



ENVOICE

A Newsletter from the Department of Environmental Science, Vivekananda College, Thakurpukur, Kolkata

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Earth Day Issue

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FROM THE DESK OF PRINCIPAL

Publication of ENVOICE to mark the observation of Earth Day is a regular practice of the Department of Environmental Science of our college. This beneficent tradition was halted for some time due to worldwide pandemic situation, but it comes to its own path in this year.

I, personally congratulate all members associated with the revival of ENVOICE. This year the World is concentrating on solutions to Plastic Pollution. The creation of plastic and its use have, no doubt, immense role in the present day human society. But, at the same time, it has become a menace from the deep into seas to the top of the mountains due to ugly use by ourselves. The whole biological world is a victim of plastic pollution. Now, the time has come to control and judicious use of plastic and its proper disposal. The students of Environmental Science must shoulder the responsibility to educate the people around them to create a pollution free, sustainable and habitable earth for human being. I am confident that their leadership will obviously lead all of us to a brighter enjoyable earth in the near future.

At the end, goodbye and good wishes to all and hope for more and more advancement of the Department of Environmental Science.

Dr. Tapan Kumar Poddar,
Principal
Vivekananda College, Thakurpukur

Invest on Nature: But What and Where?

Rajarshi Mitra

Head, Dept. of Environmental Science, Vivekananda College

'Invest on Earth' the Earth day theme or 'Solution to Plastic Pollution' the World Environment Day theme of 2023, both sound nice, but 'who is going to invest and how or where lies the solution and to whom', is the focal question. The answers actually round around us.

We, the citizens of Earth, have detached ourselves from rest of the nature and had always tried to manage and manipulate the Nature, as and when needed. In turn, we had been manipulated by both civilization and Nature as well. We know, Plastics are harmful, we should limit its' usage, but still, we have plenty of excuses why we should ask for a polythene carry bag for every purchase. We are still having lots of inconvenience issues in carrying a cloth bag or reusable plastic bag to market. Will we ever learn?

Yes, we have learnt to invest, in electric vehicle, in manufacturing of biodegradable plastics and many more consumer goods tagged as ecofriendly, sometimes in expense of un-noticed consequences like loss of marine ecosystem, emission and water footprint behind biodegradable material manufactures and so on. But we need to actually stop somewhere, we need to cut our consumption or manipulate the pattern.

It is really a time to invest. Invest in minding the gaps. Being a law-abiding citizen and paying for the pollution or luxury consumption or even an investment for restoration of Nature, is not enough to resist the crimes against environment. Rather making mindful citizen, who can invest in 'ecological wisdom' is the only way to earn premium of natural capital to save our earth.

Environmental sociology induces

Mindful Citizens

*Debojyoti Hazra
6th Semester, Environmental Science (Hons.)*

Environmental sociology is the study of the interaction between human behavior and the natural and physical environment, that assumes ‘humans are part of the environment, and the environment and society can only be fully understood in relation to each other. Environmental sociology teaches us the interaction and balance between human behavior and environment. In this way of teaching, we continuously facing problems and find solutions in a way which is ideal for that community or that population. As everyone’s needs are different and based on that need we have to develop a unique solution for the community / population in accordance to their socio-economic status, education level, consumption patterns of resources etc. While previously it was believed that our lifestyle is responsible for environmental changes, now a days the feedback from nature like consequences of the climate change etc. are affecting our lifestyle too. Being environmentally conscious means being mindful about the effects of our actions on the environment as well as minimizing their negative impact consequently, the environmental footprints will be reduced.

