عنوان مقاله:

Adsorption Performance of Low-cost Java Plum Leaves and Guava Fruits as Natural Adsorbents for Removal of Free Fatty Acids from Coconut Oil

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خلاصه مقاله:

This study assesses the adsorption performance of Java plum leaves and guava fruits based adsorbents as natural products widely available in Aceh, Indonesia. These renewable adsorbents were employed to remove free fatty acids (FFAs) that cause the rancid odor in coconut oil. The adsorption tests were carried out at three different doses (50, 75, 100 g) and seven agitating periods (1, 2, 3, 4, 5, 6, 7 h). The adsorbents were characterized by Scanning Electron Microscopy (SEM) to observe their morphologies, and Fourier transform infrared (FTIR) spectroscopy to investigate the functional groups. The adsorption kinetics were also analyzed using the Freundlich and Langmuir isotherm models. The SEM image showed that the particle sizes of the guava fruits based adsorbent were 30-45 µm while those of Java plum leaves based adsorbent were 7-15 µm, both showing attractive range to enhance surface area for adsorption sites. FTIR spectra showed the presence of methylene, aliphatic and phenolic groups for both absorbent, aromatic and alkene groups only for java plum based adsorbent and secondary amine and alcohol groups only for guava fruit based adsorbent. Those groups seem to play important role in enhancing chemical adsorption of FFAs from the coconut oil sample. The results showed that Java plum leaves and guava fruits based adsorbents had a respective maximum adsorption capacity of 144.99 and 133.77 mg/g, with an optimum agitation time of 6 hour. The high absorption capacity could be ascribed from phenolic and flavonoid compounds present in both materials. Kinetics of adsorption of FFAs on both materials obeyed the Freundlich isotherm model indicating a multilayer and .heterogeneous surface of adsorbent

کلمات کلیدی:

Java plum leaves, Guava fruits, Adsorption, Freundlich and Langmuir Isotherms