

Biotechnology-2013: Biological degradation of naphthalene: A new era - Khandelwal S.R - N.F. Institute of Life Science

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Naphthalene is a best Polycyclic aromatic Hydrocarbon (PAH). PAHs are fundamental contaminants of environment, associated with commonplace anthropogenic sources along with oil refineries and incomplete combustion of fossil fuels. PAHs are poisonous, mutagenic and carcinogenic. Isolation of naphthalene degrading microorganism is usually recommended by way of a complex ONR 7a medium. present paintings include a modified medium with Naphthalene as a sole supply of carbon. four isolates were isolated from marine pattern accumulated from Mumbai in addition to petroleum soil pattern from Trimbak road Satpur, Nashik. further characterization the usage of morphological and biochemical assessments confirmed resemblance with Gram high quality microorganism in addition to Gram negative microorganism and they may belong to genus which include *Micrococcus* spp, *Bacillus* spp, *Staphylococcus* spp, *Pseudomonas* spp. those lines were similarly grown in changed broth for 45 days as well as on ONR 7a agar medium. In turbidimetric assay *Bacillus* spp confirmed good sized boom at 1 mg/ml of naphthalene attention. Catechol which is generated through biodegradation of naphthalene changed into detected through Winkelmann changed Arnow's approach. all the four isolates efficiently degraded naphthalene which changed into showed via Arnow's check. these naphthalene degraders can be similarly checked and explored for his or her efficiency in bioremediation of polluted marine environment and in oil contaminated fields.

to demonstrate the capacity use of bioremediation in polycyclic fragrant hydrocarbons infected soil the use of naphthalene as a version pollutant, a laboratory study with the objectives of investigating, comparing and evaluating the strategies of herbal attenuation, bio stimulation, bioaugmentation, and mixed bio stimulation and bioaugmentation become performed. The study handled naphthalene biodegradation in soil using inorganic NPK fertilizer and blended lifestyle of *Alcaligenes*, *Aeromonas*, *Micrococcus*, and *Serratia* as supply of bio stimulation and bioaugmentation, respectively. every remedy approach contained 4% (w/w) naphthalene in soil as a sole source of carbon and power. After 4 weeks of remediation, the outcomes revealed that herbal attenuation, biostimulation, bioaugmentation, and mixed biostimulation and bioaugmentation exhibited forty four%, sixty nine.5%, 77.5%, and eighty five% naphthalene degradation, respectively. also, the overall hydrocarbon-degrading bacteria (THDB) count in all of the remedies accelerated in the course of the remediation duration. the very best bacterial growth was

discovered for combined bio stimulation and bioaugmentation remedy method. a primary-order kinetic model became suited for the biodegradation statistics to evaluate the biodegradation rate and the corresponding 1/2-lifestyles time turned into expected. The model revealed that naphthalene contaminated-soil microcosms under mixed bio stimulation and bioaugmentation treatment method had better biodegradation charge constants, in addition to lower half of-life times, than different remediation structures. therefore, the kinetic parameter values confirmed that the degree of effectiveness of these bioremediation strategies within the cleanup of naphthalene contaminated soil is in the following order: herbal attenuation < bio stimulation < bioaugmentation < combined bio stimulation and bioaugmentation. hence, the prevailing paintings will contribute to the development of techniques for in situ remedy of polycyclic fragrant hydrocarbons infected soils.

This have a look at investigated the applicability of synthesized calcium peroxide (CaO_2) nanoparticles for naphthalene bioremediation by permeable reactive barrier (PRB) from groundwater. in step with the batch experiments the application of 400 mg/L of CaO_2 nanoparticles became the highest quality awareness for naphthalene (20 mg/L) bioremediation. furthermore, the impact of environmental situations on the steadiness of nanoparticles confirmed the tremendous affect of the initial pH and temperature on the steadiness and oxygen releasing capacity of CaO_2 . consequently, elevating the initial pH from 3 to twelve increased the dissolved oxygen from 4 to thirteen.6 mg/L and the stableness of nanoparticles become appreciably progressed round 70 d. moreover, through increasing the temperature from four to 30 °C, the stableness of CaO_2 declined from a hundred and twenty to 30 d. The continuous-float experiments revealed that the naphthalene-infected groundwater became absolutely bio-remediated within the presence of CaO_2 nanoparticles and microorganisms from the effluent of the column inside 50 d. at the same time as, the herbal remediation of the contaminant ended in 19.7% elimination at the cease of the experiments (350 d). additionally, the attached biofilm at the surface of the PRB quarter turned into studied by scanning electron microscopy (SEM) which showed the better biofilm formation at the pumice surfaces within the bioremediation column in assessment to the natural remediation column. The physico-chemical characteristics of the effluents from each column was also analyzed and indicated no negative effect of the bioremediation procedure on the groundwater. therefore, the prevailing paper gives a comprehensive look at on the

application of the CaO₂ nanoparticles in PAH-infected groundwater remedy.

the ability use of bioremediation in polycyclic aromatic hydrocarbons infected soil using naphthalene as a version pollutant, a laboratory examine with the objectives of investigating, comparing and evaluating the techniques of natural attenuation, bio stimulation, bioaugmentation, and combined bio stimulation and bioaugmentation become accomplished. The take a look at dealt with naphthalene biodegradation in soil using inorganic NPK fertilizer and blended way of life of *Alcaligenes*, *Aeromonas*, *Micrococcus*, and *Serratia* as source of bio stimulation and bioaugmentation, respectively. every remedy strategy contained 4% (w/w) naphthalene in soil as a sole source of carbon and electricity. After four weeks of remediation, the outcomes found out that herbal attenuation, biostimulation, bioaugmentation, and mixed biostimulation and bioaugmentation exhibited forty four%, 69.5%, seventy seven.five%, and 85% naphthalene degradation, respectively. additionally, the entire hydrocarbon-degrading microorganism (THDB) rely in all of the treatments multiplied at some point of the remediation period. the very best bacterial increase was determined for mixed biostimulation and bioaugmentation remedy method. a primary-order kinetic model become suited to the biodegradation data to assess the biodegradation price and the corresponding half of-lifestyles time changed into estimated.

Biography

Khandelwal S.R. gain his Ph.D. from North Maharashtra university India in the year 2001. He has been in academia for over 30 years with main interest in applied Microbiology, Biochemistry, secondary metabolites and Agro- biotechnology. He undertook several consultancies to Indian farmers regarding soya bean yield improvement. He is a life member of Association of Microbiologist of India and has published several scientific and technical papers. Other research activities includes guidance to M phil and Ph.D. students of Pune university and guided seven different research projects. He is awardee of Best Teacher Award. Currently he has been participating in several UGC projects regarding bioactive compounds in agricultural field for their health benefits as plant growth promotion, yield improvement, and bioremediation.

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