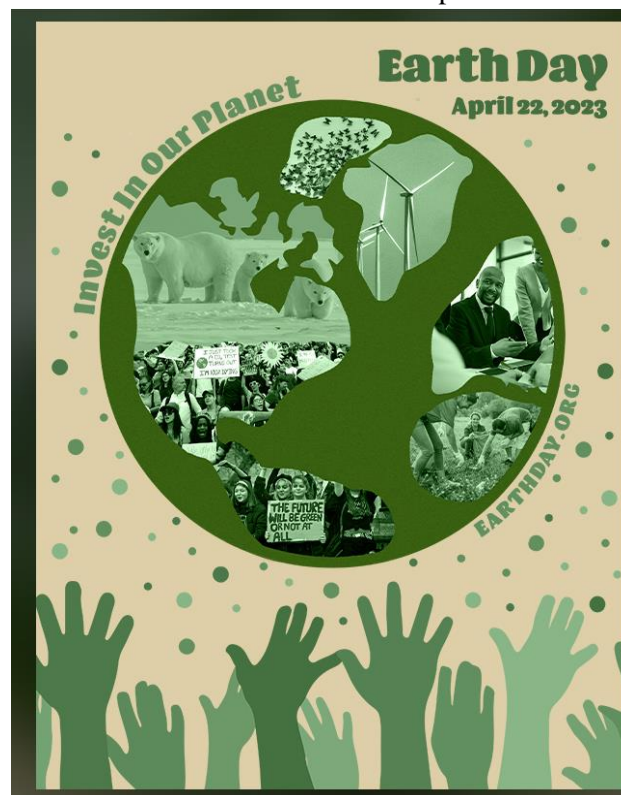
The concept of **Lifestyle for the Environment (LiFE)** was introduced by the Indian Prime Minister at 26th United Nations Climate Change Conference (COP26) in Glasgow in 2021. LiFE is an international mass movement towards “**mindful and deliberate utilization, instead of mindless and destructive consumption to protect and preserve the environment**”, that acts as a mind map for our future towards mindfulness. LiFE aims for live a life that is in tune with Earth and does not harm it. Those who practice such a lifestyle are recognized as **Pro Planet People (P3)**. A wide acceptance of Environmental Sociology can knit the matrix of unity in diversity, which is most important for a country like India. Lifestyle practices like circular lifestyle or minimalism can go better with the concept.

A **circular lifestyle** is a way of living that aims to reduce waste and pollution by keeping resources in use for as long as possible. It involves reducing consumption, reusing products, and recycling materials. The goal is to create a closed-loop system

where waste is minimized, and resources are used efficiently. A circular lifestyle is important for the environment because it reduces the amount of waste that ends up in landfills and oceans, conserves natural resources, and reduces greenhouse gas emissions. Circular lifestyle further leads to circular economy where recyclability is a major character of the economic products. In fact, an effective circular economy may even lead to around INR 14 lakh crore of additional cost savings by 2030.

Minimalism is a lifestyle that involves living with less and simplifying one’s life. It benefits the Nature by reducing consumption and waste. Minimalism also encourages people to make eco-friendly decisions, a philosophy that combats mindless consumerism by simple living or living with less. The philosophical concept of minimalism derives from the efficient interaction between human consumption behavior and environment.

Mindful consumption can be traced back to the principles of Buddhism. In Indian society mindful consumption is very ancient concept where peoples use to consume less, reuse their left-out food to fight hunger issues, live on village economy and self-reliance etc. Now, we just need to modify these ancient ideas / situations based on our today’s needs and walk towards mindful citizenship.



SPECIAL ARTICLE

Nanowork and Cleantech : A sustainable Approach in Environmental Remediation*Dr. Chandra Mukherjee**Head, Basic Science, The Neotia University, Kolkata*

Today, environmental pollution is a great concern worldwide, in both developing and developed countries. Rapid unplanned urbanization, industrialization, overpopulation growth and intensive agricultural practices are the main cause for the contamination of all the components of environmental notably. Over the years, unintentional human-made creations and activities devastated our surroundings and contributed to climate change. Major pollutants include heavy metals, metalloids, dyes, natural organic matters, chlorinated organic compounds, organophosphorus compounds, volatile organic compounds and halogenated herbicides may cause long-term damage to the environment, if not controlled at the right time. Environmental protection is one of the critical challenges faced by the human race today.

But now it is time to repair the environment and our relationship with it. Therefore, promising sustainable methods for pollutant remediation are of urgent need. In the present era, recent improvements in nanoscience and nanotechnology have led to the development of novel nanomaterials which are eco-friendly and safe for human use. Nanotechnology is considered as the next industrial revolution (IR) due to its specific and potential applications in various fields and play a vital role in securing the future sustainability of our planet.

