MOSS *(Brachythecium sp.)* and FILAMENTOUS GREEN ALGAE *(Oedogonium sp.)* AS BUNKER OIL SORBENTS

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ABSTRACT

Oil spills are very catastrophic and very destructive events. One way of controlling the dispersion of oil from these spills is by the use of sorbents. The procurement of commercial sorbents can be very costly. Thus, this study analyzed and evaluated the efficiency and effectivity of moss (*Brachythecium sp.*) and a green filamentous algae *Oedogonium sp.* as substitutes for commercial sorbents. *Brachythecium sp.* can grow in any moisture—rich environment and *Oedogonium sp.* algae grow freely in fish ponds and in any body of stagnant, oxygen-poor water. Thus, both samples are very abundant in the environment.

Sorption capacity results showed that the moss *Brachythecium sp.* and the algae *Oedogonium sp* can sorb five times and seven times its weight, respectively. In comparison, Peat Sorb, a commercial sorbent was recorded to sorb 15 times its weight (Emedco, 2007). The minimum sorption capacity of the moss and algae samples was recorded to be approximately equal to their weight. The adsorption isotherms of both samples follow the Langmuir plot for monolayer adsorption.

In the hexane capillary rise experiment, hexane rose significantly in ground moss (72.25 mm in 7 min.) and unground moss (64.80 mm in 7 min.) compared with unground algae (23.52 mm in 7 min.) and (20.70 mm in 7 min.), indicating that moss is more hydrophobic. In water capillary rise on the other hand, unground algae is a better medium (5.76 mm in 4 min) compared to the rest (ground algae – 4 mm, unground moss – 5.29 mm, and ground moss – 4.11 mm, all in 4 min.).

Results also revealed that the moss *Brachythecium sp.* and the algae *Oedogonium sp.* expressed hydrophobic characters in the hexane-water system by remaining in the hexane layer after agitation. The moisture content of the algae (14.85%) is twice that of moss (7.94%). This gives the moss an advantage in oil sorption. The lipid contents of algae (15.58%) and moss (11.47%) do not comprise majority of its biomass, but the lipids aid in increasing the samples' affinity for non-polar substances.

The samples may not sorb as effectively as the commercial sorbents but they are abundant in the environment, thus, a cheaper alternative. Like Peat Sorb, which was processed from the biomass of *Sphagnum sp.* moss, the samples may undergo the same process that increases the hydrophobicity several folds and give oil-biodegration capabilities.