

## Recovery of Fried Soybean Oil Using Bentonite as an Adsorbent: Optimization, Isotherm and Kinetics Studies

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**Abstract :** Soybean oil is one of the most widely consumed cooking oils, worldwide. Deep-fat frying of foods at higher temperatures adds unique flavour, golden brown colour and crispy texture to foods. But it brings in various changes like hydrolysis, oxidation, hydrogenation and thermal alteration to oil. The presence of Peroxide value (PV) is one of the most important factors affecting the quality of the deep-fat fried oil. Using bentonite as an adsorbent, the PV can be reduced, thereby improving the quality of the soybean oil. In this study, operating parameters like heating time of oil (10, 15, 20, 25 & 30 h), contact time ( 5, 10, 15, 20, 25 h) and concentration of adsorbent (0.25, 0.5, 0.75, 1.0 and 1.25 g/ 100 ml of oil) have been optimized by response surface methodology (RSM) considering percentage reduction of PV as a response. Adsorption data were analysed by fitting with Langmuir and Freundlich isotherm model. The results show that the Langmuir model shows the best fit compared to the Freundlich model. The adsorption process was also found to follow a pseudo-second-order kinetic model.

**Keywords :** bentonite, Langmuir isotherm, peroxide value, RSM, soybean oil

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