What is nanoscience and nanotechnology?

Nanoscience is the study of phenomena and manipulation of materials at atomic, molecular and macromolecular scales, where properties differ significantly from those at a larger scale.

Nanotechnologies are the design, characterisation, production and application of structures, devices and systems by controlling shape and size at nanometre scale. When you think a nanometre is one-billionth of a meter, that's incredibly impressive! 1 nanometre is about three atoms long. If you took a human hair, for instance, it would measure approximately 100,000 nanometres wide.

How does nanotechnology address problems in the environment?

The application of nanotechnology in pollution control and environmental remediation has gained popularity over the last decade and provides a sustainable solution to the global challenges. Nanomaterials have a high adsorption capacity for pollutants because of their large specific surface area (SSA), a large number of active surface sites and a good affinity to other species. It is noted that nanomaterials such as metal oxides, carbonaceous nanomaterials, polymeric materials, natural materials and agriculturally derived low-cost adsorbents are commonly used in environmental remediation as adsorbents, catalysts, photocatalysts, membrane (filtration), disinfectants and sensors. Carbonaceous materials have been commonly used in the removal of organic and inorganic contaminants from water. Nanoscale zero-valent iron is used for soil remediation. Agriculture uses nano-particles to modify the genome of plants. Nanotechnology and IoT are effectively connected as it can enhance the performance and capabilities of IoT devices by enabling the creation of smaller, more efficient and more versatile sensors, antennas and processors. Smart dust networks are a vision of the networked future where intelligent network of trillions of miniscale sensors continuously feel, taste, smell, see and hear what is going on in their surrounding environment, one step to the development of smart cities. Nanoferrites are the promising VOC sensors at room temperature. In medicine, nano-sized particles are used to deliver drugs to specific parts of the human body for treatment.

Many environmental areas have seen advancements in recent years due to nanotechnology;

Water Cleanliness; Nano-sized materials like zinc oxide, titanium dioxide and tungsten oxide can bind to harmful pollutants, making them inert. Molybdenum disulfide can be used to create membranes for an energy efficient desalination technique. Titanate nanotubes and nanofibers are used for the removal of radioactive cesium and iodine ions in water.

Save the Seas: Nano-fabrics capable of selectively absorbing oil with an aim to solve world's heavily polluted waterways.

Sensing and Detection: Nanoparticles are used to create precise sensors capable of detecting tiny, harmful pollutants in the air, like VOCs, heavy metal ions and radioactive elements.

Cleansing the Air: The addition of nanoparticles to fuel can improve fuel efficiency, reducing the rate of greenhouse gas production. Nanomaterials are being developed to selectively capture carbon dioxide.

Advance renewable energy: Nanotechnology can also be used to create more efficient and effective methods for solar energy capture and storage as well as for producing biofuels from renewable resources.

Regulation of Nanotechnology

Due to toxic nanomaterial findings, regulatory research are carried out to ensure nanotechnology safety and efficiency. Green synthesis of nanomaterials needs to be adopted because not all nanomaterials are produced in an eco-friendly way. The development of biodegradable nanomaterials focusing on new functional materials, processing technology and cost reduction needs to be considered for commercial application. Proactive nano-waste management strategies need to be adopted and nano-waste should be recycled. Sustainable nanotechnology and cleantech for environmental remediation provides a single-source solution to researchers working in environmental, wastewater management, biological and composite nanomaterials applications.

What is clean technology or cleantech?

Clean technology, in short cleantech, is any process, product, or service that reduces negative environmental impacts through significant energy efficiency improvements, the sustainable use of resources, or environmental protection activities. The idea of cleantech first emerged among a group of emerging technologies and industries, based on principles of biology, resource efficiency and second-generation production concepts in basic industries. Nanomaterials synthesized using green techniques play an important role in the application of nanotechnology in different areas.

