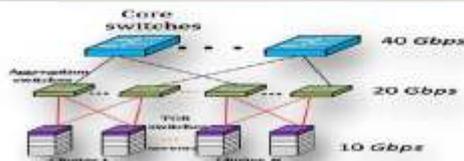


Figure 1: Schematic of data center network

Objectives:

- (i) To propose an improved design of a core router for high speed optical cloud computing environment.
- (ii) To set the QOS parameters to evaluate performance of the model to be proposed.
- (iii) To evaluate performance of the model to be proposed with existing ones.
- (iv) To reduce the power consumption of router.

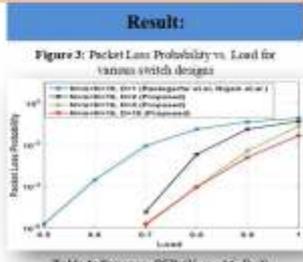


Table 1: Power vs. BER (N=16, D=2)

Buffer and	Output loss Compensation	Full loss	Comp ensatio n
Power	Bit Error Rate	Power	Bit Error Rate
30	3.3*10 ⁻⁷	10	1.2*10 ⁻⁷
32	9.4*10 ⁻⁸	11	1.6*10 ⁻⁸
34	2.6*10 ⁻⁸	12	2.1*10 ⁻⁹
36	7.2*10 ⁻⁹	13	2.5*10 ⁻¹¹
38	1.94*10 ⁻⁹	14	3*10 ⁻¹¹
40	5.15*10 ⁻¹⁰	15	3*10 ⁻¹²

Methodology:
Network-based totally cloud computing is hastily increasing as an alternative to traditional workplace-based computing. As cloud computing turns into extra large, the electricity consumption of the network and computing assets that underpin the cloud will develop. This is occurring at a time while there is growing interest being paid to the want to manipulate energy intake throughout the complete information and communications generation (ICT) quarter. While statistics middle strength use has received lots attention currently, there has been much less interest paid to the electricity consumption of the transmission and switching networks which are key to connecting users to the cloud

Conclusion:
This poster proposes a large capacity optical based on AWG and WDM re-circulating type buffer. In the re-circulating type buffers, the accumulation of ASE noise of the amplifier limits the re-circulation count of the packets in the buffer. To utilize buffer capacity effectively the length of the FDL is chosen wisely such that accumulated noise can be minimized. It is shown that the required amount of power for correct switch operation remains nearly same in Nigam *et al* and in the proposed design. However, the packet loss probability has improved significantly. In case of N = 16, the optimal switch design is found when D = 4, i.e., total storage of 64 packets, which can provide low packet loss rate and required amount of power for correct switch operation is also very less.

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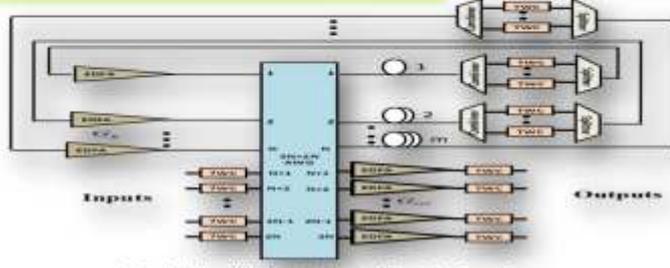


Figure 2:AWG and WDM Re-circulating type buffer design (Proposed)





Organizer

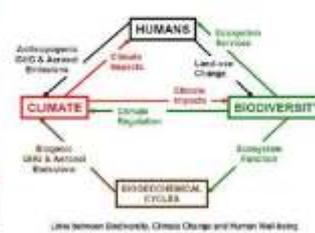


Imbalance of biodiversity and threat to human life

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Abstract: - The most unique feature of earth is the existence of life, and the most extraordinary feature of life is its diversity on earth. It refers to genetic variation, ecosystem variation, species variation within an area, biome or planet. Biodiversity is the life support system, it has serviceable values by providing food, fodder, fuel, timber and medicine. Despite these all reimbursements from balanced biodiversity, it was observed that in order to develop countries and nations, human mismanagement of biological resources by economic policies, pollution, proliferation, plastics, leads to wildlife destruction and climate change and imbalance in biodiversity. Human actions have proceeded without people giving much thought to sustainability of ecosystem. These actions include some activities such as draining wetlands, cutting down forests, and damming rivers. If human actions lead to destruction of entire ecosystem, deforestation such as wetlands or rainforests, biodiversity on earth could decrease. Human activity has substantially changed one third to one half to the world's surface. In the next 50 years it is expected that human will seriously impact 50-90% of land in developing countries. The increase in human inhabitants causes a problem because with it comes a need to convert natural habitats to land for human consumption. Our basic needs are dependent on this vast variation of species but human actions are eliminating gene and species and different traits at alarming rate and this is life threatening to every species existing on the earth including human lives. Biological resources serve about 40% of world's economy and nearly 80% of the education and economic development. Declining the biodiversity, is a concern for countless reasons. Biodiversity is an issue that affects everyone and therefore, everyone should be aware of their effect on biodiversity. As biodiversity decrease on earth so do the chances of human survival. Therefore, it is important to make sure that government is making laws that will ensure biodiversity for the future and not on focus on short signed economics. E O WILSON said, "we should preserve every scrap of biodiversity as priceless while we learn to use it and come to understand what it means to humanity." These human activities raised a question how a big loss and imbalance of biodiversity through pollution and gene elimination and species have ability to provide society the goods and services which is needed. These all actions which threatens ecosystem services are a big threat to survival of every living species on the planet. If humans become extinct, it will likely be a result of their own action or lack of action.

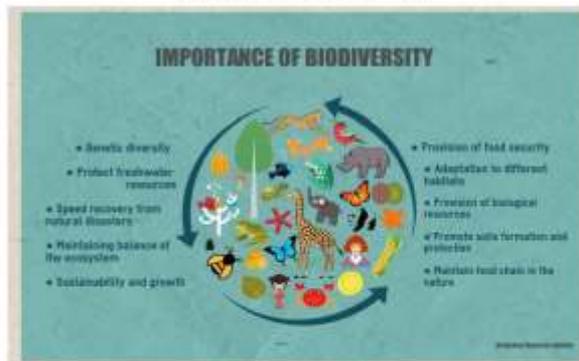
Biodiversity loss affecting life forms-



Human activities affecting biodiversity-

- Negative Human Impacts on biodiversity**
- Habitat change
 - Invasive species
 - Pollution
 - Pesticide
 - Overexploitation
 - Climate change

Importance of biodiversity-



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Organizer

COVID-19 related lockdown decreased air and water pollution that increased biodiversity

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Abstract

India is the fifth most polluted country and is home to 21 of the 30 most polluted cities in the world. In 2019, PM_{2.5} (per cubic meter) levels in India are 58.1, a level much higher than safe. Air pollution has emerged as a top-10 risk factor for human health and biodiversity in India and many of the cities are exceeding the national and the World Health Organizational guidelines for criteria pollutants. Not just air, but Indian waterways are also being extremely polluted. The Ganges River is among the largest rivers in Asia, covers 26% of landmass and provides water to about 40% of India's population across 11 states. The Ganges has been severely polluted with human waste and industrial contaminants over recent decades. The Ganges has more than 375 species of fishes, but now most are under threat or endangered. The national aquatic animal, the dolphin, is even endangered.

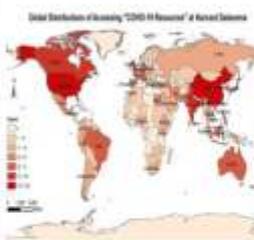
COVID-19 has turned into a worldwide pandemic, and within the first 3 months it infected more than 6 million people and killed about 400,000 people worldwide. In an attempt to curb the spread of the virus, countries have enforced social distancing, school and business closures, bans on social gatherings, cancellation of public transportation, and stay-at-home orders. With these enactments, air pollution drastically dropped to a 20-year low, and the Ganges river's pollution has decreased by 25-30 percent and has seen increased levels of biodiversity.

Data Sources

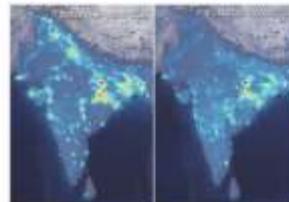
Air pollution information collected from various data resources: The information regarding the top polluted cities of the world: <https://www.iaair.com/us/world-most-polluted-cities>; the European Union satellite Copernicus Sentinel-5P map of India with the pollution levels in major cities across the country. India's PM_{2.5} data obtained from <https://aqicn.org/map/india/>. Information for the Ganges obtained from <https://wii.gov.in/nmcg/national-mission-for-clean-ganga>.

Some of the air quality (PM_{2.5}) images obtained from <https://www.insider.com/photos-reduced-air-pollution-india-2020-4>
The Ganges river pollution images obtained from: <https://www.businessinsider.com/photos-indias-ganges-river-pollution-2018-1>

World distribution of COVID-19



The lockdown has halted all the transportation, gatherings, visiting religious places including India's holy rivers. This has drastically reduced air pollution due to the decrease in transportation. Several government agencies have analyzed the air and water quality during this period.



Lockdown

Coronavirus Disease 2019 (COVID-19), first detected in Wuhan in December 2019, spread rapidly to other countries around the world. More than 2 lakh people have been infected with the virus in India and the numbers are increasing very rapidly. On 24 March 2020, the Indian Government has implemented Phase I of lockdown for 21 days, followed by Phase 2, 3, and 4.

The European Union satellite Copernicus Sentinel-5P has compared the PM_{2.5} levels for Jan-24th March and 25th March – 20th April of 2020. The pollution levels have substantially decreased during this period.

NASA has compared the Air quality of New Delhi where it has taken images of April of 2019 and April of 2020 and the air quality has drastically and visibly increased during the lockdown period, and (Note: the Eagle can be seen)

The Ganges river is India's largest rivers and supports more than 400 million people. The Ganges also supports around 2000 aquatic species, including the threatened river dolphin and gharial.



The water is polluted by various reasons:

- Industrial wastes:** Various dumping dangerous chemicals
- Human wastes:** people use the river for bathing, cooking, and washing
- Religious activities:** idols of god, rituals

More than one billion gallons of waste entering each day

UP Pollution Control Board (UPPCB) has studied the Ganges water quality during the lockdown period

	BOD level (mg/L)	Total coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)
March 13	2.8	3400	1300
April 9	2.4	2600	820
April 30	2.2	2200	680

Data collected samples from five locations shows the dissolved oxygen (DO) level has increased to 25-30%, while bio oxygen demand (BOD) level decreased to 35-40%.

SHULTAKESHWAR		
Parameter	March 24	April 20
Dissolved Oxygen	6.7	9.3
BOD	2.2	1.2
SAMNE GHAT		
Parameter	March 24	April 20
DO	14	17
BOD	3.2	1.6
ASSI GHAT		
Parameter	March 24	April 20
DO	2.5	3.5
BOD	4.5	2.5
DASHASHWAMEDH		
Parameter	March 24	April 20
DO	2.2	3.5
BOD	4.5	1.8
RAJGHAT		
Parameter	March 24	April 20
DO	4.5	3.8
BOD	6.5	7.5

Lockdown has promoted increased biodiversity as pollutants have decreased.



Due to the lockdown, now the National Aquatic Animal (Dolphin) has lost its endangered status and is now at safer levels.

Studies have shown that increased air pollution levels allow for greater aerosol retention of the Coronavirus and increased its spread. Decreased air pollution dampens the threat of the virus, beneficial for human life.

Conclusions

- The Government has made many attempts to control air and water pollution, none were able to decrease the pollution levels substantially.
- COVID-19 lockdowns have significantly decreased pollution levels by 35-40%.
- Decreased air pollution also plays a key role in the viral spread.





Microbial Biodiversity destruction - setting fire to our life boat

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Introduction:

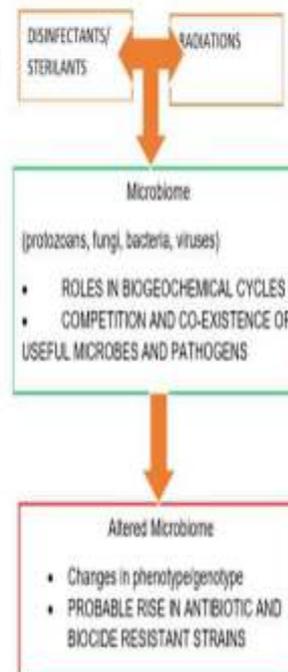
- ❑ Microorganisms form a significant section of the biological system
- ❑ Useful for household needs to waste water treatment, biofuel production (gobar gas) and also production of antibiotics (penicillin), used as probiotics and keeps check on gut pathogens.
- ❑ The entire diversity of microbes also regulate the biogeochemical cycles, e.g.
 - atmospheric nitrogen fixation
 - phosphate and sulphur cycling
 - Carbon cycling, etc
- ❑ Microorganisms are also well known as crop/ human pathogens

The Problem:

- ❖ To ward off pathogens, biocides (radiations, pesticides, antibiotics, antiseptics, etc) are used on regular basis
- ❖ Biocides, unknowingly pollute ground water, farmlands and water bodies, killing both harmful and useful microbes
- ❖ **Balance between harmful and pathogenic microorganisms is lost**
- ❖ **Microbial biodiversity is impacted, changes in biogeochemical cycles**
- ❖ **GLOBAL changes in environment after few decades**

References:

Paul, D., Chakraborty, R., Mandal, S.M. Biocides and health-care agents are more than just antibiotics: Inducing cross to co-resistance in microbes. *Ecotoxicol. Env. Safety*. **174**, 601-610(2019).



SOLUTION:

1. Apply required quantity judiciously
2. Indiscriminate application should be discouraged

Acknowledgement:
We thank AMITY and PALAMURU UNIVERSITY

CONCLUSION:

- Microbial diversity is the basis of all life forms
- In an attempt to ward off pathogens, one should not destroy biodiversity
- Destroying the microbial balance in nature is equivalent to depriving our future generations of basic necessities of life, i.e. clean water, pure air and a productive land





Organizer



Introduction: Climate change refers to significant and long-term changes to a region's climate. Effects of climate change are observed as increase in temperature, change in rainfall patterns and increased frequency of extreme events like heat waves, drought and these has consequences on environment such as changes in the start and length of the seasons, water scarcity, melting of glacier, a rise in sea level, floods and other effects also. Range of change has not been uniform on spatial or temporal basis.

Objectives: To find out the effects of climate change on human, plant and animals.

Methodology: There are several methods and tools to assess the impact of climate change on biodiversity and ecosystem services. Vulnerability assessments have particular meaning in the natural hazards and socio-economic fields but are used more loosely and encompass a variety of methods in the field of biodiversity and climate change. Climate envelope modelling is by far the most common tool used to assess potential impacts on species. Although these suffer a number of limitations, they do provide a first cut assessment of the likely magnitude and direction of change. Dynamic models, population models and mechanistic models are other modelling tools that have been used to assess future impact and vulnerability on both species and ecosystems, though ecosystem service modelling is still in its infancy. These latter models need to become more prominent as climate envelope modelling mainly provide species exposure to climate change and thus only one facet of vulnerability. Indeed vulnerability is defined as a function of exposure, sensitivity and adaptive capacity.

Changes to ecosystems as a result of climate change are likely to have significant and often negative social, cultural and economic consequences.

CLIMATE CHANGE IMPACT ON BIODIVERSITY

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Results: Occurrence of climate change has sensitive effect on biodiversity and ecosystem including changes in growing season, phenology, primary production and species distributions. It affects disease behavior in human, plants as well as animals. Scientific studies say that climate change will critically affect the biodiversity over the next several decades. Increasing in water temperatures and increasing storm intensity have been found in many tropical regions which resulted substantial mortality and it has occurred as a challenge as it increases ocean acidity, unsustainable fishing as well as pollution. A rise in sea water temperature will affect mortality of fish and their geographical distribution. It has been observed by satellite that climate variability reflects changes in vegetation activity, land use and other influences also. Various direct and indirect effects of changes in atmospheric carbon dioxide concentrations on ecosystem, iron and sea surface temperature has been reported. There are other possible impacts and changes in biodiversity like disruption of the relationships between pollinators such as bees, flowering plants and breeding capacity of species. In terms of ecosystems, evidence like expansion of desert ecosystems and tree lines in mountain systems has changed. Reports suggests that approximately 10 percent of species assessed so far will be at an increasingly high risk of extinction for every 1°C rise in global mean temperature. Aquatic freshwater habitats and wetlands as well as cloud forests are particularly vulnerable to the impacts of climate change. Other potential changes to ecosystem services due to climate change include changes to food, fibre, timber, carbon storage and sequestration, water regulation and disease regulation. Indian agriculture would become more vulnerable to weather behavior with lesser precipitation and increased evapotranspiration, survival and productivity of agri-horticultural crops would become a serious problem. The coastal soil and aquifers would become salinized and staple food crops like paddy would come under severe stress. With every 1°C rise in temperature, yield of rice and wheat will decrease.

Conclusion: Climate change patterns causes a great effect on biodiversity and it hampers the health of the entire ecosystem. Reports suggests that approximately 10 percent of species assessed so far will be at an increasingly high risk of extinction for every 1°C rise in global mean temperature. A potential change was reported to ecosystem services due to climate change that include changes to food, fibre, timber, carbon storage and sequestration, water regulation and disease regulation. In terms of agriculture, there is a need for developing and spreading climate resilient farming techniques and systems

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Resynthesis Of *Brassica juncea*. An Efficient Tool For Genetic Stock Development

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INTRODUCTION

Brassica juncea (Indian Mustard, AABB, $2n=36$) an important oilseed crop of India and stands second in position among oilseed crops. It is an amphidiploid species i.e., an interspecific hybrid carrying the complete diploid chromosome set from each parent, also referred as allotetraploids. This evolved in nature by intercrossing between diploids, *Brassica rapa* (AA, $2n=20$) and *Brassica nigra* (BB, $2n=16$). The occurrence of wide genetic diversity in the germplasm pool of any crop allows its progress through improvement in desired traits besides increasing the scope through heterosis breeding approach. The native gene pool of *B. juncea*, however, is narrow due to allopolyploidy. The utilization of diversity of parental species for resynthesis of *Brassica juncea* opens an opportunity to broaden its genetic base and find new gene combinations. Studies have been carried out with this vision to resynthesize *Brassica juncea* through interspecific hybridization between its progenitor species, *B. rapa* and *B. nigra*. In *B. juncea* resynthesis, there are some basic problems which makes it more complicated i.e sexual incompatibility between parents, development of chimeras, irregularly in the chromosome doubling, meiotic instability or stability of traits etc. Some of these problems can be overcome by the continuous selfing and directive selections over the generations.



Fig. 1. U Triangle concept (1932)

METHODOLOGY

Table 1. Crosses details of *B. rapa* (NRCPB rapa 8) X *Brassica nigra* (horta) during 2018-19

S. No.	Cross Details	No. of Buds	No. of Seeds
<i>B. nigra</i> X <i>B. rapa</i>			
1.	Bn (IC-656996) x Br (Shalini)	89	10
2.	Bn (IC-656996) x NRCPB Rapa 8	87	10
3.	Bn (IC-656996-1) x Br (Shalini)	153	5
4.	Bn (IC-656996-1) x NRCPB Rapa 8	47	8
5.	Bn (IC 281862- DWARF) x Br (Shalini)	52	2
6.	Bn (IC 281862- DWARF) x NRCPB Rapa 8	46	3
7.	Bn (IC 328460) x Br (Shalini)	80	0
8.	Bn (IC 328460) x NRCPB Rapa 8	53	3
9.	Bn (NMK 17/41) x Br (Shalini)	82	0
10.	Bn (NMK 17/41) x NRCPB Rapa 8	78	20

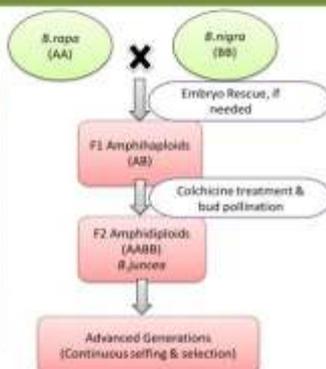


Fig. 2. Schematic representation of crossing for resynthesis of *B. juncea*



Fig. 3. Flowchart representing steps involved in embryo rescue

RESULTS AND DISCUSSIONS

Resynthesis of *B. juncea* by crossing diverse germplasm of the parental diploid species would be proficient in enlarging the gene pool and genetic diversity. Since such synthesized interspecific hybrids generally fail to set seed, embryo rescue approach and colchicine treatment for amphidiploidization have to be followed to obtain hybrids but the frequency of amphidiploid production is very low. NRCPB rapa 8 enables in-vitro hybrid seeds (amphidiploid) development following hybridization with *Brassica nigra* accessions by bypassing the in vitro embryo rescue procedures.



Fig. 4. Pictures showing seed setting and silique development using NRCPB rapa 8 without embryo rescue.



Fig. 5. Comparative illustration showing advantage of using NRCPB rapa 8



Fig. 6. Experimental view, a, b, h, i, rapa, c, e, i, d, nigra, d, to g, j, to m, F₁ amphidiploids

CONCLUSION

Genetic diversity is important because it helps maintain the health of the crop, by including alleles that may be valuable in imparting resistance to diseases, pest, and other stresses. Maintaining diversity gives the population a buffer against change, providing flexibility to adapt. It is a major source of crop improvement against all odds. Unfortunately, the process of domestication has led to decrease in the genetic diversity between and within the crop species. Reproductive isolation between amphidiploids and their diploid progenitor species also blocked gene flow between them. All this contributed to narrow the genetic base of amphidiploids. Resynthesis of polyploid species given an opportunity to utilize the variability of diploids to enhance the diversity of the related polyploidy species. The resynthesized *B. juncea* lines developed by various workers possess the diversity for many desirable agronomic traits such as growth habit, branch number, and silique number on main axis and per plant, silique density, seeds per silique, plant height, leaf colour, seed size, plant biomass and tolerance to many biotic and abiotic stresses.

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ACKNOWLEDGEMENTS

The researcher acknowledge the support received from DST-SERB, Gov. Indian Council of Agricultural Research (ICAR) and ICAR-NIPB, Delhi.







DEVELOPMENT OF MICROBIAL BASED MAP FOR CELIAC DISEASE DIAGNOSIS USING 16S RRNA SEQUENCING

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INTRODUCTION

Celiac disease (CD)/Gluten allergy is a disease characterized by damage of the lining of the small intestinal.

- Gliadin and glutenin proteins (Wheat, barley, Rye
- Triggers an immune reaction
- Villous atrophy, crypt hyperplasia and increased number of lymphocytes in the lamina
- Nutrient Malabsorption
- Symptoms (anaemia, osteoporosis, as well as growth retardation in case of children), sometimes asymptomatic or confusing symptoms in adults

METHODOLOGY USED

Informed consent , enrolment and clinical characterization of study subjects

Sample collection and sample preparation

DNA extraction and DNA amplification using PCR

Denaturing Gradient Gel Electrophoresis (DGGE) analysis of PCR amplicons

Sequencing of the PCR products i.e. of desired DNA from outsourced

Analysis of DNA sequence using Bioinformatics tools

Constitution of probiotic map

Comparison of marker probiotic species on map

Outcome: Differential diagnostic technique and treatment modality

OBJECTIVE OF THE STUDY

(1) To study merits and demerits of present diagnostic tools
(2) To develop newer method for diagnosis of celiac disease based upon the fecal microbiome with the help of 16s rDNA sequencing followed by bioinformatics tools.

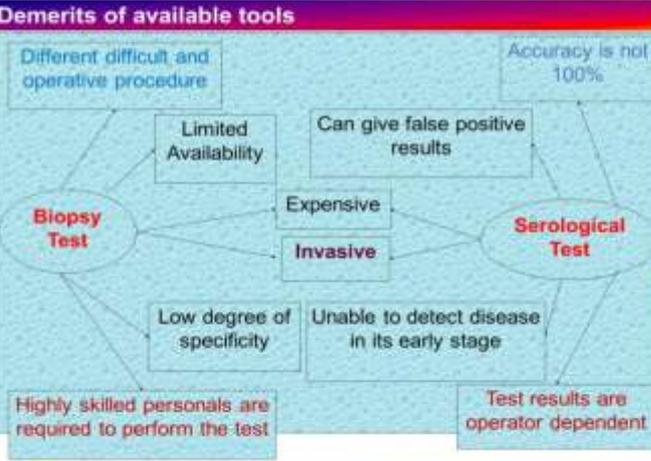
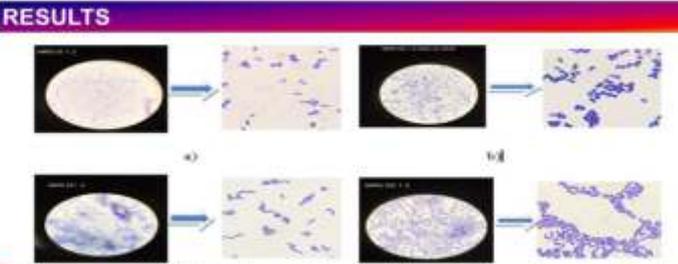
CURRENT AVAILABLE DIAGNOSTIC MODULES FOR GLUTEN ALLERGY/CELIAC DISEASE

SEROLOGICAL TESTING:

- Antigliadin antibody (AGA IgA and AGA (IgG), Endomysial antibody (EMA), Anti-deamidated gliadin peptide (DGP)
- Tissue transglutaminase (ITG) (**Mostly used test**)

CONFIRMATORY TESTS:

- Small intestine biopsy (**Gold Standard**)



•As per reports, it has been observed that gluten allergy is due to absence of *Lactobacillus* and *Bifidobacterium* species.

- The supplementation of probiotics is supposed to subside the disease.
- The gluten allergy thus reflects the absence of both of these strains in the fecal matter.
- So presence/absence of *Lactobacillus* and *Bifidobacterium* in the fecal matter may be exploited as diagnostic tool in the gluten allergy patients.
- The compilation of comparative data of probiotics presence or absence in CD patients in comparison to normal individual may lead to development of an easy cheaper and noninvasive diagnostic modality for confirmation of the gluten allergy and CD.

ACKNOWLEDGEMENTS

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Topic : BIODIVERSITY MANAGEMENT



Introduction : Management for biodiversity conservation requires that it be built into all aspects of management through inventory.

Managing appropriately to promote and enhance those :-

- Wildlife
- Seed Dispersal
- Insect and disease control
- Report of an ecosystems food web.

Biodiversity is the shortened form of two words that is biological and diversity. It refers to the all variety of life that can be found on earth bracket plants and animals, fungi,, microorganism as well as to the communities that they form and habitats in which they live.

Biodiversity is under serious threat as a result of human activities. The main dangers worldwide are population growth and resources consumption, climate change and global warming, habitat conversion and urbanization.

Objectives:- basically biodiversity management has three prime objective ;

- Maintain crucial ecological processes as well as life support systems. Preserve the variety of species.
- To be precious, manage it at its sexual level and acquire sustainable development both for the present and future population.
- The conservation of biodiversity sustainable use of its components ecosystem species and genetic resources for fair and equitable sharing of the benefits of the utilisation of genetic resources.

Methodology:- biodiversity can be conserved in the in situ conservation method help in the conservation of biodiversity within the natural habitat of the animal and plants by clicking protected areas such as natural Parks and wildlife.

- Government legislation, nature preserves, reducing invasive species
- Habitat restoration, captive breeding and seed banks, research
- Reduce climate change, purchase sustainable products.

Results :- BIODIVERSITY experiment show that increases in plant diversity can lead to greater biomass production, and some researcher suggests that high diversity planting should be used for bioenergy production however many methods used in past by density experiment are in practical for biodiversity planting .

Conclusion:- the problem and benefits of biodiversity are many . They focus on the need for sustainable development and adequate use of coastal resources. Loss of biodiversity and biodiversity conservation are concepts that provide the basis for biodiversity management.

- So in the conclusion we can see that we have to maintain are conserve our manager biodiversity .





Organizer



Introduction: Thar Desert- Thar occupies about 9% of India's geographical area. In the north it extends up to Ferozpur district of Punjab and in the northeast it joins the desert areas of Haryana. The Aravalli Mountains, starting from northern Gujarat and extending up to Delhi forms the eastern boundary of the Thar. In the west it joins with Thar deserts of Pakistan and in the south it extends into Kutch of Gujarat. The Thar desert is the eastern extension of the vast Persio-Arabian desert, which joins the great Sahara deserts (Rahmani, 1957a). Gujarat and Rajasthan provinces constitute more than 80% area of the Thar Desert. This covers an area of about 0.32 million sq km, which is nearly 12% of India's total geographical area. Life in the Indian Desert is extraordinary and in spite of massive biotic and abiotic stresses, the world's largest concentration of large mammals and winter migratory birds exists in the desert. The global significance of the Indian desert lies in the fact that it is not an isolated arid zone but forms part of an extensive desert belt comprising the Sahara and the arid regions of Arabia, Iran and Pakistan. Scientific evidence and the continuity of the Sahara-Tharain region proves that the Thar is not a man-made desert but is more than 100,000 years old.

Thar Biodiversity-Need For Conservation

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Rainfall: Rainfall is very low in the Thar. July to September are the months when a few shower takes place. May and June are the hottest months, temperature goes up to 50° C and winds blows with very high velocity during this period.

Vegetation: A major portion of the Thar is occupied either by dry open grassland or by grassland interspersed with trees and thorny bushes (Gupta 1975). Most of the grasses are *Dichanthium-Louisia-Cenchrus* type (Dabadihoo & Shankararayan, 1975). Most of the vegetation consists of stunted, thorny or prickly shrubs and perennial herbs capable of drought resistance.

Basic Flora - The Thar Desert is distinct in vegetative biomass specially the Sewan grass which cover a major part of Arid Rajasthan. Typical shrubs include Phog (*Calligonum polygonoides*) growing on sand dunes, Khair (*Capparis decidua*) a leafless shrub growing to a middle size tree, Aak (*Colotropis procer*) and Thar (*Euphorbia Caduca*) representing the juicy shrubs Jal (*Salvadora procer*), Khejri (*Prosopis cineraria*), Rohida (*Leitommelle undulata*), Neem (*Azadirachta indica*), Babul (*Acacia nilotica*), vilayati Babul (*Prosopis juliflora*), Kumat (*Acacia senegal*) etc. constitutes major tree species. Khair, Rohira and Aak, when in flower in Feb-March add colour to the landscape of arid Rajasthan and are the center of activity for insects and birds. In the semi arid zone tree species like Dhok (*Anogeissus Pongula* and *A. latifolia*), Dhak (*Butea monosperma*) Ardu (*Ailanthus excelsa*), Teak etc.

Basic Fauna: Most of the major insect orders are found in the Thar Desert. There are 17 species of termites. The colorful members are the butterflies of the group hepidoptera. The dung beetle (coleoptera order) which rolls dung balls larger than itself. The hot sandy areas are ideal for swarms of locusts and grasshoppers, many of which are brightly colored. The velvet mite which has disappeared from many area due to chemical sprays, is still to be seen in the desert. Among reptiles, forty-three reptiles species inhabit the Indian desert today. The spiny-tail lizard (*Uromastix hardwicki*) lives in underground colonies in flat calcareous interdunal areas and Kankar (limestone) pans. Its L-shaped burrow is 6-8 inches (15-20 cm) deep. Besides these, saw-scaled viper (*Echis carnotus*), Russel's Viper (*Vipera russelli*), Desert Monitors (*Voronax griseus* and *Voronax bengalensis*), Sandfish (*Ophiomorus tridactylus*) etc. are the other reptiles commonly found in the Thar desert.

Outstanding among the birds is the great Indian bustard (*Chriots nigricaps*). The bustard feeds on a varied diet - cereals, grasshoppers, locusts, dung beetles, lizard, snakes, berries and small sparrow-size birds. Overhunting of it, since it provided substantial meat, trampling of it's eggs by cattle and loss and disturbance in it's habitat, had not long ago reduced it's numbers to near extinction.

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FAUNA

- Only those species are found which can withstand harsh climatic conditions and tolerate prolonged food & water scarcity
- Specially adapted to desert conditions

Mammals	Chinkara, Black buck, Desert fox, Indian fox, Blue bull, Desert cat, Jackal, Desert hare, Wolf, Mongoose, Black naped hare, Long eared Hedgehog, Gerbils	
Birds	Great Indian Bustard, Babbler, Bee eater, Bulbul, Doves, Drongo, Fly catcher, Lagwing, Mynah, Partridge, Robin, Shrike, Sand grouse, Owls, Eagles, Falcons, Vultures	
Reptiles	Common lizard, Monitor Lizard, Spiny tailed lizard, Keeled Rock Gecko, Agamid lizard	
Amphibians	Toad bufo, Toad agama	
Insects	Locusts, Termites, Grass hoppers, Beetles, Ants	

Winter Visitors - The desert attracts many visitors among which includes common crane (*Grus grus*) and demisele crane (*Arthropoides virgo*) pass through desert during October. The graceful greater flamingo (*Phoenicopterus roseus*) and the colorful lesser flamingo (*Phoenicopterus minor*) visit the shallow saline lakes all over the desert. The saline ponds in the process of drying, if they happen to hold enough water till winter attract rose and grey pelicans (*Pelecanus onocrotalus* and *P. philippensis philippensis*) and migratory waterfowl - bar-headed goose (*Anser indicus*), whistling teal (*Dendrocygna javanica*) ruddy shelduck (*Tadorna ferruginea*), Pintail (*Anas acuta*), Shoveler (*Anas crecca*), Coot (*Fulica atra*) and waders including curlew sandpiper (*Colinus asiaticus*) and snipe (*Capella spax*).

In recent years a significant event was the establishment of the fact that the desert coarner (*Carpinus coronadardicus*) nests in the Indian desert. The bird is Cream coloured and arrives in November to feed on termites & insects. The Kashmir roller (*Coracias gammaus*) arrives by October and stays till March. In contrast, orioles (*Oriolus oriolus*) visit the desert in hot summer and delight one with their melodious note. Migration of rosy pastors (*Sturnus roseus*) and Starlings (*Sternus vulgaris*) in Swarms across the desert is seen in October and their return flight in February-March.



BARE FOOT JOURNEY START FROM CHILDHOOD ON HOT SAND MAKES PEOPLE HARDY





Rich traditions

- Role of Bishnois in Conservation



- Sacred Trees (tree worshipping)
- Sacred Groves (Deovans / Orans)
- Kesar Chhanta (Saffron Sprinkling)
- Kuladhi Bandh Panchayats

Unique Selling Point

WILD LIFE NEEDS YOUR SUPPORT

Conclusion: The Rajasthan has a very rich culture and heritage for conservators of local flora and fauna. The area has experience a historical event of "khejri" where 363 persons died in saving khejri trees. A particular communities "BISHNOI" is devoted in conserving flora and fauna. It is the need of present era to conserve such historical heritage in future otherwise the rich biodiversity of Rajasthan will be disturbed and many rare flora and fauna become extinct.

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Organizer



Biodiversity – The varieties of ecosystem

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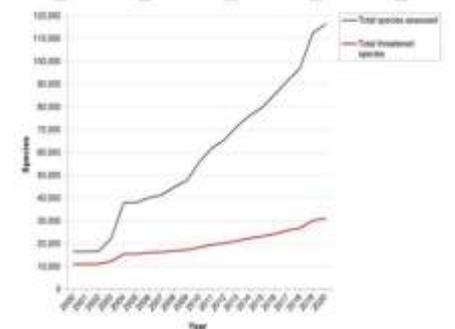
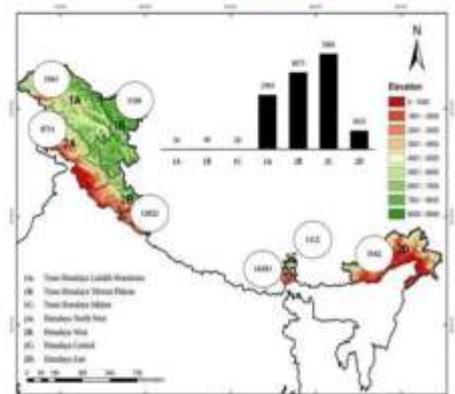
Abstract-

The geographic area of India is around 329 million hectares along with that India is the ones world richest countries have a vast variety of biodiversity. Biodiversity or biological diversity is the occurrence of different type of ecosystem. In general high levels of biodiversity in ecosystem are often linked to the relative health to the ecosystem. When we discussing about the biodiversity one must consider the scale and distribution of management activities. Biodiversity include the genetic and diversity of life form including plant, animals, microbes etc. living in a wide range of ecosystem. Ecosystem provides supporting regulating provisioning and cultural service. Generally areas differ in the biodiversity of species found only there. Species having relatively small ranges are called endemic species for example about 1000 plant species a small number compare with hose at the same latitude in continental central America. There are so many reasons for the loss of biodiversity. Growing pollution degrade ecosystem and further threatens biodiversity along with that global warming, poor management, industrialization, damage of farmland, over hunting, inappropriate agriculture practices and urbanization. Biodiversity conservation contributes to producing and delivering ecosystem services are the primary motivation for biodiversity when plantation of different varieties are grown together that retains the biodata of diversity along with that use organic maintenance methods and cut back on lawns, utilize existing green space connection.

Ecosystem



All plants, animals & human beings depend on their immediate surroundings and are interdependent on each other. This relationship between the living organisms, as well as the relation between organism and their surroundings form an Ecosystem.



BIODIVERSITY

Biodiversity

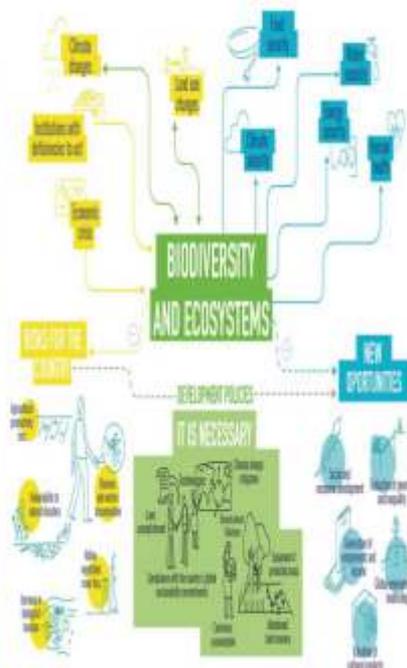
- Bio - Life
- Diversity - Variety

Biodiversity describes the variety of biological organisms in a given habitat, area, or ecosystem.

TYPE OF BIODIVERSITY

Types Of Biodiversity

1. **Genetic diversity:** variety in the genetic makeup among individuals within a species.
2. **Species diversity:** variety among the species or distinct types of living organisms found in different habitats of the planet.
3. **Ecosystem or ecological diversity:** variety of forests, deserts, grasslands, streams, lakes, oceans, coral reefs, wetlands and other biological communities.



Causes of Biodiversity Loss

According to most sources, the major direct causes of human-induced biodiversity loss are

1. land-use change (the fragmentation, degradation or loss of habitats)
2. pollution (air and water)
3. the over-exploitation of natural resources
4. the introduction of non-native (alien or exotic) species
5. climate change-induced biodiversity





EFFECT OF GLOBAL WARMING ON LIVESTOCK DISEASES

Harshit Verma and Surendra Upadhyay
SVPUA&T, Meerut

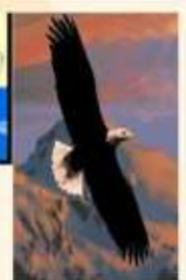


Globalization and climate change have had an unprecedented global impact on emerging and re-emerging animal infection and zoonotic diseases. Climate change is disorganize natural ecosystems by imparting more suitable environments for infectious diseases allowing disease-causing bacteria, viruses, and fungi to transport into new regions where they may harm wild species and domestic species, as well as humans. Diseases that had been previously limited only to tropical areas are now spreading to other previously cooler areas e.g. malaria. Significant zoonotic diseases for example avian influenza, lyme disease and rift valley fever are additionally liable to spread due to global warming. Vector borne maladies that were recently restricted to tropical areas are now spreading to previously cooler areas. A significant expanded occurrence in lethal infectious diseases in wildlife, livestock, and people may be the most immediate serious consequence of global warming.



How Global Warming Works

1. Nature's defense against many of these green house gases is called a sink
2. Soil and trees act as natural sinks absorbing tons of carbon from CO₂
3. So activities like uncontrolled deforestation destroy these natural sinks
4. Larger populations also mean we are producing more CO₂

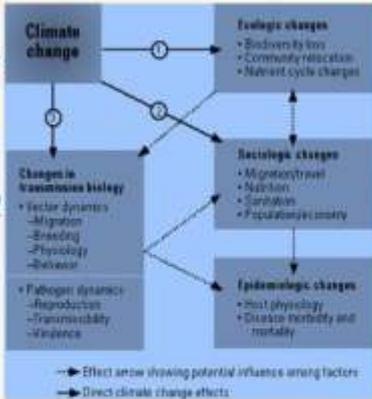


Anthropogenic Causes of Global Warming

Pollution, Mining, Cattle Rearing, Deforestation, Population, Methane Release, Solar Variation, Volcanic eruptions.



Global Warming and Infectious Diseases



Factors of global warming that affects the spread and rate of infectious diseases:

1. Vector-Borne Diseases
2. Public Health
3. Food Borne Diseases
4. Water Borne Diseases
5. Human Migration
6. Animal Migration

Conclusions

- Global warming is likely to have wide ranging and mostly adverse impact on animal as well as human health, with significant loss of life.
- Warmer temperatures and altered rainfall patterns are likely to increase the range and burden of vector-borne infectious diseases.
- Altered patterns of rainfall and increased frequency of extreme weather events are likely to influence the incidence of water-borne gastrointestinal and respiratory diseases
- Climate change will increase the risk of infectious disease by expanding the ranges of species changing pathogen dynamics in environmental reservoirs and altering pathogen transmission cycles.



Preservation of our environment is not a liberal or conservative challenge, it's common sense.

-Ronald Reagan





HOLISTIC IMPACT OF HOUSEPLANTS ON HUMAN SOCIALISM: A REVIEW



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ABSTRACT:

Interacting with nature may be important not only for survival, but also for human quality of life. Indeed, there is mounting empirical evidence that interacting with nature delivers a range of measurable human benefits, including positive effects on physical health, psychological well-being, cognitive ability and social cohesion. The hypothesis that humans have an inherent inclination to affiliate with Nature has been referred to as biophilia. Biophilia implies affection for plants and other living things. Greenery can help foster a sense of pride, local identity and ownership and increase future use. Green spaces in house have more benefits consequently affect social life. If the surroundings of family are green and fresh, family wants to invite society people, thus increase the social phenomena of the family. Interacting with nature may have specific psychological well-being benefits also. The exposure to nature in urban and wilderness settings can improve cognitive function and performance. The introduction of foliage plants into an indoor environment may reduce symptoms of physical discomfort and improve health. Adding elements of nature to living spaces can presumably induce positively valued changes in emotion, which again may impact on stress level, health and well-being, ultimately better cohesion with society. Addition of houseplants is a sure way to create and enhance the social life.

Key words: Houseplants, Human Socialism, Nature

AN OVERVIEW:

Throughout history, humans have had an intimate relationship with nature, most obviously depending on it for subsistence and production. As modern society emerged, and the human population condensed into urban areas, industrialization freed many people from reliance on direct consumptive interactions with nature. Indeed, in post-war society, people-nature interactions have fundamentally shifted from direct consumption and exploitation to more mutualistic relationships in which people actively seek out interactions with nature for recreation and enjoyment. Interacting with nature may therefore be important not only for survival, but also for human quality of life. Indeed, there is mounting empirical evidence that interacting with nature delivers a range of measurable human benefits, including positive effects on physical health, psychological well-being, cognitive ability and social cohesion.

The hypothesis that humans have an inherent inclination to affiliate with Nature has been referred to as biophilia. Biophilia implies affection for plants and other living things. Cities and indoor environments are dominated by manmade objects; the question is whether the concomitant depletion of natural elements has a negative impact on the human mind.

We do seem to have an affinity to nature - just think how calming and restorative it is to potter around in the garden. The same can be said for the home or indoor environment. Interaction with plants, both passive and active, can change human attitudes, behaviours, and physiological responses.

Social Life: Indoor Green Space

Some of the negative impacts of urbanisation include individual isolation, lack of social support, interracial conflict and increased incidence of crime and violence.

- Interactions with nature can facilitate social interaction in adults and children, foster social empowerment, enhance interracial interaction and promote social cohesion and support.
- There is a significant decrease in crime rates and violent behaviour in urban areas with surrounding green space or vegetation, in comparison with urban areas with limited greenery.
- Humans have an inherent inclination to affiliate with Nature has been referred to as biophilia. Biophilia implies affection for plants and other living things. Nature activities often implies socializing, e.g. in the form of walking together or sitting in a park with friends. Building social networks has a well documented potential for improving health.
- Socially, green space, particularly smaller, natural areas of green space close to housing, provides opportunities for social interaction and community activities, which foster community cohesion.
- Access to green space appears to be particularly beneficial to children, providing areas for social interaction. For both buildings and places, greenery can help foster a sense of pride, local identity and ownership and increase future use.
- Giving opportunity to plant a vegetation in home, to the child will help familiar to see the growth throughout life. The child will care utmost, when given responsibility. It penetrates different values in the child like bearing responsibility, caring of nature as well as others present in the family as well as society. When the child does this responsibility, he/she will definitely share it with peer group or other people outside the family.
- Time to time tree plantation campaigns can be organized to create green spaces among the society. All families in a particular society, when engaged in this, will surely aware the other societies to come forward to do the same for their well being. More the time is given to add green patches in houses as well as surroundings, people join hands together, more it fastens the bondages.

Further, green spaces in house have more benefits consequently affect social life, as follows:

1. Research by the Environmental Protection Agency indicates that indoor air can be up to 10 times more polluted than outdoor air. Airborne dust, bacteria, and mold spores can be problematic for many people. Plants kept indoors, absorb these air and release fresh air. Thus, houseplants are considered as 'Air Cleaners'. If health is good, the mind of family members will surely want to share their feelings with others. If the surroundings of family are green and fresh, family wants to invite society people, thus increase the social phenomena of the family.
2. Interacting with nature may have specific psychological well-being benefits for children. In addition, there is emerging evidence that childhood interactions with nature may influence attitudes towards nature in later life. This attitude and behavior change further helps in creating more socialism.
3. Urban environments can be very stimulating, requiring directed attention and negatively impacting cognitive function. Exposure to nature in urban and wilderness settings can improve cognitive function and performance. Concentration enhancement reduces the actual time taken in the particular activity. The more time family have, can be spent in doing social involvement.
4. Urban environments contain many potential stressors such as traffic, crime, dense crowds, and over-stimulation. There is evidence to suggest that interactions with nature may alleviate some of the negative physiological effects of such stressors. The presence of plants correlated with a reduction in dry skin, hoarse throat, coughing and fatigue, suggesting that the introduction of foliage plants into an indoor environment may reduce symptoms of physical discomfort and improve health.
5. Concrete elements among the multiple definitions of spiritual well-being include a sense of connectedness, a sense of purpose, a sense of awe and inspiration and faith in a larger reality. The experiences of wilderness landscapes or specific natural features where the power of nature is apparent have been shown to invoke feelings of awe and inspiration. This inspiration can be spread by the family to other people.

How House Plants Increase Happiness?

Most people love the feeling of walking into their houses with green plants. Not only does it make the room feel alive, it keeps the air and mind fresh. Here are several reasons house plants help increase happiness-

- a) Exposure to plants with improved learning skills in children. Plants can improve concentration and memory for adults, in the home and workplace.
- b) Beautiful and fragrant flowers around the house or office can boost moods, reduce stress and relieve depression.
- c) Plants and flowers can soothe patients and boost recovery time. Likewise, working with plants, such as gardening, soon after coming out of a hospital situation can significantly reduce recovery time.
- d) People who spend time around plants also have better relationships with humans. Increased levels of compassion come from exposure to ornamental plants, making them more likely to help others and have advanced social relationships.
- e) Spending time with plants can boost your energy level (and oxygen) bringing feelings of vitality and positivity. This can enhance job performance as well as increase the efficiency of a household and relationships.
- f) Gardening has become popular for PTSD sufferers and those with mental health issues. Just five minutes in nature can have a profound effect on mood and happiness, bringing more positivity and an ability to better handle stress triggers. Studies have shown that reducing stress and anxiety levels also reduces the risks of developing certain diseases.

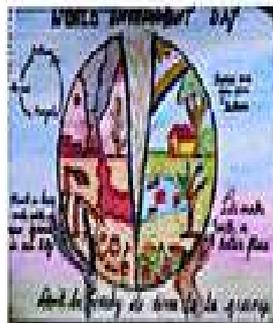
CONCLUSIONS

Adding elements of nature to living spaces can presumably induce positively valued changes in emotion, which again may impact on stress level, health and well-being, ultimately better cohesion with society. Too much stress may lead to various ailments, including anxiety related disorders. Thus, it can be concluded that inclusion of plants and greenery in the house, helps in boosting socialism among the family members. Society itself by seeing this, will come forward, and consequently propagate enthusiasm among other society members to go green. The feel automatically increase the periphery and surroundings. Addition of houseplants is a sure way to create and enhance the social life.

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Topic: biodiversity management
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Class : BSC 3rd year
Department : food science
College : R.G.P.G meerut



Introduction: Management for biodiversity conservation requires that built into all aspects of management through inventory. Managing appropriately to promote and enhance those-

wildlife, sea dispersion, insect and disease control, report of an ecosystem food web.

Biodiversity is a shortened form of two words that is biological and diversity.

**** It refers to the all variety of life that can be found on earth (plants, animals, fungi, microorganism as well as to the communities that they form and habitat in which they live. Biodiversity is under serious threat as a result of human activities. the main dangers worldwide are population growth and resources consumption, climate changes and global warming, habitat conversion and urbanization..****

Objectives :- biodiversity management prime objective that are :-

Maintain crucial ecological processes as well as life support system.

Preserve the variety of species.. To be precious manage and acquire sustainable development both for the present and future population. The conservation of biodiversity sustainable use of companies ecosystem species and genetic resources for fair and equitable sharing of the benefit of the utilisation of genetic resources.

Methodology: biodiversity can be conserved in situ conservation method which is help in the conservation of biodiversity within the natural habitat of the animal and plants by clicking protective area such as natural Parks and wildlife.

* government legislation, nature reserves, reducing invasive species habitat restoration captive breeding and seed banks, research reduce the climate change purchase sustainable products. *

Results :- BIODIVERSITY experiment show that increases in plant diversity can lead to create a biomass production , and some researchers suggested , that high diversity planting should be used for bioenergy production however many method used in past by density experiment are in practical for biodiversity planting.

Conclusion:- The problems and benefits of biodiversity are many but we focus on the need for sustainable development and adequate use of coastal resources.biodiversity and biodiversity conservation and construct that provide the basis for biodiversity management.

****So in the conclusion we can see that we have to maintain or our manage our biodiversity for our future lives.**





Organizer



Conservation of biodiversity in ancient India : A concise review

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Introduction: In the Rio Summit (1992), one of the two major treaties namely, *Conservation and management of Biodiversity (Agenda 21)* was signed. Interestingly, ancient Indian civilization also recognized the significance of nature which was practiced as several principles in ancient India and found to be similar to Rio Principles.

The modern holistic methods of Biodiversity Conservation are replicated in ancient Indian literatures. The Vedic, Jain, Buddhist, *Manusmriti* and Kautilya's *Arthashastra* established the principles of sustainability centuries ago.



Manusmriti written in the post-Vedic age, is the world's first ethical compendium on human jurisprudence, presented by *Maharshi Manu* which stated its role in saving the integrity of the natural environment.

✓ According to its text Biodiversity means all living forms broadly assigned to *Chara* (movable living world) and *Achara* (immovable like plant kingdom).

✓ Storage organs of plants, crops, timber yielding plants were important to human, thus *Manusmriti* imposed various punishments for destroying such plants and their parts. It also stated that killing of animals is a sin.

✓ According to Manu emphasis should be given to conservation and domestication of animals, biodiversity protection, and vegetarian food habit. According to him agriculture caused injury to animals, specially the insects and germs in the soil.

✓ Manu referred pollution as spoilage of the five gross elements by unethical activity and contamination referred to as any action against wholesomeness.



The book *Arthashastra* written by *Kautilya* (also known as *Chanakya*), is a treatise on the protection and management of forests, gardens, orchards, wild life (321-297 B.C.E).

Even in the affairs of the state, the administration and the ruler were directed to preserve and promote environmental welfare. Kautilya suggests the need to develop *Abhayaranya* or *Abhayavana*, forest and animal sanctuaries, where trees and animals would both reside free from the fear of slaughter.

➤ *Arthashastra* concerned about the plants, vegetations, domestic and wild animals.

➤ Penalties and punishments were imposed for damaging such living creatures.

➤ Special ranks were created, for example Director of forest, Supervisor of animal slaughter, Superintendents of cattle, horses, elephants, and their role was to protect wildlife, ensured proper care and rations for pet animals, prevented poaching of wild animals.

➤ Forests were considered as a valuable resource, hence forest products should be used in a sustainable manner.

Kautilya divided the country into various regions - forests (*aranyas*), village (*gramya*), mountains (*paryata*), wet or humid areas (*audaka*), drylands (*bhauma*), plains (*sasra*) and uneven lands (*visama*). He also estimated average annual rainfall in some famous places like *Asmaka* and *Avanti* was 13.5 and 23 dronas respectively [1 *drona* = 1.5 – 2.0 inches]. *Kautilya* described efficient water management. The *Arthashastra*'s directives on water indicate that it was regarded as a 'collective, not a private commodity'.

The issues related to conservation of natural resources as described in *Arthashastra* are very much relevant in modern society. In India, many *Environmental Acts and Laws* demonstrate remarkable similarity with structures and gist of *Kautilya's Arthashastra*.



In ancient India, there were three types of forests namely, *Mahavana*, *Tapovana* and *Srivana*. *Upanishads* and *Aranakays* were written in *Tapobans*.



Rabindranath Tagore was an environmental pioneer, churned out poems, plays and short stories emphasizing the need to protect nature. Human interaction with nature was a persistent concern of Tagore. The guiding principle of *Visva-Bharati* is best described in Tagore's own word, "The highest education is that which does not merely give us information but makes our life in harmony with all existence"

With the concept of *Upanishad* in mind, Tagore established an experimental school at Santiniketan in 1901 with five students and an equal number of teachers. He originally named it "*Brahmcharya Ashram*" (now called *Putha Bharan*), in the tradition of *Tapovana*. The distinctive features of this include its open-air classrooms and emphasis upon oriental learning.

Shruti Vedas



➤ Vedas are universally accepted to be the most precious Indian heritage.

➤ Vedas contained several references on environment conservation, ecological balance, and weather cycle. This indicates the high level of awareness of the people at that time.

The main Vedic views revolve around the concept of nature and life. The Vedas emphasize that the plants and trees are the treasures for generations

✓ A verse of Rig-Veda says, "thousands and hundreds of years if you want to enjoy the fruits and happiness of life then take up systematic planting of trees."

✓ "Do not harm the environment; do not harm the water and the flora; earth is my mother, I am her son; may the waters remain fresh, do not harm the waters". "do not cut trees, because they remove pollution." (Rig Veda, 6:48:17).

✓ "Do not disturb the sky and do not pollute the atmosphere." (Yajur Veda, 5:43)

The term pollution did not exist at the Vedic time but they call it "poisoning of environment". They believe that the five great elements (space, air, fire, water and earth) that constitute the environment are all derived from *Prakriti*, the primal energy and our human body is composed of these and related to these five elements.



In *Atharvaveda*, earth is to be honoured as well as protected like our mother "*Rishomi Mata Patroham Prithivyah*". Many India communities have inherited such tradition.

Most of the Rituals in Hinduism indirectly supports the conservation of plants.

For example:

*The coconut tree and the coconut fruits are sacred and are offered to God during worship.

*Mango leaves are used as festoons during pujas and auspicious events.

*All flowers and leaves of banana, young bamboo and *Barunda* grass, etc. are used during worship for *pushpa puja* and *patra puja*.

*The lotus is a sacred flower; the 'tulsi' plant or Indian basil is an important symbol in the Hindu religious tradition.

*Til, barley, rice, jaggery, sandal, dhano (gum), are used in worship.



The idea about protection of animals by making sanctuaries for animals was dated back to the time of *King Devanampiyatissa* in the 3rd Century B.C.E, who was a disciple of Buddha.

✓ The King told that he was only a trustee of land, and not the owner of it.

✓ Trusteeship is one of the basic principles of modern environmental law. Yet, it was anticipated over two thousand years ago.

✓ The idea that animals had to be protected was so well respected that there were sanctuaries for animals, dating back to the time of King Wild life sanctuaries thus established continued to be preserved throughout this period.



