

Kinetic Modelling of Oil Extraction from Neem Seed

Ogunleye O.O.^{1*}, T. L. Adewoye² and T.O. Salawudeen¹

¹Department of Chemical Engineering, Faculty of Engineering, Ladoke Akintola University of Technology, P.M.B. 4000, Ogbomoso, Oyo State, Nigeria.

²Department of Chemical Engineering, Faculty of Engineering, University of Ilorin, P.M.B. 1515, Ilorin –Kwara State, Nigeria.

Abstract

The suitability of three different types of extraction kinetic models (one- step, two –step and three – step models) for neem oil was investigated in this study. Solvent extraction using n-hexane at temperatures range between 303K and 323 K; 360minutes of extraction time were experimented and the oil yield calculated. The three models were fitted to the experimental data obtained. The oil yield increased from 31.80 % to 41% at 303K and 323 K, respectively and the equilibrium was reached at 300 minutes. The saturation extraction capacity (C_s) increased from 35.0631 gL⁻¹ to 42.9698 gL⁻¹ 303K and 323 K, respectively for one step model and the R^2 ranged between 0.9874 and 0.9998. The washing mass transfer coefficient (C_e^w) of oil yields at equilibrium accounts for about 60% of the extraction in the two-step model and the R^2 ranged between 0.9840 and 0.9960. The first coefficient of diffusion (w_e^{d1}) in the three-step model had is higher value than the second (w_e^{d2}) and R^2 ranged between 0.9920 and 0.9980. The three-step model best fitted the experimental data.

Keywords: Extraction, kinetic, equilibrium, diffusion, saturation.

***E-mail:** ooogunleye@yahoo.com

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