Bioremediation: Using Strains of Pseudomonas on Oil Spills

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Oil spills drastically affect mammalian and marine environments because they damage fragile ecosystems and leave areas unsuitable for wildlife habitats. According to a 2010 report conducted by the U.S. Environmental Protection Agency, over 13,000 uncontained spills occur every year, which damage various species and their respective breeding grounds. Currently, mechanical containment equipment and dispersing agents are used to contain oil spills in the water; however, these methods are insufficient in keeping oil from reaching shorelines. I propose a novel approach using biological agents to contain oil spills. A type of bacteria capable of degrading oil, mainly composed of polymers of hydrocarbons, is Pseudomonas. The objective of this study is to determine which strain of Pseudomonas is capable of efficiently metabolizing oil, thereby degrading it into a less environmentally toxic substance. Four Vermont local strains of Pseudomonas: P. aeruginosa, P. putida, P. alcaligenes, and P. mendocina were all combined with ten different types of oil: gasoline, diesel, motor oil, and crude oil. The bacteria were cultured in morpholinepropanesulfonic acid minimal media and the respective oil was the only carbon source in the system. When measuring oil degradation, the specific amount of oil broken down by bacteria is difficult to quantify. Rather than directly measuring oil, bacterial growth is measured via spectrophotometer; the greater the bacterial growth, the more carbon sources have been removed, thus effectively remediating oil. My results indicate that Pseudomonas mendocina have the highest culture growth in the most amount of oil. Data collected on this specific strain of bacteria can pave the way for future studies on the degradation of other hazardous contaminan

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