Charaka-Sambhita is the significant ancient Indian document on Medical Science. This book describes different diseases, their treatment procedures and are considered as excellent texts for revealing the utility of medicinal plant resources.



In ancient India, planting and rearing of trees was a highly developed practice. The 10th Century treatise, *Vrikshayurveda* on the subject ascribed to *Sarapala* dealt with various species of trees and their growth & its Verses 9-23 indicate how spiritual beliefs and conservation of nature was inter-linked.

Verses of 9-23 of *Vrikshayurveda*: i) A person is honored in *Yajurveda* for as many thousand years as the days he resides in a house where *tulasi* is grown. ii) He who plant a couple of *laxmi* trees as per the prescribed mode would go to the abode of *Siva* and many heavenly nymphs will attend upon him. iii) After planting *arun* trees a person well-versed in *Upanishads* attains the abode of *Son*. Indeed! He resides there for a long period. iv) He who himself plants eight *udambara* trees or even prompts someone to plant them, rejoices in the lunar world.





A review on the production and physicochemical properties of Algae & *Jatropha* biodiesel

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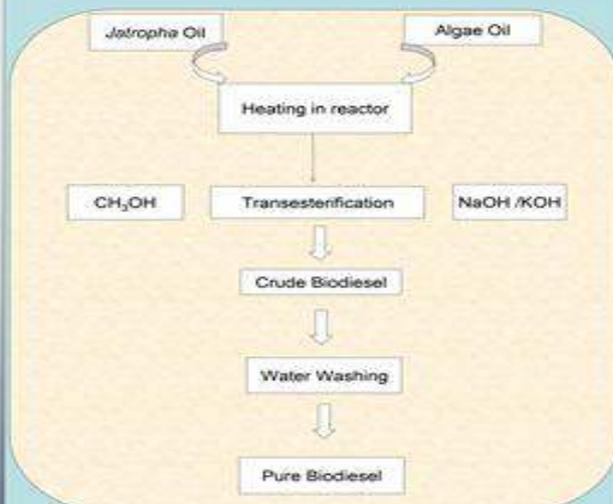
Introduction

Biodiesel is promising renewable biofuel resources having potential to address the problem of climate change, since later has catastrophic effect not only on the plants but also on the human beings. In few decades, environmental pollution has reached on alarming stage and it should be deal immediately without any delay. Right to clean air, clean water & healthy food is basic right to the every citizen. In wake of urgency to deal the crisis, through the comparative study we like to illustrate that biodiesel from algae is environmentally benign and eco-friendly biofuel. Algae are potential biofuel available both in unicellular and multicellular in nature. It has great capability of photosynthesis in comparison to terrestrial plant due smaller size and large surface area. *Jatropha* is drought resistant and easy to grow in tropical to semi-tropical locations and also used for biodiesel production.

Material & Methods

The process of oil extraction is similar in algae and *Jatropha*. There are several forms of biofuel resulting from manufacturing process using sedimentation, centrifugation, and filtration. The fats and oils are turned into esters while separating the glycerin. At the end of the process, the glycerin settles down and the biofuel floats. Glycerin is separated from the biodiesel is known as transesterification in presence of catalyst usually KOH or NaOH. Glycerin is another by-product from Algae as well as *Jatropha* oil processing that can add value to the crop.

Flow Chart of Biodiesel Formation



Algae V/S. *Jatropha*

S. No.	Feed Stocks	Oil yield (L/ha per year) (approximate)	Land area needed (M ha) (approximate)
1	<i>Jatropha</i>	1901	140
2	Algae	137007	2.2

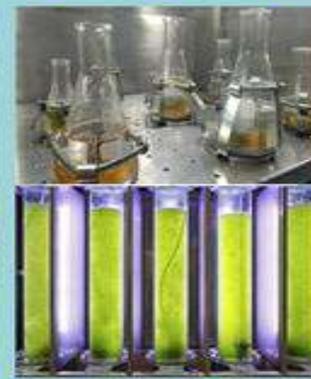
Physical and Chemical Properties of Algae biodiesel blend & *Jatropha* biodiesel blend

S.No.	Biodiesel Blends	Density[at 15.56°C, Kg/m ³ , ASTM D-4052	Kinematic Viscosity (at 40°C, mm ² /s(cst), ASTM D-445	Flash Point (0°C) ASTM D-93	Heating Value ASTM D-224	Cetane Number ASTM D-13
1.	<i>Jatropha</i> Biodiesel(B1 O)	835	3.5	83	41,500	48
2.	<i>Jatropha</i> Biodiesel(B1 O)	845	5.2	88	40,000	53
3.	Algae Biodiesel(B2 O)	840.5	3.3	83	40,017	56
4.	Algae Biodiesel(B2 O)	843.8	4.8	90	37,866	70

Fig.1- *Jatropha* & Algae as a feedstock for biodiesel Production



Fig.2 –Algae Culture in Lab.



Conclusions

- It was concluded that the maximum amount of oil was extracted from algal biomass using appropriate solvent.
- Percentage Oil yield in Algae is very high in comparison to *Jatropha* due to more photosynthesis and large surface area.
- For lower amount of blending heating value almost same for both feed stocks.
- Algae biodiesel have higher cetane value than those of *Jatropha* biodiesel, so algae biodiesel ignite easily due to compression and ensures complete combustion.

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भारत में वर्षा जल संग्रहण

शिवांशु तिवारी¹ एवं सौरभ त्यागी²

1. गोविन्द बल्लभ पंत कृषि एवं प्रौद्योगिक विश्वविद्यालय, पतनगर, उत्तराखण्ड
2. शोभित विश्वविद्यालय, मोदीपुरम, मेरठ

सारांश –

जल हमारी प्रथी पर सबसे अधिक उपयोग किए जाने वाले पदार्थों में से एक है। हमें दिन प्रतिदिन के जीवन में अपनी सभी गतिविधियों के लिए जल की आवश्यकता होती है। कुल मांग क मुकाबले शहरी क्षेत्रों में जल की आपूर्ति हमेशा कम रहती है। हमारी मांग को पूरा करने के लिए सतही जल अपर्याप्त है और हमें भू जल पर निर्भर रहना होगा। तेजी से शहरी करण के कारण, उप-जल वर्षा के जल में भारी कमी आयी है और भूजल का पुनर्भरण कम हुआ है। इस परिदृश्य को मांग और आपूर्ति के बीच अंतर को पाटने के लिए एक वैकल्पिक स्रोत की आवश्यकता है। वर्षा जल जो कि पानी का सबसे शुद्ध रूप है, मौजूदा जल आपूर्ति को 'जहाँ भी जल गिरता है' के द्वारा मौजूदा जल की आपूर्ति बढ़ाने का एक तत्काल स्रोत है। वर्षा जल संचयन भविष्य में उपयोग के लिए वैज्ञानिक और नियंत्रित तरीके से वर्षा जल को एकत्र करने और संग्रहीत करने की प्रक्रिया है। शहरी क्षेत्रों में वर्षा जल संचयन में छत के जल को संचित किया जा सकता है। कच्चे व गैर कच्चे क्षेत्रों (खेतों, तालाबों, पार्कों, टैंकों, फुटपाथ परिदृश्य आदि) में वर्षा जल संचयन किया जा सकता है। जिसके फलस्वरूप भू जल स्तर में सुधार होगा एवं जल चक्र भी संतुलन में आ जायेगा।



जल चक्र



वर्षा जल संचयन (घरों में)



वर्षा जल संचयन (कारखानों में)

जल संचयन अति आवश्यक है, क्योंकि जल ही जीवन है.....






Future forest of Ranchi, state capital city of Jharkhand with reference to Jan Van Yojana, Jharkhand

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Introduction

- Jharkhand is a land of biodiversified forest having cover area of 33.81% (year -2019)¹.
- Forest is subject of concurrent list of Indian Constitution, so both state and central government are concerned with enrichment of various types of plantation. In this context, Jharkhand government has launched a fantastic-welfare plantation scheme/program in 2016 called as JAN VAN YOJANA².

Objectives

- JanVan Yojana plantation scheme will create extra forest land/forest cover designating future forest having following objectives with people participation³:
- To increase the green cover and maintain the environmental imbalance
- Conservation of the underground water by plantation
- To reduce the pressure on notified forest by planting the trees in the private land
- To increase the farmers income by planting trees in their private lands
- To increase forest cover in the state by people's participation

Methodology

- Primary data collected from beneficiaries' Plantation sites of different blocks viz. Bundu, Ormanjhi etc of Ranchi districts.
- Secondary data collected from Department of Forest, Environment and Climate change, Government of Jharkhand (2016-17 to 2019-2020).

Results & Discussion

- The database of JanVan Yojana, Jharkhand (2016-17 to 2019-2020)⁴.

Table 1. Data of Application status under JanVan Yojana, Jharkhand for Ranchi District

	2016-17	2017-18	2018-19
Total No. of Applications	81	31	85
Rejected	2	8	1
Applications Approved	78	21	78
Pending Application	1	2	6
Approved Area for plantation (in acre)	184	65	144.21
Pending Area for plantation (in acre)	2	58	47.77

Table 2. Compiled Data of different parameters of JanVan Yojana, Jharkhand for Ranchi District.

	Ranchi					
	2016-17		2017-18		2018-19	
	1 st Year	3 rd Year	1 st Year	3 rd Year	1 st Year	3 rd Year
No. of Beneficiaries	74	24	12	0	63	NA
Area of plantation (acre)	147.61	43.03	34.22	0	10464	NA
No. of Fruit yielding Crops	13850	2399	1302	0	11217	NA
No. of Timber yielding Crops	16121	3052	2379	0	9750	NA
Approved Amount	116734.35	76105.2	141990	0	98209.90	NA

Conclusion

- Climate change is a very forewarning and challenging issue nowadays and is getting worse due to pollution, population explosion and water scarcity.
- To overcome this situation and for benefit of the society, the government of Jharkhand has introduced a welfare scheme known as JanVan Yojana.
- The proper implementation of this scheme will increase the green cover of the state, maintain the environmental balance, conserve the water, reduce soil erosion, reduction in greenhouse gases, increase farmer's income by increasing the scope of fruit and timber yielding industries as well as helpful in employment generation.
- Besides the implementation, it is very much important to follow up the reports of this type of schemes and also develop an action plan to implement audit findings.

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Organizer

7850947393

BIODIVERSITY CONSERVATION

SAVE TREES

Trees provide soil and water conservation, facilitate carbon sequestration, improve biodiversity and increase the number of pollinators and natural pest predators. In birds.

SAVE WATER

Water is required to support biodiversity. Without sufficient water, stresses on forests increase global biodiversity losses.

SAVE ENERGY

Energy is something that we have taken for granted for centuries. So that Save Energy, Save the Environment.

Introduction: Biodiversity conservation is the protection and management of biodiversity to their resources for sustainable development.

Objectives: Biodiversity conservation has three prime objectives:

- (i) Maintain crucial ecological processes as well as life support system.
- (ii) Preserve the variety of species.
- (iii) Make sustainable exploitation of ecosystems and species.

Methodology: Aim of biodiversity conservation methods to preservation, maintenance, conservation, recovery and enhancement as discussed below:

- (i) Protecting against degradation and destruction of natural ecosystems.
- (ii) Maintain habitat, and natural ecological systems while promoting the implementation of better conservation practices.

Results: Conservation of Biodiversity is so important to protect plant, animals, microbial and genetic resources for food production, agriculture, and ecosystem functions such as fertilizing the soil, recycling nutrients, regulating pests and diseases, controlling erosion and pollinating crops and trees.

Conclusions: Biodiversity is our life, if the biodiversity got lost at this rate then in near future, the diversity of human being will be threatened. So, it is our moral duty to conserve biodiversity as well as environment.

AIR POLLUTION

Air Pollution is a serious threat to the diversity of life.







A Review: White Button Mushroom cultivation Transforming Environmental risk into positive Environmental and Economic benefits

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Abstract

White Button mushroom cultivation is considered as a highly environmental friendly than other agricultural activities as it is a soil-less culture. This review focuses on the various aspects of White Button mushroom cultivation. The paper highlights the various environmental and economic benefits of White Button mushroom cultivation. The paper also discusses the various challenges associated with White Button mushroom cultivation and the various strategies to overcome these challenges.

White Button mushroom (WBM) cultivation is considered as a highly environmental friendly than other agricultural activities as it is a soil-less culture. This review focuses on the various aspects of White Button mushroom cultivation. The paper highlights the various environmental and economic benefits of White Button mushroom cultivation. The paper also discusses the various challenges associated with White Button mushroom cultivation and the various strategies to overcome these challenges.

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Introduction

The most commonly cultivated white button mushroom (WBM) is *Agaricus bisporus*. It is grown on compost consisting of straw, horse manure, poultry manure, gypsum, nitrogen-containing compounds, and water.

There are many reasons for the success of WBM, which are: (i) it is a soil-less culture, (ii) it is a short cycle crop, (iii) it is a high yielding crop, (iv) it is a high value crop, (v) it is a high demand crop, (vi) it is a high profit crop, (vii) it is a high export crop, (viii) it is a high quality crop, (ix) it is a high safety crop, (x) it is a high health crop, (xi) it is a high nutrition crop, (xii) it is a high medicinal crop, (xiii) it is a high cosmetic crop, (xiv) it is a high pharmaceutical crop, (xv) it is a high nutraceutical crop, (xvi) it is a high functional food crop, (xvii) it is a high nutraceutical crop, (xviii) it is a high nutraceutical crop, (xix) it is a high nutraceutical crop, (xx) it is a high nutraceutical crop.

WBM production worldwide has increased rapidly during the last 20 years. In 2017, world mushroom production had reached 2080.93 million tons (Mn) (FAO, 2018).

Over 40% is produced in China, followed by USA (2.7%), India (1.5%), Thailand (1.5%), Spain (0.8%), Canada (0.8%), UK (0.7%), France (0.7%), Italy (0.7%), Japan (0.7%), and other countries (0.7%).



Statement of Problem

The problem being discussed is a global issue in White Button Mushroom Cultivation. The problem is that the current cultivation process is highly labor-intensive and costly.

A lot of waste is generated during the White Button Mushroom Cultivation process which is difficult to dispose of safely.

Objectives

1. Investigate global White Button Mushroom production and export.
2. Determine the various environmental and economic benefits of White Button Mushroom Cultivation.