The United Nations has set goals for the 2030 Agenda for Sustainable Development, which is called "Sustainable Development Goals" composed of 17 goals to build a sustainable future. Many parts of the 17 goals are related to the usage of clean technology since it is eventually an essential part of designing a sustainable future in various areas such as land, cities, industries, climate, purification and new paradigms in energy conservation.

However, more extensive research and development into the promising application of nanotechnology are highly warranted

Do the plants can scream really....!!!

Sanjib Halder

4th Semester, Environmental Science (Hons.)

In the times of intense stress, sometimes people express their anger by screaming to get relief from the stress---but the amazing fact is that plants can do the same to get relief from the stress. A new study suggests that the plants who are stressed by drought or physical damage may emit ultrasonic squeals. Unlike human screams, however plants, scream is too high frequency for us to hear (according to the research, posted on the bioRxiv database). But when researchers from Tel Aviv University in Israel placed microphones near stressed tomato and tobacco plants, the instruments picked up the crops' ultrasonic squeals from about 4 inches away. A biologist named Lilach Hadany from Tel Aviv University said that 'CAVITATION' is the most likely explanation, at least for most of the sounds. In the process cavitation, air bubbles form and pop in the plants, xylem, the tissue that carries water from the roots to leaves. Only the vascular plants can experience this process.

Animals and plants might listen and react to the silent screams of plants; for example moths may listen the sound emitted by stressed plants to assess their condition before laying eggs on the leaves of that plants. The Tel Aviv researchers wanted to know if any plants' sounds could travel through the air. So, the team set up microphones near stressed-out tomato and tobacco plants placed in either a soundproof box or an open greenhouse space. The researchers subjected one set of crops to drought conditions and another to physical damage (a snapped stem). A third untouched group served as a point of comparison. The recordings revealed that the different plant species made distinct sounds at varying rates, depending on their stressor. Drought-stressed tomato plants emitted about 35 ultrasonic squeals per hour, on average, while those with cut stems made about 25. Drought-stressed tobacco plants let out about 11 screams per hour, and cut crops made about 15 sounds in the same time. The researchers said that human can hear the sound with the right tools in hand. The idea that "sounds that drought-stressed plants make could be used in precision agriculture seems feasible if it is not too costly to set up the recording in a field situation," Anne Visscher, a fellow in the Department of Comparative Plant and Fungal Biology at the Royal Botanic Gardens in the U.K. So, that is how plants scream quietly.

Blue Carbon Ecosystem

Ratul Ghosh

6th Semester, Environmental Science (Hons.)

The role of natural ecosystems in capturing CO₂ is an increasingly important component in developing strategies to mitigate climate change. Blue carbon ecosystems are critical coastal habitats that help to mitigate climate change by sequestering and storing vast amounts of carbon in their biomass and pedologic pool. These ecosystems are typically found in shallow coastal waters and include salt marshes, seagrass beds, and mangrove forests. While they cover less than 1% of the ocean floor, they are estimated to store up to 10 times more carbon per unit area than terrestrial forests.

Mangrove forests are found in tropical and subtropical regions and are characterized by their salt-tolerant trees and shrubs that grow in the intertidal zone. Mangroves sequester carbon by absorbing carbon dioxide from the atmosphere through photosynthesis and storing it in their biomass and sediment. According to recent estimates, mangroves can store up to four times more carbon per hectare than tropical forests on land. Additionally, they provide critical habitat for a variety of marine species, including fish, crabs, and shrimp. However, mangroves are facing significant threats, including deforestation for development, aquaculture, and agriculture. It is estimated that mangrove deforestation releases approximately 24 million tons of carbon dioxide into the atmosphere annually.

Salt marshes are coastal wetlands that are inundated with saltwater and are characterized by low-lying grasses and shrubs. These ecosystems play a critical role in carbon sequestration by capturing carbon dioxide from the atmosphere and storing it in the sediment below the marsh. This carbon is then locked away for hundreds or even thousands of years, making salt marshes an important tool in mitigating climate change. According to recent estimates, salt marshes can store up to 500 metric tons of carbon per hectare per year. However, salt marshes are facing significant threats, including sea-level rise, coastal development, and climate change.

