Evaluation of Sargassum as an Oleophilic Material for Mitigating Oil Spill in Seawater

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This investigation examined whether untreated sargassum and sargassum treated with a wax coating can function as efficient absorbents of hydrocarbons in seawater. The research question guiding the study was: Can sargassum act as an efficient absorbent of hydrocarbons in salt water? Absorbent rolls of 50 g were prepared using untreated sargassum and sargassum treated with a wax–isopropyl alcohol solution. Five samples were tested for each condition. Each roll was exposed for five minutes to seawater, seawater with motor oil, or motor oil only, and changes in mass were recorded to quantify absorption. The results showed that in the water control test, the absorbent rolls increased from 50 g to final masses between 78 g and 148 g, corresponding to water absorption efficiencies from 56% to 196%. In the experimental seawater + oil test, final masses ranged from 167 g to 250 g, corresponding to total absorption efficiencies from 234% to 400%. In the oil-only test, final masses ranged from 82 g to 87 g, confirming direct hydrocarbon absorption. Also, the average absorption was 101.8 g for the water control, 84.6 g for the oil-only test, and 212.2 g for the seawater + oil test. Data were analyzed using descriptive statistics, probability plots to assess normality, and a two-sample t-test with a significance level of 0.05. Probability plots showed p-values greater than 0.05, supporting normality, and the t-test confirmed that the difference between the water control and the experimental test was statistically significant ($p < 0.05$). Results indicate that untreated sargassum mainly absorbed water, while wax-treated sargassum showed improved hydrocarbon absorption. Wax treatment enhanced the effectiveness of sargassum as a potential sustainable material for oil spill mitigation.

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