Materials and Method

1. Data Collection: Literature Review, White Button Mushroom and WBM production.
2. All sample data analyzed statistically.

Significance of the study

- Present study revealed the analysis of chemical content in the WBM.
- Due to risk source of antibiotic and heavy metal can be used.
- Based on the findings, the paper concludes that can be prepared for the use of WBM with regard to different use as a nutraceutical industry.

Composting & WBM Cultivation



Compost is produced by first macerating straw with water for a few days. Then, manure, gypsum and nitrogen supplements are added. The compost is stored in a duration of 15-18 days with 5% the height in large and depth depends upon the quantity of compost, either in the open or under a shed. Straws are treated with an extremely hot temperature.

The second temperature of the compost should not exceed 70°C within 24-48 hours during the composting process, when it is pasteurized by 94 hours at 50°C (below 60°C), conditioned 3-4 days at 45-50°C, and cooled down to 25°C.

The finished compost is filled into the polythene bags (size 24x28 inches and thickness 100-125 gauge) which hold 10-15 kg compost to a depth of 15-18 inches. The bags are covered and the polythene is sealed at 45-50°C for 10 days. The bags are placed in a growing room temperature between 25-28°C and RH 80-85%.

After 7-10 days, the compost is completely colonized by mycelium, and can be covered with a moist material, usually peat with a layer 2.5-3 cm. 7-12 days after covering, the first mushrooms can be harvested as the water temperature is maintained between 18-19°C. Mushrooms appear in week-long cycles under these conditions.

WBM can size 2.5-4 cm in diameter WBM harvested by cutting gently the stalk with a sharp knife. The compost should not be put in polythene or discarded bags except with using PVC sheet because best grade for fresh marketing. The used compost is usually added upon mushroom substrate (SMS), although the basic mushroom compost (BMC) sometimes encountered.

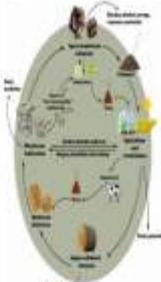
Characteristic of SMS

SMS	Country	Year	Yield (kg)
1	India	5 days	0.75
2	Thailand	5 days	2.25
3	Japan	5 days	0.75
4	Canada	5 days	0.75
5	Thailand	5 days	0.75
6	India	5 days	0.75
7	Thailand	5 days	0.75
8	Thailand	5 days	0.75
9	Thailand	5 days	0.75
10	Thailand	5 days	0.75
11	Thailand	5 days	0.75
12	Thailand	5 days	0.75
13	Thailand	5 days	0.75
14	Thailand	5 days	0.75
15	Thailand	5 days	0.75
16	Thailand	5 days	0.75
17	Thailand	5 days	0.75
18	Thailand	5 days	0.75
19	Thailand	5 days	0.75
20	Thailand	5 days	0.75

Changes in compost during different stages of composting and cultivation of WBM

Stages	Temp. (°C)	Dry Matter (%)	Water content (%)	Mycelia content (%)
1. Initial Material	100	48	20	11
2. Composting Stage	100	28	13	11
3. Spawning Stage	71	23	47	47
4. Fruiting	42	23	49	44
5. Harvesting	45	31	24	48

Recycling and Application of SMS



Conclusion

- WBM is a commercial mushroom production practices a responsible green choice. Addressed the possible ways for many decades, exploring environmental, agricultural and economic.
- The utilization will not be restricted to a single application but will only be limited by the availability and quantity of mushroom substrate, scientific, and technological.
- It can be concluded that the application of SMS, obtained from a long cultivation system, contained a considerable amount of substrate and may be used as a nutrient rich, renewable energy production, to support farming, climate control.
- The review also showed that inclusion of spent substrate of the first harvest affect the nutrient intake, digestibility and nitrogen balance. SMS improve the biological, physical and chemical characteristics of the soil.
- By using organic matter containing by-products, implementing a green technology for spent compost and increasing water recycled, source of spent compost, environmental risks can be safely completely mitigated.

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Organizer



IMPACTS OF CLIMATE CHANGE ON BIODIVERSITY

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Abstract

In many areas of the world, biodiversity is being reduced by humankind through changes in land cover and use, pollution, invasions of exotic species and possibly climate change. Assessing the impact of climate change on biodiversity is difficult, because changes occur slowly, and effects of climate change interact with other stress factors already imposed on the environment. Also, there is compelling evidence that climate change is directly affecting biodiversity in forests throughout the world. These impacts occur as a result of changes in temperature, rainfall, storm frequency and magnitude, fire frequency, and the frequency and magnitude of pest and disease outbreaks. Climate change will have strong indirect effects on biodiversity. These include changes in species selection (including use of species mixtures), rotation length, thinning, pruning, extraction of bioenergy feedstocks, and large-scale climate change driven afforestation, reforestation, and potentially deforestation. As there are still many gaps in our knowledge of effects of climate change on biodiversity, so, an interdisciplinary research programme should be initiated for a better knowledge and control on the effects of climate driven change on biodiversity.

Keywords: Biodiversity, Climate Change, Effects, Species Selection, Control

Introduction

Climate change refers to the effect of human-induced increase in the concentration of greenhouse gases in the atmosphere, enhancing the natural greenhouse effect. It poses a potential threat to the earth's biodiversity. In comparison to threats by other human-induced environmental changes (e.g., changes in land cover and use, pollution, effects of increased concentrations of greenhouse gases), direct effects of recent climate change on biodiversity will be slow and difficult to measure, but the processes are global and practically irreversible (Maarten Kappelle, M.M. 1999). Current climate change coupled with other human pressures is stressing biodiversity far beyond the levels imposed by the global climatic change that occurred in the recent evolutionary past. Moreover, climate change will exacerbate the stresses already imposed on the environment. For example, in a fragmented landscape, species may be unable to move to a climatically more favourable environment, because their dispersal capacities are insufficient to cross the barriers between the remaining natural areas.

Impacts of recent climate change on biodiversity

- Shifts of major vegetation zones or biomes
- Shifts in ranges of individual species and in the composition of species assemblages
- Interactions between effects of climate change and habitat fragmentation
- Changes in ecosystem functioning

Consequences of biodiversity loss

- Loss of genetic diversity, species extinction
- Droughts and floods
- Soil erosion and landslides
- Desertification, mineralisation and water logging of productive lands
- Crop loss due to decrease of pollinators, seed dispersers and biological control
- Coastal erosion like tsunami and storm

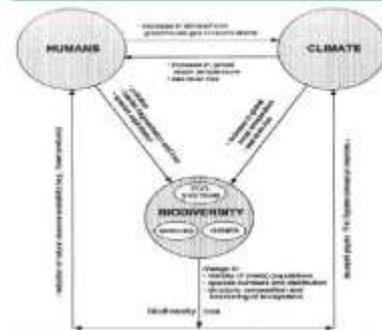


Figure 1. Schematic diagram identifying the direct human and climate drivers leading to loss of biodiversity.

EXAMPLES OF DECLINES IN NATURE

ECOSYSTEM EXTENT AND CONDITION

Natural ecosystems have declined by 47% on average relative to their earliest estimated states.

SPECIES EXTINCTION RISK

Approximately 25% of species are already threatened with extinction in most animal and plant groups studied.

ECOLOGICAL COMMUNITIES

Biotic integrity—the abundance of naturally present species—has declined by 23% on average in terrestrial communities.

BIOMASS AND SPECIES ABUNDANCE

The global biomass of wild animals has fallen by 82%. Indicators of vertebrate abundance have declined rapidly since 1970.

NATURE FOR INDIGENOUS PEOPLES AND LOCAL COMMUNITIES

72% of indicators developed by indigenous peoples and local communities show ongoing deterioration of elements of nature important to them.

SPECIES AT RISK OF EXTINCTION

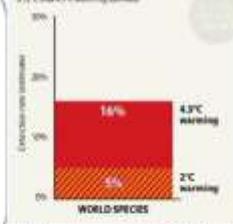


Fig. 7. Impact of cyclone Idai on the Frelimo disaster in Mozambique. In the left 10 years two devastating cyclones have destroyed about 45 % of the standing timber volume in this 1 million ha plantation of *Pinus patula*. Photo credits: Satellite image courtesy of Mexico France Centre de Meteorologie Spatiale (Lanoux) and forest stand image courtesy of DRAP Agriculture, France

Risk of climate change on Biodiversity

As climate changes, ecosystems will respond to changes in temperature and precipitation as well as changes in the carbon-dioxide concentrations in the atmosphere. These changes are likely to favor some species and to negatively affect others, which will alter competitive relationships and may cause invasions by "generalist" species (Walker et al. 1999). Perhaps most significantly, there is a risk that climatic changes will occur more rapidly than individual species are able to adapt. For those species that are able to migrate with climate change, there is a risk that migration "escape routes" will be closed due to anthropogenically altered landscapes or natural barriers, such as mountains, rivers and oceans. The ultimate result could be large scale extinctions.

Conclusion

The study of climate change impacts on biodiversity is still in its infancy, but several path breaking workshops and research initiatives suggest future research directions for those interested in how humanity can mitigate the impacts of climate change on other species (Global Change in Terrestrial Ecosystems, IAI 1994). While climate change has not been the dominant driver of biodiversity loss to date in most parts of the world, it is projected to become as or more important than the other drivers of change. Therefore it is essential that we address the issues of biodiversity loss and climate change together.

Responding to change

There is an urgent need for more research into the impacts and implications of climate change on biodiversity, looking at geographical changes, and at differing sensitivities of species and habitats. Immediate response strategies may follow three paths - avoidance, mitigation and adaptation.

Avoidance

- Utilization of irrigation, drainage or other artificial means to maintain habitats for particular species.
- Artificial removal of invasive species.

Mitigation

- Habitat creation in new areas.
- Translocation of species.

Adaptation

- Breed new plant varieties that have desired properties to that area.
- Allowance of natural 'succession' of communities, including processes of desertification, inundation and migration.

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EMPATHETIC VALUE AND PARAMETERS OF NATURAL SOLUTIONS TO ENVIRONMENT REVOLUTION AND OTHER GLOBAL CHALLENGES



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Natural Solution

NS involve working with and enhancing nature to help address societal challenges. They encompass a wide range of actions, such as the protection and management of natural and semi-natural ecosystems, the incorporation of green and blue infrastructure in urban areas, and the application of ecosystem-based principles to agricultural systems.

Natural Solutions for climate change adaptation

The World Economic Forum Global Risks Report lists extreme weather events and natural disasters as the top two greatest risks to the global economy and human wellbeing, both in terms of severity of impact and likelihood of occurrence. It also ranks the failure to mitigate and adapt to climate change, which exacerbates both extreme weather and natural disasters as one of the most impactful risks.

Social-Economic System

ECOSYSTEM

Sensitivity

Exposure

Adaptive capacity

Potential impact

Nature-based Solutions

Flow of ecosystem services

+/-

Social-ecological vulnerability

+/-

Use and management of ecosystem services

SOCIOECONOMIC SYSTEM

Adaptive capacity

Potential impact

Exposure

Sensitivity

Fig.1. Integrating Natural Solutions to climate change impacts into the social-ecological vulnerability framework

Challenges to Governing NS

NS often involve multiple actions taking place over broad landscapes and seascapes, crossing jurisdictional boundaries. For example, effective management of storm-water drainage across watersheds using nature-based approaches requires joint decision-making across different local, regional or even national governments and among multiple ministries (agriculture, forestry, environment, finance, development, transport). Therefore, to be successful, governance of NS requires (indeed enables) active cooperation and coordinated action between stakeholders whose priorities, interest, or values may not align, or may even conflict.

Conclusion

NS are gaining traction in international policy and business discourse. They offer huge potential to address both causes and consequences of climate change whilst supporting biodiversity and thereby securing the flow of ecosystem services on which human wellbeing depends. Yet three barriers hinder the evidence-based integration of NS into international, national and local climate and development policy and practice.

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Organizer



Physiological status of HIV infected patients pre ART

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Abstract:

Human Immunodeficiency Virus (HIV) has emerged as one of the most devastating human pandemics with significant morbidity and mortality. A plethora of physiological factors including haematological status, immunological response, renal and liver enzymes, sex hormones, vitamin and mineral status play significant role in determining the HIV infection progression and effect of anti-retroviral therapy (ART). The present study aims to investigate the overall physiological status in HIV infected individuals prior to ART. The study was conducted as a quasi-experimental study where HIV infected males and females at Stage 1 and III of HIV were assessed for their CD4 count, IL-6 content, biochemical, haematological, immunological, hormonal and Vitamin D functions. Marked variations were noticed in majority of the study variables when compared with the standard defined values. Statistical significant results were obtained in case of total RBCs content and platelet distribution width (PDW) when compared within the disease stages along with increasing trend of few variables with disease progression. It is believed that baseline assessment of physiological parameters prior to treatment initiation will provide greater understanding of disease progression with better treatment outcomes.

Introduction:

HIV infection has emerged as one of the most devastating human pandemics with significant morbidity and mortality. However, with the advent of antiretroviral therapy (ART) the course of this pandemic is remarkably altered therefore enhancing the survival of millions of HIV positive people. It is estimated that more than 70% of the HIV infected people will be aged more than 50 years by 2030. Although antiretroviral therapy has transformed the HIV infection status from non-curable to treatable and manageable, complications associated with the disease course and appearance of associated co-morbid conditions still remains a concern for people living with HIV. A plethora of physiological factors such as liver function analysed through the enzymatic activity, thyroid function, HIV viral load, immunological status, male and female gonadal function, haematologic status, and cellular injury play significant role in determining the HIV infection progression and effect of ART. For instance, haematological abnormalities such as anaemia have been correlated with the progression of HIV infection as well as increased morbidity and mortality of HIV infected patients. Similarly, over-expression of IL-6 cytokine has been linked with HIV infection which further contributes to the B-cell activation. Low levels of testosterone and dehydroepiandrosterone (DHEA) were reported to be associated with disease progression in people with HIV infection. Hypo-vitaminosis D is linked with the exacerbated inflammation and immune response and low peripheral blood CD4+ T-cells in HIV patients resulting in rapid disease progression and short survival time for HIV-infected patients. On the contrary, increased Vitamin D content and Vitamin D Receptor (VDR) expression were linked with the natural resistance to HIV-1 infection. Considering the importance of multiple physiological variables in the disease progression as well as treatment outcomes, assessment of the status of these parameters before starting the ART may provide great benefits to the clinicians in designing best treatment strategies for improved output. The present study aims to assess the status of different physiological parameters at two different stages of HIV infection (Stage 1 and Stage 3) prior to ART among males and females HIV patients.