Seagrass beds are underwater meadows of grasses

that are found in shallow coastal waters around the world. Seagrasses also have a high capacity for carbon sequestration, as they can store carbon in their leaves, roots, and sediment. According to recent estimates, seagrasses can store up to 83,000 metric tons of carbon per sq km, which is equivalent to the carbon storage capacity of a mature tropical forest. However, seagrasses are facing significant threats, including pollution, coastal development, and climate change. It is estimated that seagrass meadows have declined by approximately 29% globally over the past century.

Blue carbon ecosystems are under threat from a variety of human activities, including coastal development, pollution, and climate change. When these ecosystems are destroyed, the carbon that they have stored is released into the atmosphere, contributing to global warming. To protect these important habitats, it is essential that we take action to reduce our greenhouse gas emissions and invest in the conservation and restoration of blue carbon ecosystems, furthermore blue carbon ecosystems can provide numerous co-benefits, such as biodiversity conservation and coastal protection, we can help to preserve these important habitats for future generations.



How GREEN is it to drive an electric car, in expense of marine ecosystems those are destroyed during digging and mining of Rare Earth Elements from the Ocean floor? It's a time to rethink.

- Nishitha Das, 6th Semester, Environmental Science(Hons.)

Light Pollution: The Negative Impact of Artificial Lights on Bird Populations

Sristy Mukherjee

6th Semester, Environmental Science (Hons.)

Most organisms on Earth regulate their daily activities based on the information provided by the Sun, and all organisms have evolved to ensure they are active at the right time to find food and avoid predation. Circadian rhythms – an endogenous mechanism, help organisms to track temporal changes in the light environment and anticipate these changes when needed. Light is the most potent synchronizer of circadian and circannual rhythms in birds, those possess a variety of photoreceptors involved in circadian timing, such as the eyes, the hypothalamus, and the pineal gland. The pineal gland acts as a key site of light signal transduction, transforming photic information into a diffusible signal via the production and secretion of melatonin – the master circadian hormone, directly into the blood and cerebrospinal fluid.

Following the discovery of light bulbs in 19th century, night suddenly became day. With electric light we can travel, work, go out or party whatever the time of day. In fact, in many places electric light has banished true darkness to such an extent that artificial light has become a form of pollution. While artificial lights have undoubtedly brought many benefits to human society, such as increased safety and convenience, they have also had unintended consequences for the natural world.

Scientists consider excessive or misdirected artificial lights having negative impacts on the environment, wildlife, and human health as light pollution. Several studies have discussed the effects of light pollution on birds' daily rhythms, specifically the modification of their time of singing or activities. Several species of birds, such as the European robin, American robin, Common blackbird, and Great tit, have been found to be strongly affected by artificial light, with some birds even singing at night. While some studies have shown an earlier onset of dawn song, few have also reported a later offset of activity in the evening and even singing behavior in the middle of the night. Laboratory studies have also demonstrated that light at night is a major source of modification of daily activity patterns, independent of any other environmental factor. However, most of these studies are limited by the presence of other environmental factors that covary with light

pollution in the city, such as noise, anthropogenic food supply, and temperature.

Light Pollution also affects annual cycles, like reproductive activities in bird species. Research on the European blackbird, showed that exposure to light pollution advanced the development of gonads, testosterone levels, and molting in the first reproductive year by three weeks. In the second year, birds exposed to artificial light at night failed to develop their gonads, and testosterone levels were at their baseline, and molting was interrupted. Two studies have shown that light pollution causes a two and five days advance in lay dates in blue tits and great tits, respectively. However, this timing discrepancies have more significant impacts on reproductive physiology than on laying dates. The exact physiological system that light pollution affects in order to accelerate reproductive growth remains unknown as yet.

Apart from the above mentioned effects on daily and annual cycles, Artificial lights can interfere with the natural circadian rhythms of birds, which are regulated by light and darkness. Exposure to artificial light at night can confuse birds, disrupt their sleep patterns, and affect their hormonal cycles. This can lead to changes in behavior, such as altered feeding and mating habits, as well as impaired immune function.

