Removal of naphthalene from aqueous system using unripe orange peel as adsorbent: effects of operating variables

C.N. Owabor*, S.E. Agarryb, D. Jatoa

aDepartment of Chemical Engineering, University of Benin, Benin City
Tel. + 23 480 3410 1218; email: owabor4you@yahoo.com
bDepartment of Chemical Engineering, Ladoke Akintola University, Ogbomoso, Nigeria
email: sam_agarry@yahoo.com

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ABSTRACT

The adsorption of naphthalene from aqueous solution onto unripe orange peel has been investigated. The experiments were conducted using a batch reactor system. The influence of different experimental parameters such as pH, initial naphthalene concentration, particle size, adsorbent dosage and contact time on naphthalene removal was considered. Results of the batch adsorption experiment showed that equilibrium adsorption was attained in 180 min. The removal efficiency increased with an increase in adsorbent dosage, contact time and concentration but decreased with an increase in the particle size. The adsorption capacity of the unripe orange peel for an initial 100 mg/l of naphthalene was maximum at an optimum pH of 6, with an orange peel loading of 7.5 g. This study satisfactorily demonstrated that unripe orange peel which is an environmental pollutant could be used to adsorb polycyclic aromatic hydrocarbons and achieve environmental cleanliness.

Keywords: Adsorption; Agricultural waste; Adsorbent loading; Low density materials; Sorption capacity

*Corresponding author.