

Pandan Leaves for Oil Sorption: Characterization and Sorption Studies

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Structured Abstract

Background: Sorption materials, like synthetic polymers, are commonly used to remove oil from water, but they are costly and non-renewable. Using biomass as a low-cost, eco-friendly solution for oil removal is a promising solution.

Methods: In this study, Pandan leaves performance was compared between Raw Pandan leaves (RPL) and Modified Pandan leaves (MPL) which MPL was modified chemically using acetic acid to reduce hydroxyl group and alter with acetyl group. Both RPL and MPL were characterized by bulk density, degree of hydrophobicity, FTIR, and SEM. Two types of oil were used for absorptivity test performance which is palm oil and lubricant oil. The effectiveness of both conditions Pandan leaves was evaluated by oil sorption and retention capacity methods. To determine Pandan leaves effectiveness in removing oil from water, oil-water selectivity of Pandan leaves was investigated.

Results: Characterization of the sorbents was found that after acetylation process, MPL show better surface morphology and porosity with lower bulk density and higher of hydrophobicity compared to RPL. In oil sorption and retention capacity, MPL sorbents also show better in result which is higher than RPL. Compared to RPL, MPL showed the highest oil sorption and retention capacities in both palm oil and lubricant oil. Next, RPL has lower selectivity for oil-water separation compared to MPL which shows that after acetylation process, MPL tend to repel water and increase the efficiency of sorption oil.

Conclusion: The modified Pandan leaves was found to be an effective adsorbent for oil sorption, and the findings of this study can be useful for developing cost-effective and eco-friendly methods for oil removal.

Keywords: Modified adsorbent, Biomass, Oil Sorption

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