

W.C.

Thesis: Despite recent aspects of bioremediation being very experimental, the subject should gain more attention and support from scientists and the public alike because the benefits of bioremediation work to create a more efficient, healthy community.

I. Introduction

II. Background Information

III. One of the most important benefits of bioremediation is its astounding ability to clean up oil products from various environments, stimulating the reuse of land and the growth of natural habitat.

- A. In one test, the cobweb-like underground growth of the oyster mushroom, called mycelium, devoured 95 percent of the toxins at a site polluted by diesel fuel (Kallen 72).
- B. Bioremediation got its big break during the Exxon Valdez oil spill of 1989, when nutrients added to 74 miles of oil-smeared shoreline in Alaska's Prince William Sound helped marine micro-organisms break down the oil much faster than in untreated areas--and with no ill effects, according to the Environmental Protection Agency (Efron).
- C. By stimulating the growth of the oil-degrading bacteria, which were already present in the Alaska soil, many mile of shoreline were cleaned up nearly three times faster than they would have been had chemical cleaning agents alone had been used (Thieman).
- D. Preliminary studies suggest that novel strains of oil-degrading bacteria are slowly working to break down oil below the surface of the sand (Thieman 201).

IV Through use of bioremediation, various soil enriched habitats have been decontaminated, establishing a healthier environment for the surrounding community.

- A. They can break down organic toxins, leaving other harmless compounds that other microorganisms use as food (Lee).
- B. When we checked how it did, the Marasmiellus had decomposed all but 10 percent of the contaminant, while the other fungus had left 67 percent (Lee).
- C. A bacterium known as BAV1, for example, flourished in soil polluted by vinal chloride, the most common and hazardous industrial chemical. The bacterium was discovered 20 feet below the surface at a toxic waste site in Oscoda, Michigan, where BAV1 was eating the toxic compound rendering it harmless (Kallen 72).
- D. Other scientific literature, some going back to the 1960's, shows that the fungus has the capacity to decompose everything from paper to now-banned pesticides such as DDT (Lee).

V. Bioremediation has also aided in the decontamination and purification of aquatic habitats, allowing both drinking water and aquatic animals to be healthy.

- A. And when placed around rivers or lakes, the mycelium also filtered toxic waste from pesticide and fertilizer runoff (Kallen 72).
- B. Tiny worms which are usually present in the sludge also help to break down the sludge into small particles (Thieman 195).
- C. In these tanks, water is sprayed over rocks or plastic covered with biofilms of waste-degrading microbes that actively degrade organic materials in the water (Thieman 194).

Very good.

Very thorough

25/25

land?

D. Some of these genetically altered bacteria can absorb mercury directly while others that bind mercury can be grown on biofilms to act as sponges for soaking up mercury from a water supply. (Thieman 199).

VI. Not only does bioremediation clean the environment, but it can also be very cost efficient, enabling the countries money to be spent on more pressing matters.

A. Also, because the soil or water does not have to be excavated or pumped out of the site, larger areas of contaminated can be treated at one time (Thieman 193).

B. In addition, the average cost for offsite incineration of soil is \$1000/ton whereas land farming can cost as little as \$200-300 to treat the same amount and type of waste (Stabinsky).

C. By using bioremediation the membranes can be cleaned within the closed system, without removing the membranes. This can prevent damage to the machinery, reducing the need for expensive repair and replacement (Clean).

VII. Conclusion