

Fungus for pyrene remediation

August 9, 2022

In news- Researchers at the Council of Scientific & Industrial Research-Indian Institute of Petroleum (CSIR-IIP), Dehradun, have recently identified a fungus for pyrene remediation.

What is environmental remediation?

- The removal of environmental contaminants is known as environmental remediation.
- It is the removal of pollution or contaminants from water (both ground water and surface water) and soil.
- Environmental remediation deals with the removal of pollution or contaminants from environmental media such as soil, groundwater, sediment, or surface water.
- Remedial action is generally subject to an array of regulatory requirements, and may also be based on assessments of human health and ecological risks where no legislative standards exist, or where standards are advisory.

Key findings-

Following are the key findings of the study-

- The fungus identified by the researchers is capable of removing toxic, recalcitrant, and carcinogenic polycyclic aromatic hydrocarbons (PAHs) from the environment.
- **The PAHs are ubiquitous environmental pollutants originating from multiple sources, including combustion of petrogenic fossil fuels,** and incomplete incineration of municipal wastes and biomass.
- **Pyrene, possessing four benzene rings, belongs to the highly toxic class of PAHs,** with carcinogenic and mutagenic properties.
- **It gets lodged into the environmental matrices like**

soil, water and atmosphere, resulting in widespread environmental pollution, necessitating adequate remediation of contaminated environmental matrices.

- **The researchers at IIP identified a white-rot fungus Trametesmaxima IIPLC-32,** which has the potential to cause microbial degradation of pyrene.
- According to researchers, growing on dead plants, **this fungus causes pyrene degradation using special enzymes.**
- The researchers used gas chromatographic-mass spectrometer and serotome analysis for their study.
- Gas chromatographic-mass spectrometric identification of prominent metabolites helped determine the pyrene degradation pathway.
- As found by researchers, the pyrene concentration decreased within 16 days from the initial levels of 10 mg per litre.
- The serotome analysis revealed the presence of 81 **extracellular proteins.** Knowledge of serotome analysis in pyrene degradation helped understand the degradation mechanism of pyrene.
- It may be noted that among the pollutants found in the soil, many PAHs are also present.
- **The fungus identified by the researchers can cause microbial degradation,** thereby improving the soil quality.
- **As revealed by the study, the fungus T.maxima may prove to be helpful in the remediation of especially pyrene.**
- The recommendation from the study is that T.maxima IIPLC-32 can be tried in the future for the bioremediation of PAH-contaminated aquatic environments.