Evaluating Petroleum-Contaminated Soil Remediation Methods

Alborano, Jacob

The purpose of my project is to determine which petroleum contaminated soil remediation method is the most effective when is dealing with contaminated soil. For this experiment, I tested one type of bacteria (Pseudomonas fluorescens) and one fungi (Penicillium notatum) that are known for their ability to degrade hydrocarbons in oil. I also used one other type of fungi, Aspergillus niger, which has shown some preliminary indications of an ability to degrade hydrocarbons. In addition to these types of fungi and bacteria, I used a microorganism fertilizer called S-200. The S-200 fertilizer is a biodegradable fertilizer that promotes and increases bacterial and fungal growth during bioremediation. In order to test these microorganisms and S-200 fertilizer, I started by placing contaminated soil into 24 paint cans. Second, I thoroughly mixed the soil in each can to disperse the hydrocarbons and sent 100 mL samples to Energy Labs in Billings, Montana to test for initial hydrocarbon content in each. Next, I applied each microorganism to three individual paint cans each and each microorganism combined with the S-200 fertilizer to three individual paint cans and thoroughly mixed. For the controls, I applied just the S-200 fertilizer to three paint cans and left the last three paint cans with just the contaminated soil. I watered and thoroughly mixed the soil every three days to promote further bacterial and fungal growth and to allow the microorganisms to have access to oxygen. Finally, I sent 100 mL samples at two weeks and four weeks to Energy Labs in Billings, Montana to test for hydrocarbon content. After statistically analyzing my results I came to the conclusion that the Aspergillus niger combined with the S-200 Fertilizer allowed for the most effective remediation method.

Awards Won: