Microplex™ OD Efficacy, Oil Spill Absorption and Biodegradation

LAB REPORT

Conducted by: Independent Lab

Problem

There are many oil-absorbing products for oil spills on the market today, but many fewer that also offer oil degradation as part of the package. Further, such products usually offer little information on the absorptive and/or biodegradative capabilities of the product. The objective of this lab work was to evaluate the hydrocarbon absorption and biodegradation capabilities of three different commercially available absorber/degrader products, including Probiotic Solutions® MICROPLEX™ OD.

Products Evaluated

- Competitor A Product
- Probiotic Solutions® MICROPLEX™ OD
- Competitor B Product

Experimental Design

Oil Absorption Test

The absorption test consisted of placing 5 grams of each product in a porcelain Gooch crucible, with holes in the bottom. One (1) mL increments of motor oil were added until oil drained from the bottom of the crucible. Crucibles were then weighed to verify the amount of oil retained.

Oil Degradation Test

The biodegradation test was measured using respirometry. Five grams (5) of each product with 1.0 gram of absorbed diesel fuel were mixed with 50 grams of potting soil and placed in a 250 mL respirometer reactor. Control reactors containing 50 grams of potting soil and five (5) grams of the product but no diesel fuel were used to correct for degradation of the absorbent. 50 mL of deionized water was then added to each reactor and oxygen consumption measured with the respirometer as a measure of biodegradation. Also, bacterial plate counts were compared for each of the products.

Results

The test results show that MICROPLEX™ OD outperformed the competitor products in hydrocarbon adsorption capability and biodegradation of diesel fuel. In addition, it has higher bacterial counts, which speeds the adsorbed hydrocarbon degradation.

Oil Absorption

Product	Bulk Density (g/L)	Diesel Absorbed per kg	Diesel Absorbed per Liter
Competitor A Product	2700	420	1134
MICROPLEX™ OD	1300	1180	1534
Competitor B Product	590	920	542

pH and Bacterial Count

Product	pH	Total Count (cfu/g)
Competitor A Product	11.3	$5.0 \times 10^{7+}$
MICROPLEX™ OD	4.4	$1.0 \times 10^{9+}$
Competitor B Product	2.4	$3.0 \times 10^{7+}$

Oil Degradation

Oxygen Consumption at 300 Hours (mg)

Product	Blanks	Total With Absorbed Diesel	Net Biodegradable Diesel Fuel
MICROPLEX™ OD	285	630	345
Competitor B Product	828	977	149

Note: None of the products supported combustion after absorbing the fuel.

Product Information

MICROPLEX™ OD is a fine powder of preselected adsorbents and naturally occurring microbial strains that is formulated for use on spillage of petroleum products and related wastes. MICROPLEX™ OD can absorb and break down a broad range of hydrocarbon-containing wastes (from crude oil, gasoline, diesel, machine oils, solvents, and other derivatives) generated from various industries—including refining, petrochemical, transportation, textile, and steel-making.

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