

Oryzanol Recovery from Rice Bran Oil: Adsorption Equilibrium Models Through Kinetics Data Approachments

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Abstract : Oryzanol content in rice bran oil (RBO) naturally has high antioxidant activity. Its reviewed has several health properties and high interested in pharmacy, cosmetics, and nutrition's. Because of the low concentration of oryzanol in crude RBO (0.9-2.9%) then its need to be further processed for practical usage, such as via adsorption process. In this study, investigation and adjustment of adsorption equilibrium models were conducted through the kinetic data approachments. Mathematical modeling on kinetics of batch adsorption of oryzanol separation from RBO has been set-up and then applied for equilibrium results. The size of adsorbent particles used in this case are usually relatively small then the concentration in the adsorbent is assumed to be not different. Hence, the adsorption rate is controlled by the rate of oryzanol mass transfer from the bulk fluid of RBO to the surface of silica gel. In this approachments, the rate of mass transfer is assumed to be proportional to the concentration deviation from the equilibrium state. The equilibrium models applied were Langmuir, coefficient distribution, and Freundlich with the values of the parameters obtained from equilibrium results. It turned out that the models set-up can quantitatively describe the experimental kinetics data and the adjustment of the values of equilibrium isotherm parameters significantly improves the accuracy of the model. And then the value of mass transfer coefficient per unit adsorbent mass (kca) is obtained by curve fitting.

Keywords : adsorption equilibrium, adsorption kinetics, oryzanol, rice bran oil

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