Many bird species rely on celestial cues, such as the position of the stars, to navigate during their migratory journeys. Artificial lights can interfere with these cues, causing birds to become disoriented and confused. This can result in birds becoming trapped in urban areas or colliding with buildings and other structures.

The effects of artificial lights on birds are significant and multifaceted. From disrupted circadian rhythms to disorienting migratory patterns, artificial lights have a range of negative impacts on bird behavior, physiology, and ecology. It is important for policymakers and urban planners to recognize the importance of mitigating the effects of light pollution and use efficient, properly directed lighting that is capable of reducing the amount of unnecessary illumination. By working together to minimize the impact of artificial lights on the natural world, we can create a more sustainable and harmonious relationship between humans and the environment.

The Sorry state of Clean Ganga

Priti Ghosh

2nd Semester, Environmental Science (Hons.)

Since 2014, the Centre had taken up 409 projects with a budget outlay of Rs.32,912.400 crore to clean up the river. Still at least 71% of the river's monitoring stations reported alarming levels of faecal coliform in January 2023.

Faecal coliforms are a group of bacteria found in the gut and faeces of warm blooded animals. These indicate the discharge of untreated sewage into the river which is contaminated with the faecal materials of humans or other animals.

The three alarming states are Uttar Pradesh, Bihar, West Bengal. Bihar and West Bengal had unhealthy levels of faecal coliform at all 37 monitoring stations. According to the data accessed by Down to Earth (DTE) under the Right to Information (RTI) act, 5 of the 10 monitored stations in Uttar Pradesh had high levels of pollution. State pollution control boards collect manual samples twice a month at most stations. Central Pollution Control Board (CPCB) shared data for January 2021, 2022 and 2023 under the RTI act. In its covering note the agency identified the polluted stations for 2022, many of which were not monitored in January 2023. CPCB analysis for 2022 says faecal coliform was high at almost all the monitoring stations of Bihar and West Bengal. In January 2022, West Bengal had high faecal contamination. In January 2023 the state monitored just five stations. In Bihar samples were collected from 32 stations. In January 2022 three of them had permissible faecal coliform levels but a year later, even they were contaminated.

On 22nd July 2022 the National Green Tribunal (NGT) observed that untreated waste continues to be discharged in 60% of the Ganga. The tribunal had asked the states to file an updated report on sewage treatment, whereas Uttarakhand is the only state with sufficient treatment capacity.

At a time when the center is focusing on cleaning up the Ganga, data collection and dissemination remains challenging. The current monitoring mechanism needs to be more ambitious. The five parameters monitored at present are part of the notified Environment (Protection) Amendment Rules, 2000. More 25 parameters were recommended in the guidelines released by the center. The guidelines were never notified leading to partial implementation of the parameters leaving out the crucial parameters required for understanding the true condition of the rivers.

--From the reports of DTE

Ecotourism: A way to feel the Nature

Shreejato Bhattacharya

4th Semester, Environmental Science (Hons.)

From the ancient ages people used to travel many places and also eager to discover new things from that place. Of let being captivated in the concrete forest, people are having high desire to spend time amidst the nature. Here, comes the scopes of ecotourism development.

Ecotourism means quite simply "ecologically sound tourism" or "ecologically sensitive tourism." The International Ecotourism Society (TIES) defines ecotourism as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education".

It is one of the fastest growing tourism segments and further rapid growth is expected in the future. It is an idea of travelling to areas and appreciate the cultural and natural history of the environment, while not to disturb the integrity of the ecosystem as well as creating economic opportunities that ensures conservation and protection of natural resources.

It accommodates and entertains visitors in a way that is minimally destructive to the environment and supports the native cultures of the area.

Ecotourism typically involves travel to destinations where flora, fauna, and cultural heritage are the primary attractions. It is intended to offer tourists an insight into relation of human beings with the environment and to indulge in greater appreciation of our natural habitats. Areas that offer birdwatching, wildlife safaris, trekking and camping, are ideal for ecotourism sites, since these activities have a low impact on the environment.

However, there are some unwritten norms of ecotourism, which must be followed to sustain a healthy environment and business as well.

