PLANT TERPENE AS AN INDUCER FOR TRICHLOROETHYLENE (TCE) BIODEGRADATION AND BIOREMEDIATION

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Trichlorothylene (TCE), a chlorinated hydrocarbon, is a major water pollutant originated from land-based activities such as spillage and inappropriate disposal of dry cleaning agents, degreasing solvents, and paint strippers. TCE is also detected in the atmosphere and seawater. Since it is a suspected human carcinogen, remediation technology for clean-up TCE is necessary. It is known that TCE can aerobically transform by cometabolism, a special form of microbial metabolism that occurred when a microorganism grown on certain substrate indirectly oxidizes a hazardous chemical into non-toxic compounds. Bacteria such as *Pseudomonas*, *Burkholderia*, and *Rhodococcus* had been reported to oxidize TCE while using toluene or phenol as carbon source and inducer. However, the amendments of these compounds to TCE contaminated site is prevented by their toxicity, thus an alternative TCE inducer is required. This study investigated the ability of plant terpene on inducing TCE biodegradation and then developed a TCE bioremediation technique using plant terpene and local isolated bacteria. Plant terpene is a group of plant-derived aromatic compound that have been reported to stimulate microbial degradation of xenobiotic compounds. Because of their natural origins, terpenes are considered environmental friendly and probably safe for introducing them into the environment. In the study, four types of purified terpene solutions i.e. carvone, cumene, limonene, and pinene were tested with *Rhodococcus pyridinovorans* L4 and *Pseudomonas* sp. T1, local toluene degrading isolates. We found that overnight terpene grown cells can decrease more than 50% of 10 ppm TCE within 30 hr incubation. Meanwhile, the extent of degradation was depended on type of terpene and bacteria strain used in the experiment. The results from preliminary microcosm study suggested that terpene can induce TCE biodegradation in soil and can be used for bioremediation of TCE contaminated soil.