Characterization of the fungal strains isolated from attock refinery with petrole...

Environment, Pollution

Pollution poses serious threats to the environment, agricultural crops and human health. Soil pollution is one of them. There is one contaminant having complex nature is Petroleum Hydrocarbons. The complex nature of this contaminant stops the natural degradation. Different methods are being used since long time to find out a way to degrade these contaminants without disturbing the nature. There are many approaches which have been tested. There are such fungi which have ability to metabolize or degrade the petroleum hydrocarbons. This contaminants enter the nature by extraction which is being done in Missa Keswal oil field, Toot oil field etc. accidental oil spills while transportation and by the waste of refineries some of which are Attock Limited refinery, Pak Arab refinery etc. The main purpose of this study is to characterize the fungal strains which are isolated from Attock Refinery with petroleum hydrocarbons at a molecular level. Molecular characterization of these strains will pave way for eco-friendly degradation of this pollutant.

Petroleum hydrocarbons can be defined as they are broad range of chemicals that comprise oil and products which are refined from oil, such as gasoline and diesel. Petroleum hydrocarbons has complex structure so it cannot be easily be remediated. Over the time scientists tried many approaches to remediate the petroleum hydrocarbons also to remediate the contaminated soil and water but they are highly dangerous to the nature and energy consuming. There are many ex-situ and in-situ methods which have been tried for the degradation of petroleum hydrocarbons like Floatation and washing, Coal agglomeration, Thermal desorption, Surfactant enhanced aquifer remediation (SEAR), solidification , stabilization, ultrasonic desorption, chemical remediation, but these methods are effective for lower

concentration of contaminant they are highly priced and time consuming and the disposal of sorbed contaminants is also an issue related with these approaches whereas biodegradation which consist of utilization of indigenous plants and microorganisms which are used for the degradation of the pollutants is an approach alien to all these problems.

Pseudomonas paucimobilis strain (which are reclassified as Sphingomonas paucimobilis) which was reported to mineralize and degrade it. Many different microorganisms like Bacillus subtilis, Pseudomonas fluorescens, Acaligenes sp., P aeruginosa, Bacillus sp., Micrococus roseus and flavobacterium sp. were reported to have ability to degrade the crude oil. Acinetobacter sp. strain DSM 17874 were reported have ability to degrade the n. alkanes with chain ranging in length from (C10h22) to tetracontane (C40h82). Many genes are responsible for degradation.

Petroleum hydrocarbons which contaminating the soil are causing serious health problems to the mankind. Moreover molecular characterization of fungal strains that could be involved for the degradation of pollutants has not been done yet.

Characterization of isolated fungal strains

Morphological characterization

Morphological characterization of fungus will be done by studying different aspects of fungal growth such as conidiophores, underside color, colony diameter, the spore color, conidial head, vesicular shape, serration of the

colony, plate surface and of each isolated fungal strains by using Olympus Reflection Microscope (BX1).

Molecular characterization

The genomic DNA (g DNA) will be extracted using CTAB DNA extraction method of Raeder and Broda (1985), for molecular characterization. Once there are precipitated the DNA pellets are rinsed with 70% ethanol after which it be kept at room temperature for 1 minutes to dry it. Then it will be dissolved in TE buffer and by using Nanodrop Spectrophotometre set at absorbance ratio of 260nm and 280nm its quantification will be done. To check the quality of DNA in each sample, 1% agarose gel electrophoresis fortified with ethidium bromide will be carried out. The fungal DNA which are isolated will be subjected to the PCR amplification of the ITS regions of 18s and 28s.