The Viability of a Mixed Bacterial Culture for Bioremediation of Heavy Metals, Poly-Cyclic Hydrocarbons, and Volatile Organic Compounds

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Purpose: The purpose was to find more reliable and wide-ranging methods of cleaning freshwater, using hardy and efficient mixed cultures of proven bio-remediatory bacteria to degrade severe contaminants. Procedure: P. Putida, Bacillus, and Corynebacterium were combined in ratios of 1:1:5, 1:5:1, and 5:1:1. All six were tested against 10% concentrated solutions of mercury (II) nitrate, benzene, toluene, and pyrene. They were exposed to the solutions for 48 hours, after which Samples were tested for percent transmission with a spectrophotometer. Chemical concentrations were mathematically determined by comparing results to a set of solutions of known concentration also tested for percent transmission. Conclusion: As expected, each single bacteria degraded a certain chemical but couldn't contain all pollutants. However, the 1:1:5 mixed culture was an unprecedented success, degrading over 95% of every single chemical mixture that it was exposed to. This shows the surprising effectiveness of sole Corynebacterium, but more so proves the necessity of a hardy, innovative combination of similar bacteria in a bio-remediatory power mixed culture. By far, the mixed culture was more effective than any lone bacteria over all four chemicals.

Awards Won:

Fourth Award of $500