

Biodegradation of Polycyclic Aromatic Hydrocarbons (PAHs) by tropical microorganisms.

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In this research, phenanthrene-degrading bacteria strain CH3 was isolated from oil-contaminated soil in Thailand using a spraying plate technique. The strain CH3 was identified as *Pseudomonas* sp. CH3 based on its 16S rDNA sequence analysis. Complete degradation of phenanthrene in the minimal salt medium culture was observed within 3 days of incubation at room temperature ($30\pm 2^\circ\text{C}$) whereas at 37°C , complete degradation of phenanthrene occurred within 6 days. At 42°C , the strain CH3 was still able to grow and degrade approximately 23% of phenanthrene. Therefore, the strain CH3 is suitable for phenanthrene bioremediation in tropical areas, where temperature may exceed 40°C during the hot season. Additionally, *Pseudomonas* sp. CH3 can utilize aromatics and small carbon compounds, thus offering an environmentally friendly method to remove hazardous substances from the environment.

Screening of white rot fungi with capability to degrade PAHs, phenanthrene, fluorene and pyrene, were investigated. A newly isolated white rot fungal strain RYNF13 was selected according to its high efficiency in biodegradation of PAHs. Complete degradation of phenanthrene in the mineral salt glucose medium culture was observed within 18 days of incubation at room temperature ($30\pm 2^\circ\text{C}$) whereas 95% of fluorene and 50% of pyrene were degraded in the same condition. The strain RYNF13 secreted three kinds of ligninolytic enzyme, manganese peroxidase, laccase and lignin peroxidase, during PAHs biodegradation. Manganese peroxidase was the major enzyme produced by the fungus. In the culture containing phenanthrene, manganese peroxidase showed the highest enzymatic activity at 178 U mL^{-1} . Thus, RYNF13 is a promising tropical white rot fungus for an environmentally friendly removal of hazardous substances from the environment.