Methods:

The study was conducted as a quasi-experimental study with due approval from Institutional Ethical Committee. HIV positive patients at different disease stages and were naive to HAART were duly recruited and registered in the study. Inclusion criteria for participants were HIV seropositive, naive ART, adults with documented gender and date of birth, no previous history of enrolling in ART clinical studies, and voluntarily ready to give a signed informed consent. The exclusion criteria include pregnant women, nursing mothers, age less than 18 years and non-consenting HIV patients. Blood collection was done to perform CD4 count, IL-6, biochemical, haematological, immunological, hormonal and Vitamin D analysis using automated analyzers. Data was analysed using Graph prism pad software version 6 and mean value plus SEM was calculated for each variable. The statistical output was obtained using One Way ANOVA followed by Post-hoc analysis through Tukey's test. Correlation coefficient was determined using Pearson's correlation test. P value less than 0.05 was considered as significant.

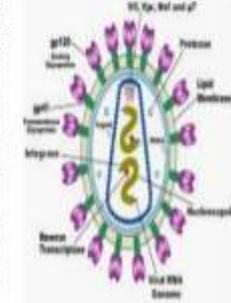
Results:

CD4 count and IL-6 levels in HIV patients

A total of 17 male and 14 females' samples were analyzed from Stage 1 whereas 16 male and 13 female samples were studied from Stage 3. In Stage 1 HIV patients, the mean age of males and females were 37.29 ± 12.31 and 30.37 ± 8.84 years whereas in stage 3 HIV it was 32.39 ± 11.48 and 30.68 ± 8.88 years respectively. Figure 1 demonstrated the CD4+ count at Stage 1 and 3. In both the stages an overall decrease in the CD4 count from normal range of 500 – 1500 per cubic mm was noticed however, no significant differences were obtained in comparison with each other. While in males a decreasing trend in CD4 count was noticed when compared between Stage 1 and 3, interestingly vice versa was noticed in case of females.

Table 1: Comparative Analysis of Red Blood Cell and White Blood Cell Indices among Stage 1 and 3 male and female patients prior to ART

Haematological Parameters	Stage 1		Stage 3	
	Male	Female	Male	Female
Hemoglobin (g/dL)	13.42 ± 2.33	10.64 ± 1.73	10.63 ± 1.78	11.75 ± 2.50
Total RBC count (million/cmm)	4.14 ± 0.27	4.71 ± 0.2	3.88 ± 0.64*	4.72 ± 0.72*
MCV (fL/red cell)	74.86 ± 8.48	74.36 ± 9.23	76.35 ± 7.38	76.25 ± 8.89
MCH (pg/red cell)	28.81 ± 2.83	27.26 ± 2.98	27.68 ± 2.85	27.88 ± 2.91
MCHC (g/dL)	35.31 ± 1.99	34.68 ± 1.75	34.68 ± 1.33	36.83 ± 1.24
RDW (%)	13.85 ± 1.10	12.85 ± 0.24	14.63 ± 1.63	13.27 ± 1.33
RDW-CV	16.24 ± 3.07	14.90 ± 1.11	16.84 ± 2.53	15.14 ± 3.03
TLC (per cmm)	2540.06 ± 2804.84	13157.94 ± 11899.08	33600 ± 2986.66	6718.46 ± 5812.30
Neutrophils (per %)	68.64 ± 9.17	68.36 ± 10.83	62.32 ± 6.30	65.65 ± 11.35
Lymphocytes (per %)	12.46 ± 7.69	33.14 ± 13.09	33.54 ± 8.67	33.62 ± 8.69
Platelet Count (Lacs per cmm)	3.02 ± 2.16	2.64 ± 0.67	3.24 ± 2.93	3.15 ± 1.72
Platelet Count (Lacs per cmm)	6.59 ± 12.00	3.12 ± 1.18	5.85 ± 1.13	8.56 ± 0.78
PDW (%)	13.46 ± 2.35	12.68 ± 0.64	12.77 ± 2.33	13.40 ± 0.74*
MPV (fL)	10.35 ± 1.23	10.81 ± 0.81	10.41 ± 0.39	16.36 ± 0.27
PCT (%)	10.27 ± 0.13	10.58 ± 0.88	12.42 ± 7.20	13.22 ± 8.68
PCT (%)	14.88 ±	24.30 ± 4.89	25.23 ± 4.20	25.57 ± 11.75



Conclusion:

Research outcomes of the present study demonstrated no significant deviations in albumin and creatinine content on one side whereas marked increase in urea and uric acid was noticed on the other side when compared with standard reference range. Further, while in males an increase in urea content was found with disease stage, similar trend was noticed in case of uric acid among females. In addition, marginal elevation in protein content was also noticed in all groups. All these outcomes are in accordance with recent published reports suggesting renal insufficiency. Hypertension has been extensively reported in HIV infection and indicates either renal insufficiency or body's adaptive mechanism to combat HIV-associated excessive free radicals generation. Similarly, elevated urea content suggest compromised filtration process of kidney and pre-renal uremia attributed either to high protein intake or hyper catabolic states including muscle wasting. The present study further noticed few independent associations between urea and other disease covariates at Stage 1. While in females a negative correlation was obtained between CD4 count and urea, in males urea was positively and negatively correlated with PCT and total RBCs respectively.

Table 2: Comparative Analysis of the biochemical tests data perform to study the renal function among Stage 1 and 3 male and female patients prior to ART

Biochemical Parameters	Stage 1		Stage 3	
	Male	Female	Male	Female
Protein (g/dL)	8.35 ± 1	8.51 ± 0.80	8.48 ± 1.13	8.62 ± 0.94
Albumin (g/dL)	3.40 ± 0.84	3.42 ± 0.80	3.48 ± 0.49	3.75 ± 0.52
Urea (mg/dL)	8.86 ± 1.71	1.98 ± 1.51	7.67 ± 2.05	9.36 ± 7.93
Urea (mg/dL)	32.40 ± 14.59	39 ± 5.76	40.77 ± 14.28	31.55 ± 6.32
Creatinine (mg/dL)	1.1 ± 0.26	0.96 ± 0.41	0.99 ± 0.37	0.75 ± 0.24
Bilirubin, Total (mg/dL)	0.64 ± 0.28	0.74 ± 0.30	0.97 ± 0.34	0.67 ± 0.30
Bilirubin, Direct (mg/dL)	0.49 ± 0.17	0.47 ± 0.17	0.51 ± 0.23	0.44 ± 0.21
Bilirubin, Indirect	0.39 ± 0.05	0.27 ± 0.13	0.38 ± 0.07	0.23 ± 0.11
SGOT (units/L serum)	47.20 ± 229.27	48.64 ± 23.33	62.93 ± 155.40	44.08 ± 38.38
SGPT (units/L serum)	48.42 ± 229.31	36.54 ± 14.97	38.93 ± 106.27	43.75 ± 22.41
Alkaline Phosphatase (IU/L)	41.41 ± 200.7	296.54 ± 103.8	584.54 ± 107.1	305.3 ± 151.85
Gamma-GT (IU/L)	3.29 ± 3.11	22.98 ±	281.22 ± 226.6	220.88 ± 100.2
Plasma Glucose (mg/dL)	98.85 ± 16.54	96.49 ± 17.12	88.48 ± 14.41	96.55 ± 11.28

Data represented as Mean ± SEM. Statistical analysis was performed using One Way ANOVA. No statistical differences was obtained.





Organizer



Effect of Lockdown on Yamuna River

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Introduction: With the starting of Lockdown commenced on 24 March 2020 due to pandemic disease of Corona Virus "COVID-19" all industries and other common human activities were stopped which results self cleaning of water of Yamuna river. From 24th March 2020 to 31st May 2020 lockdown is implanted in 4 phases. All phases have different level of strictness and rules which affects the water of Yamuna river. However lockdown in India adversely affect the economy, growth, GDP etc. But it makes positive impact on environment as ambient air become very clean, most of the surface water gets cleaned. We have noticed in news that visibility becomes such high that from Jalandhar of Punjab, one can see the snow covered peaks. Also it become gift to nature and ecosystem as we can see the wild animals in the street of big cities like Noida, Bangluru, dolphins in River Ganga at Haridwar, Many new birds seen at crowded places like cities, towns and villages. It was also noted that noise level of day and night of all places sharply decreases. I analyzed the water of Yamuna river at different intervals from 24th March 2020 to 31st May 2020 for parameters like Appearance, COD, BOD, Colour, odour etc.

Materials and Method: For Appearance, colour and odour organoleptic analysis is done. For BOD, 3 Days incubation is done using the Indian standard method. Similarly Indian standard method is used for COD analysis.

Sr. No.	Parameter	Method	Technique
1	Appearance	--	Organoleptic
2	Colour	IS 3025 (Part-4)	Organoleptic
3	Odour	IS 3025 (Part-5)	Organoleptic
4	Chemical Oxygen Demand (COD)	IS 3025 (Part-58)	Titrimetric
5	Biological Oxygen Demand (BOD)	IS 3025 (Part-44)	Titrimetric

Sample Details

Sampling Location: Naujheel village of Mathura district in Uttar Pradesh

Sampling Duration: March-May 2020

Sampling Method: Cluster Sampling

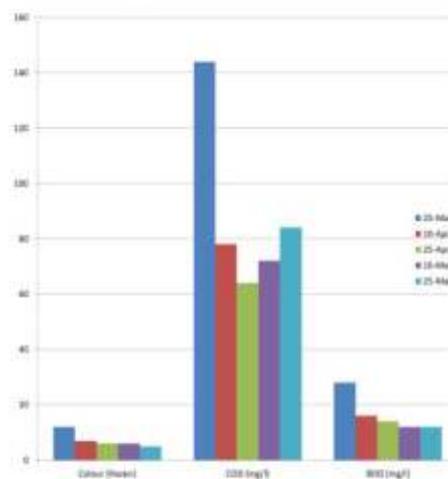
Sampling Reference: IS 3025 (Part-1)

Sampling interval: 15 Days

Sample No.	Date of Sampling	Lockdown No.	Description
1	26 th March	1 (25 th March to 14 th April)	No effect of lockdown on sample
2	10 th April	1 (25 th March to 14 th April)	Sample collected after 15 days of strict lockdown
3	25 th April	2 (15 th April to 3 rd May)	Sample collected after a month of strict Lockdown.
4	10 th May	3 (4 th May to 17 th May)	Sample collected after 45 days of with less strict Lockdown at end.
5	25 th May	4 (18 th May to 31 st May)	Sample collected after 2 months of with much less strict Lockdown at end.

Result and Discussion: Results obtained by analysis of different parameters are as Summarized in table.

Parameter / Date of Sampling	Appearance	Colour (Hazen)	Odour	COD (mg/l)	BOD (mg/l)
26 th March	Brownish Yellow in colour	12	Very Much Unpleasant	144	28
10 th April	Yellowish in colour	7	Unpleasant	78	16
25 th April	Very light yellow in colour	6	Agreeable	64	14
10 th May	Very light yellow in colour	6	Agreeable	72	12
25 th May	Very light yellow in colour	5	Agreeable	84	12



Comparative Chart Showing trend of Results

Conclusion: Above result shows that when there was much strictness in lockdown the river water becomes more clean. From these results we can conclude that lockdown has positive impact on river water. It can be seen that even 15 days lockdown is enough for revival of river water.





Micropropagation of *Aristolochia indica* L. an Endangered Plant

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INTRODUCTION

- Medicinal plants are the mines of useful drugs & are the rich source of therapeutic agents for the prevention of many diseases & ailments (Sharma *et al.* 2010).
- *Aristolochia* is an important genera of the family Aristolochiaceae, consist of about 400 species, distributed in tropical, sub tropical and temperate regions.
- *Aristolochia indica* also called Ishwarmool in Hindi and Indian birthwort in English and it is a herbaceous or shrubby perennial creeper plant with woody base and root stock (Kanjilal *et al.* 2009).
- The plant is well known for its medicinal value such as in leprosy, ulcer, asthma, tumor and widely used as antidote in poisonous bites of snake & poisonous insects.

WHY NEED MICROPROPAGATION

- Conserve plants rarely low seed germination.
- Conserve elite characters of PGs.
- Conserve endangered out extinct plant.
- Extract higher active ingredient.
- Achieve uniform quality medicinal plant.

OBJECTIVE

- Induction of shoot regeneration and develop a whole plantlet of *A. indica* using mature explant.

RESULTS

EFFECT OF AUXINS (BAP)

S.no.	Cytokinin(mg/l)	FSH(%)		MSN		MSL(cm)	
1.	BAP	Apical bud	Axillary bud	Apical bud	Axillary bud	Apical bud	Axillary bud
2.	0.1	60	80	1.0	2.6	2.30	4.5
3.	0.5	59.6	90	2.29	4.30	3.2	7.4
4.	1.0	60.3	80.3	3.230	2.3	3.50	5.4
5.	2.0	50	80	1.10	1.20	2.80	3.6

METHODOLOGY

- Collection of Explants.
- Surface sterilization of explants.
- Media preparation (MS medium).
- Sterilization of culture medium.
- Prepare and wiping he Laminar for inoculation.
- inoculated cultures were maintained in culture room.

Hardening and Acclimatization in Liquid medium & Pot

CONCLUSION

Present investigation in turn provided the knowledge for the micropropagation of the plant *A. indica*

- AxB proved more suitable than ApB for direct shoot multiplication.
- BAP (1mg⁻¹) led to maximum shoot primordia.
- Rooted plantlets hardened and acclimatized on soil: sand: farmyard manure: vermiculite (1:1:1:1), with 40-60% survival.

ACKNOWLEDGEMENTS

We are thankful to Department of Post Graduate Studies and Research in Biological Science for providing lab. Facilities





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Biodiversity - Need for Cornucopia of Ecosystem

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Abstract: Biodiversity comprises terrestrial, marine and other aquatic ecosystems that include diversity within and between species. Around 7% of world's surface tropical forests bear 83-70% identified species. Biodiversity serves as a key indicator of an ecosystem. Every species irrespective of their size plays a significant role in maintaining our ecosystem. Any damage to this rich biodiversity results in irreparable loss to our society in all forms. The loss threatens food security, climate change that will have a huge impact on our ecosystem where sustainability of our future generations will be at high risk. This paper deals with significance of biodiversity, threats to biodiversity and measures to be taken for establishment of ecosystem cornucopia viz., attracting good insects by planting pollen and nectar plants, maintaining wet lands by conserving water and constructing fences to protect riparian areas etc.

Keywords: Biodiversity, Ecosystem, Cornucopia, Hotspots, Sustainability.

Introduction:

Biodiversity refers to wide variety of living forms viz., plants, animals, tiny microbes, their genes, ecosystem they form. The present shape of biodiversity is a result of billions of years of evolution shaped by natural processes and more influenced by human activities. A report of UNEP (United Nations Environment Program) states that only 2.1 millions species have been reported out of 9 to 52 million species and most of the identified species are insects. Distribution of biodiversity is said to be uneven and is largely depends on geography, soils, temperature, precipitation, altitude, presence of other species etc. Biodiversity is found to be richest in tropics. Terrestrial biodiversity is recorded highest near equator where as marine biodiversity tends to be highest along coasts. Hotspots are areas where significant levels of biodiversity are threatened by human habitation and hence biodiversity at these regions will be in clusters.



Significance of the Study:

Biodiversity – Major levels:

Biodiversity is considered at three major levels viz., Genetic level, where it deals with variation at genetic level of all plants, animals and microorganisms, occurring within the population of species; Species level, dealing with variety of species and is measured in terms of species richness (total count of species in a defined area) and species abundance (relative numbers among species); Ecosystem diversity that deals with variations in the ecosystems found in a region.

Biodiversity - significance:

Human life is inseparable from biodiversity. All our material well being is contributed by the existing biodiversity. Agricultural, food, medicine, industrial raw material etc are provided by the biodiversity. Thirteen major world crops existing today are obtained from 60 wild crop species (IUCN,2012). Worldwide around 200 million depends on wild species for at least part of their food. Since the introduction of agriculture as an occupation, around 7000 plant species have been used for human consumption. Production of 87 out of 113 leading food crops directly or indirectly depends on pollination carried out by insects, bats and birds.

Amphibians are considered as indicators of environment health and are called hopping pharmacies due to their usage for searching new medicines. Microorganisms are proved to be rich source of many antibiotics that are available today. Taxol derived from the bark of Pacific yew has proved to kill cancer cells. Ace inhibitors are proved to have significant therapeutic use for controlling high blood pressure is obtained from poison of Pit viper.

Biodiversity plays a major role in estenuating climate change by contributing in sequestration of carbon from many biomes. The balance between carbon dioxide and oxygen is maintained by biodiversity. Forest wetlands and mangroves play a significant role in reducing impact of extreme severe conditions like drought, floods and tsunamis. The role of biodiversity in breakdown of pollutants through decomposition and maintaining bio-geo chemical cycles is phreases.

Loss of Biodiversity:

Species extinction is a natural process in evolution but human activity has increased these extinction rates 100 times more than natural process. All the ecosystems have been virtually distorted by human activities. Conversion of forest lands to agricultural land is a major activity that has caused significant damage to the biodiversity globally. Habitat alteration and destruction, over exploitation of biological resources, climate change, ever increasing population, pollution, and invasive species are major threats to biodiversity.

Need for establishment of Ecosystem Cornucopia:

Biodiversity conservation is need of the hour. Biodiversity is considered as life supporting system of our earth and its conservation can be done outside the natural habitats called Ex- situ conservation through establishing gene banks, conserving them in zoo, museums etc. Biodiversity can be conserved even in their natural habitats called In-situ conservation where ecosystems and natural habitats including maintenance and recovery of viable population of species can be done at natural habitats. Conservation can be done by establishing National parks, wild life sanctuaries, biosphere reserves, restoring viable population of large mammals such as tigers, lions, rhinoceros, elephants and crocodiles etc.

Conclusion:

Life in every form on earth is unique and deserves respect equal right to exist regardless of its worth to humans. The well being and sustainability of future generations is a social responsibility of the present generation and its existence warrants conservation of organism. So establishment of Ecosystem cornucopia boosts and guarantees the sustainability of future generations.

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Note: Some of the Figures are used from Wikipedia Biodiversity.

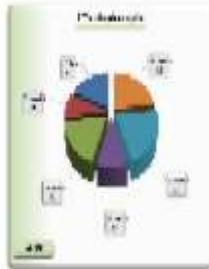
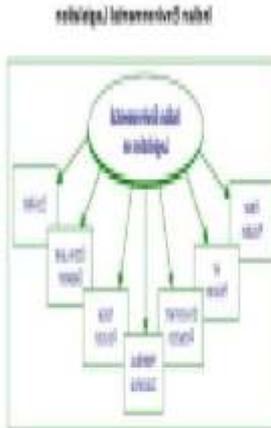




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ENVIRONMENTAL LAWS

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ABSTRACT

Word "environment" is most commonly used describing "natural" environment and means the sum of all living and non-living that surround and organism, or group of organism, or group of organism. Environmental law is the law concerned with environmental problems. It is a vast areas of law that operates from the local to the global, involving a range of different legal and regulatory techniques.

INTRODUCTION

Environmental law is a collective term encompassing aspects of the law that provide protection to the environment. A related but distinct set of regulatory regimes, now strongly influenced by environmental legal principles, focus on the management of specific natural resources, such as forests, minerals, or fisheries. Other areas, such as environmental impact assessment, may not fit neatly into either category, but are nonetheless important components of environmental law.

Environmental Protection Law and Policy in India

The need for protection and conservation of environment and sustainable use of natural resources is reflected in the constitutional framework of India and also in the international commitments of India. The Constitution under Part IVA (Art 51A-Fundamental Duties) casts a duty on every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures. Further, the Constitution of India under Part IV (Art 48A-Directive Principles of State Policies) stipulates that the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.

Environmental Protection Law and Policy in India

Is a cause of serious pollution; for example, the use of uranium for nuclear power generation produces extremely dangerous waste that would take thousands of years to neutralize. But there is no reasonable doubt that fossil fuels are among the most serious sources of environmental pollution. Power-generating plants and transport are probably the biggest sources of fossil fuel pollution

Trading activities may be another source of environmental pollution. For example, it's been recently noted that packaging of products sold in supermarkets and other retail outlets is far too excessive and generates large quantities of solid waste that ends up either in landfills or municipal incinerators leading to soil contamination and air pollution. Residential sector is another significant source of pollution generating solid municipal waste that may end up in landfills or incinerators leading to soil contamination and air pollution.

LAWS REALTED TO ENVIRONMENT

The six laws related to environmental protection and wildlife are: The Environment (Protection) Act, 1986; The Forest (Conservation) Act, 1980; The Wildlife Protection Act, 1972; Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981 and The Indian Forest Act, 1927.





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TEXTILE DYES: A THREAT TO BIODIVERSITY

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Introduction:

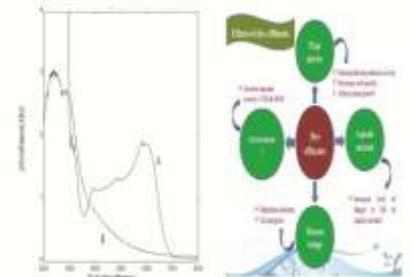
Earth is the only known planet which supports the life of mankind by providing multiple resources. We humans are enjoying the resources and in the name of the technology and are polluting the planet by introducing many pollutants into such resources like soil, water and air, which leads to contamination and pollution of the resources. Textile industries are using dyes to stain fabrics. Dyes are of two types, they are natural dyes and a synthetic dye, Natural dyes does not contaminate water even after their release in the environment but synthetic dyes which are normally called man made dyes causes water pollution, people on drinking such contaminated water leads to severe illness and even the death of individuals. Irrational usage and release of chemicals like textile dyes without treatment, into the environment is resulting in destruction of biodiversity. Bioremediation is defined as the eco-friendly process where organic wastes are biologically degraded under controlled conditions to safe state, or to levels below concentration limits established by regulatory authorities. It uses naturally occurring bacteria and fungi or plants to degrade or detoxify substances hazardous to human health and/or the environment. Like the other technologies bioremediations also have its own limitations like they cannot degrade chlorinated contents and high aromatic contents are resisted to the microbial attack. Here in this poster we present work on the impact of Black WNN Dye on environment and its bioremediation using *Staphylococcus epidermidis* isolated from the dye industries located in Mahabubnagar district.

Materials and Methods

- Screening isolation and identification of Black WNN Dye degrading microorganisms from the soil.
- Optimization of various process parameters for bioremediation of dye.
- Biodegradation analysis using UV-Vis Spectrophotometer.

Morphological/ Biochemical test	Result	Antibiotic	Result
Configuration	Circular	Dalactose	+
Margin	Entire	Glucose	+
Elevation	Slightly raised	Mannitol	-
Surface	Smooth	Fuifinase	-
Opacity	Opaque	Xylose	-
Gram staining	Gram -ve	Sucrose	+
Shape	Cocci	Fructose	+
Motility	Motile	Growth at 12°C	-
Sporulating	-	Growth at 25°C	+
Starch hydrolysis	+	Growth at 37°C	+
Casain hydrolysis	+	Growth at 42°C	+
Chitinase	+	Growth at pH 5.2	+
Gelatin hydrolysis	+	Growth at pH 8.0	+
H ₂ S production	-	Growth at pH 9.0	+
Indole	-	Growth at pH 10.5	+
MR	+	Growth on NaCl 2%	+
VP	+	Growth on NaCl 5%	+
Catalase	+		
Oxidase	+		
Nitrate reduction	+		
Urea hydrolysis	+		

Decolorization of dye under different process parameters after 72 H of incubation



Biodegradation analysis- UV-visible spectra of Black WNN dye by

S. epidermidis under static condition
A: Dye control; B: Decolorized sample

Conclusion: *S. epidermidis*, isolated from dye contaminated site of textile industry achieved a significant decolorization of Black WNN dye. We can conclude that *S. epidermidis* can be a potent organism and would be used successfully in the commercial treatment of Black WNN dye textile wastewater.

Future study: More studies in order to study the process in continuous column system are underway in the laboratory.

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Decolorization of dyes in static air

Inoculum volume				
pH				
0	7	8	9	11
10%	63.1	68.3	88%	61.4
%	%	%	%	%
Temperature (°C)				
25	30	35	40	45
10%	57%	71.3	56.2	61.3
%	%	%	%	%
Dye concentration				
50	100	150	200	250
67%	89%	71.7	71.6	60%
%	%	%	%	%
Incubation time (days)				
5	7	10	15	20
76.4%	81.3	90%	98%	91.4
%	%	%	%	%





LOSS OF BIODIVERSITY DUE TO STEM BORER INFECTION

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BACKGROUND:

Modern world require the balance of nature through the biodiversity protection. In natural ecosystems many plants are infected by the fungi which may cause stem borer and root borer infections. These infections if not cure at initial stage can cause heavy damage to natural ecosystems and collapse the biodiversity.

PROBLEM:

We are studying stem borer infection of world's second biggest banyan tree which has tourism importance and is considered as an archeological monument in Mahabubnagar District, Telangana. This 700 year old giant tree is named as PILLALAMARRI (*Ficus benghalensis* -family -Moraceae) due to its aerial roots spreading and anchored appearing as stems. It has occupied nearly 4 acres of land. The present state of this huge banyan tree is, the areal roots are highly infected with stem borer infection and has spread to the shoot. Most of the shoot is dried up and piles of hollow and dead branches are lying on the ground making the site pathetic. This made the government to close the site for visitors.

MOTIVATION:

Being conscious about healthy environment and biodiversity and as a responsible microbiology scholar, I have taken this task of studying the infection from Microbiology point of view and suggest any remedy for saving this natural treasure.

MATERIALS & METHODS:

- *Collection of pathogenic material from infected areas of plant areal roots and shoots.
- *Culturing, isolation and identification of the termite pathogen from infected material
- *Screening for bacterial strains for controlling the termite growth.







Present Status of Infected tree and research work:

District administration has taken initiation to control the infection through chemical saline dripping . Chemicals are non eco-friendly and unsafe to visitors, hence eco-friendly microbiology work is preferred and work has been taken up where collection of samples and identification of causative agent is under process.

Expected outcome: A novel eco-friendly and biological controlling agent which can cure the stem borer infection and brings back the proud legacy of Pillalamarri is expected.






IMPACT OF ARTIFICIAL RIPENING AGENTS ON BIODIVERSITY

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BACKGROUND:The last step of fruits harvest is ripening. Ripening is usually done by ethylene hormone but it is being done with the help of artificial ripening agents.

PROBLEM : These days calcium carbide is used to ripen fruits which is hazardous to human health and it releases many toxic residues in to the environment which affect biodiversity and it may also cause cancer indeed . Hence as a healthy alternative and a precaution Pectinase enzyme is used for ripening of fruits , which is produced by pectinase producing fungus.

OBJECTIVE: In this context, the objective of present study was to produce pectinolytic enzyme by a newly isolated species by sub-merged fermentation and process evaluation. Identification of genus was based on morphological and bio-chemical characteristics.

MOTIVATION: In being conscious about healthy methods of fruit ripening and to prevent health hazards pectinase producing fungi are isolated for the production of enzyme in large amounts for natural method of ripening.

MATERIALS: Sabourad’s pectin agar (SPA) is prepared by replacing dextrose with 1% pectin as a source of carbohydrate and fruit peel, sugarcane bagasse , rice husk , broken wheat are used in Solid State Fermentation (SSF).

METHOD:

*Soil sample collected from fruit yard was diluted and spreaded on SPA and incubated at room temperature for fungal growth.

*Cultures expressing pectinase activity exhibit a clear zone around the margins of the colony.

*Solid State Fermentation is carried out for pectinase production by using peel of fruits, sugarcane bagasse, rice husk, broken wheat with 80% moisture for 5 days.

WORKING: Fungus produces enzymes to break down middle lamella in plant tissue to which it is exposed so that it can extract nutrients from plant tissues and insert fungal hyphae and at last lead to ripening of fruits i.e., softening of the walls.

RESULT: By this method *Penicillium* species of fungus was found to produce pectinase enzyme by breaking the bonds between the poly-saccharide.

DISCUSSION: When compared to other methods its easier to isolate fungus that produce pectinase enzyme.. Further these fungi are used in production of enzyme in large quantity.

CONCLUSION: Isolated fungus can be used in production of pectinase which is used in clarification of fruit juices and fruit ripening. By solid state fermentation enzyme yield of 2500 IU/gm dry substrate was obtained.

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