B009

Phylogenetic Diversity and Microbial Community Dynamics during Bioremediation of Anoxic PAH-Contaminated Sediment

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Marine harbor sediments are frequently polluted with significant amount of polycyclic aromatic hydrocarbons (PAHs) which are naturally toxic, recalcitrant, mutagenic and carcinogenic. To stimulate biodegradation of PAHs in PAH-contaminated sediment near Gwanyang Bay, Korea, lactate was chosen as a supplementary carbonaceous substrate Sediments packed in 3-liter of anaerobic bioreactors were either under no treatment condition or lactate amended condition (1%, w/v). Microbial community composition was monitored by T-RFLP, in addition to measuring the residual PAH concentration In order to characterize the community structure present in the sediment, archaeal 16S rDNAs were sequenced Furthermore, 288 archaeal clones were analyzed by RFLP and 68 of RFLP patterns were obtained for sequencing by types. Results show that lactate amendment enhanced biodegradation rate of PAHs in the sediment by 4 to 8 times, and caused considerable changes in T-RF patterns of archaeal communities Lactate amendment also stimulated the growth and the activity of PAH-degrading bacterial popula-tions, resulting in a significant community shift in terms of structure and diversity with time.

B010

Vertical Shifts of Microbial Communities in the Sediment from the Lake Khubsugul (Mongolia)

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The vertical changes in microbial communities were investigated throughout the sediment of the lake Khubsugul (Mongolia) by PCR-denaturing gradient gel electrophoresis (DGGE) of 16S rDNA. A sediment core used in this study was collected in March 2004 at 50°57′18.4″N, 100°21′32.7″E (water depth, about 250 m) Although several DGGE bands remained throughout the sediment [*Propionibacterium acnes* (similarity 99%), *Ralstonia sp 50* (100%)], some DGGE bands newly appeared [*Pseudomonas frederiksbergensis* (100%), *Bacteroidetes bacterium ARK10264* (97%), Uncultured bacterium ITKB-201 (100%)] and disappeared [Uncultured alpha proteobacterium KY40 (99%)] A significant DGGE pattern change, especially of archaea, was observed around 12 cm of the core (from top) This borderline of the sediment (12cm) from the Lake Khubsugul is reported elsewhere as the boundary between Holocene (the present age) and Pleistocene (the last ice age, 12,000 ^{14}C years BP) It indicated that the significant change of microbial diversity would be caused by the paleoclimate event

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B011

Plant Growth Promotion by Application of Some Rhizobacteria and Photosynthetic Bacteria

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It has been well known that plant growth could be stimulated by some soil bacteria, and to date, most studies have been focused to some plant growth promoting rhizobacteria (PGPR) and nitrogen fixing bacteria Recently anaerobic photosynthetic bacteria are used in agriculture although the precise mechanisms of growth promotion have not been elucidated They may have some potential of contribution of nitrogen or growth promoting substances to plant. In this study pot test of some PGPR and photosynthetic bacteria for enhancement of plant growth was performed in the greenhouse. Some microorganisms and isolated photosynthetic bacteria were tested to examine the growth promotion of agricultural crops, such as soybean The lengths of total plant and root were longer in the inoculated soils than those in the uninoculated soils. Total nitrogen measured by Kjeldahl method and available phosphorus estimated by Lancaster method were also higher in the inoculated soils than those in the uninoculated soils. This plant growth promoting capability of PGPR and photosynthetic bacteria may be used for the rapid revegetation of barren or disturbed land and biofertilizer in the agriculture.

B012

Biodegradation of Phenanthrene by Psychrotrophic Bacteria Isolated from Lake Baikal

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Polycyclic aromatic hydrocarbons (PAHs) are one of the common recalcitrant contaminants arising from petroleum contamination or natural event such as forest fire Since some of them are known to be toxic, mutagenic and carcinogenic, they must be removal from the contaminated environments To date, studies on PAH degradations have been limited to mesophilic conditions, and there has been few report on PAH degradation at low temperature In this study, psychrotrophic phenanthrene-degrading bacteria were screened from the sediment samples in Lake Baikal, Russia Among 70 phenanthrene-degrading isolates, Gram positive rod-shaped strain P25 identified as *Rhodococcus erythropolis* showed the highest degradation rate Surfactant addition was tested to enhance phenanthrene degradation by *R erythropolis* P25 In general, low concentrations of surfactants could increase the degradation rates of phenanthrene, however, higher concentrations inhibited the phenanthrene degradation except Tween 80 This psychrotrophic phenanthrene degrading bacteria can be a candidate for the bioremediation of polycyclic hydrocarbon contamination at low temperature