



St. ALOYSIUS' COLLEGE

AUTONOMOUS) JABALPUR, (M.P)
DEPARTMENT OF BOTANY & MICROBIOLOGY
NATURE NEWSLETTER

BIOREMEDIATION (WASTE TO WORTH)

JANUARY to MARCH 2022



Bioremediation is a process that uses mainly microorganisms, plants, or microbial or plant enzymes to detoxify contaminants in the soil and other environments.

Bioremediation is an emerging technology which can be simultaneously used with other physical and chemical treatment methods for complete management of diverse group of environmental pollutants. It seems as a sustainable approach for the environmental pollution management, and hence, there is a need for more research in this area.

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ALGAE AND BACTERIA AS INTERNAL CPR

Microalgae and special types of bacteria have the power to puff vast amounts of oxygen into the atmosphere. When green algae (*Chlamydomonas reinhardtii*) and cyanobacteria (*Synechocystis* sp. PCC6803) were injected into the brains of African clawed frog (*Xenopus laevis*) tadpoles, they were found to breathe life back into the tadpoles' oxygen-starved neurons, almost like internal CPR.



OIL SPILL AND CLEAN-UP

Oil and gas producing industries have released oil and waste gases into the marine environment, thereby leading to marine pollution. There are species of marine bacteria that can eat compounds from petroleum as part of their diet. *Pseudomonas aeruginosa* is a typical strain for rhamnolipid production and can utilize crude oil as the sole carbon source.

INDIAN origin scientist Dr. Anand Mohan Chakrabarty had developed genetically engineered organisms *Pseudomonas putida* which is now extensively used.

COMPOSTING DISPOSABLE DIAPERS ENHANCED BY CYANOBACTERIA

On average, newborns go through about 8-12 diapers per day. Hence disposable diapers have become a complicated matter due to the risk generation to the environment and human health. Sodium polyacrylate is a white granular powder which rapidly absorbs water. These polymers are not easy to degrade because of their geometry. Some microorganism has potential to degrade these polymers. Microorganisms commonly used in the composting process are bacteria, actinomycetes, fungi and algae. *Cellulomonas*, *Bacillus*, *Pseudomonas*, *Rhodococcus*, and *Staphylococcus* are the prevalent bacterial genera. fungal species *Aspergillus*, *Trichoderma*, *Sclerotium*, *Penicillium* and white-rot fungi, are the dominant fungal genera that also produce extracellular enzymes accountable cellulose and lignin degradation during composting.

Industrial workhorse *Corynebacterium glutamicum* an efficient bio-tool for arsenic bioremediation

Corynebacterium glutamicum has been used for more than 60 years for the multi-million-ton scale production of amino acids (like, glutamate and lysine), nucleotides, fuels, polymers and other value-added chemicals. Recently, it has been found to be one of the most arsenic-resistant microorganisms described to date. Arsenic (As) is an extremely toxic metalloid that, when present in high concentrations, severely threatens the surrounding biota and human health. Arsenic contamination is global growing environmental problem. It is usually released in the environment by volcanic and anthropogenic activities, like, burning of fossil fuels, gold mining and improper agriculture or medical uses. Hence *C. glutamicum* being one of the most arsenic-resistant bacteria, has been explored and improved by metabolic engineering to be used as an efficient bio-tool for the bioremediation as it can sustain itself even in presence of 12 mM arsenite and 500 mM arsenate.

Training program on Bonsai cultivation

Training program on Bonsai cultivation was held by the Department of Botany and Microbiology for U.G. and P.G. students by Mrs. Manisha Dubey about techniques used for making bonsai on 21st March.



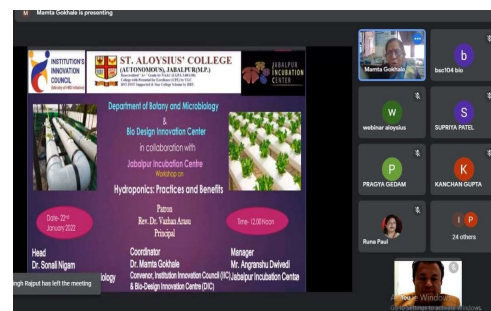
National Workshop on Organic Farming and Water Conservation

Dr. Durga Ray and Dr. Femina Sobin with MSc. students attended "National Workshop on Organic Farming and Water Conservation". Organized by RDVV, Jabalpur, Joint Director Agriculture, Jabalpur, Sehyog Narmadey Samiti, Jabalpur, Geolife, MPCST, Jal Biradri Tarun Bharat Sangh and Mandla Organic on 4th and 5th March. Key speaker of the event was Dr. Rajendra Singh.



Workshop in collaboration with Bio-design Innovation Centre and Jabalpur Incubation Centre on HYDROPONIC PRACTICES & BENEFITS

To enlighten students about hydroponic, Department of Botany and Microbiology organised workshop more than 33 participants attended the workshop. Resource person was for the event was Angranshu Dwivedi on 22nd January.



Educational trip to TIFR, Pachamrhi

First and second year of BSc. Microbiology went for an educational trip to National Center for Biological Sciences- Tata Institute of Fundamental Research (TIFR), Pachmarhi on 9th & 10th March.



ECOFEST 2022

Department of Botany and Microbiology in association with Nature Club, organized, Poster making and best out of waste competition, on the 28th of February, 2022, under DBT star college scheme. The theme of the poster competition was -Plan for the future-Sustainable development. In which, 24 students participated, whereas, best out of waste 15 students participated. Student presented their poster and artistic creation from waste things in best out of waste competition.