An ecotourist must respect local culture and lifestyle and may immerse themselves in local practices too. This can help in reducing both physical and mental stress. While visiting an ecotourist spot, people spend time by interacting with the local community as well as learning about their indigenous practices. States like Uttarakhand, Himachal Pradesh, Odisha, and Kerala have a successful trend in getting women and youth involved in ecotourism practices, which provides them with excellent socio-economic benefits. Ecotourism promotes economic growth, while conserving the environment of an area by preserving the eco system and biodiversity. It promotes a spirit of community participation, environmental awareness and social sensitivity.

Biosurfactants: A Solution to Marine Xenobiotic pollution

Asmita Rakshit

6th Semester, Environmental Science (Hons.)

The marine ecosystems have served as a sink for enormous amounts of harmful wastes/xenobiotics, which even in trace concentrations endangers ocean communities. Xenobiotics are synthetic chemical compounds that are foreign to an animal life or an ecological system. These pollutants, e.g., heavy metals, dyes, synthetic pesticides, herbicides, industrial pollutants are extremely stable making them persistent in the environment for very long time. Through land runoffs and as industrial effluents, xenobiotics that are discharged mostly from businesses like chemical and pharmaceutical, oil spills, nuclear explosions, and agricultural practices enters the marine environment.

Marine bacteria secrete large molecules known as exopolysaccharides, which can be proteins, lipids, nucleic acids, polysaccharides, or uronic acids. These exopolysaccharides improve bacterial cell viability by improving substrate adherence, biofilm formation, defense against restricted nutrition availability, metal detoxification, and antibiotic presence. Some bacteria create amphiphilic exopolysaccharides, referred to as biosurfactants, which aid in the bioavailability of hydrophobic substrates such as hydrocarbons. These biosurfactants promote the growth of bacteria that can degrade aromatic and aliphatic hydrocarbons. Furthermore, marine bacteria that produce biosurfactant can improve hydrocarbon dispersion, emulsification, degradation, and bioavailability. A wide range of bacteria, fungi, and yeast produces biosurfactant, The genus *Pseudomonas* is well known for the production of rhamnolipids.

The biodegradability of a hydrocarbon is determined by its bioavailability and state of dispersion. To increase the rate of biodegradation, the water-insoluble substrate should be either solubilized or emulsified. Biosurfactants due to their emulsifying property, low toxicity, and high biodegradability, specificity and stability at extreme temperature, pH, and salinity may play an important role in bioremediation process. The production of micelles by biosurfactants can considerably improve bioavailability. Micelles occur as a result of biosurfactant self-assembly and aggregation in water

and some polar solvents; fibrils and vesicles can also form. Polycyclic PHAs (polynuclear aromatic hydrocarbons), saturated hydrocarbons, and nitrogen-sulfur-oxygen compounds are the most common constituents of petroleum effluents. Saturated hydrocarbons with straight chains (n-alkanes) are easily degraded by microbes, but branched alkanes and aromatics are harder to degrade. Many PAHs are thought to be carcinogenic. Microorganisms with the ability to degrade hydrocarbon compounds have been isolated in particular from petroleum-contaminated sites, and biosurfactants play an important role in allowing the microorganisms to grow in such harsh environments and use hydrocarbon as a carbon and energy source.

Biosurfactants' biodegradability and low toxicity make them promising agents for application in bioremediation of the marine environment. However, the high production and downstream processing costs limit the commercial success of biosurfactants. The utilization of low-cost agro-based and industrial wastes as raw materials for biosurfactant synthesis, as well as an efficient isolation and purification process and optimisation of growth conditions for higher yield, are critical stages in making their production more economically viable.

NEWS FROM THE DEPARTMENT

Envoyage Meet, 2021

5th Reunion of the department was held on 2nd October, 2021 through online mode. During the prolonged battle against Covid-19 it was commitment of our alumni, that hold the unputdownable spirit of our department.

Envoyage – the alumni association of the Department has launched their own website <https://envcenvoyage.com> in 2022.

Envoyage Meet 2023 – the 6th Reunion is scheduled on 15th October, 2023 to be held in the college campus.

Write to us:

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