

Kinetics and Thermodynamics of Microwave-Assisted Drying of Paclitaxel for Removal of Residual Acetonitrile

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Abstract

In this study, we investigated the kinetics and thermodynamics of microwave-assisted drying of paclitaxel for the removal of residual solvent, acetonitrile. The efficiency of microwave-assisted drying increased with increasing drying temperature. When the experimental data were applied to various kinetic models, the Newton model, Page model, and the Geometric model were acceptable. Among the kinetic models, the Page model was the most appropriate. The activation energy E_a of microwave-assisted drying was found to be 76.87 kJ/mol. The Gibbs free energy change was determined to be negative, while enthalpy change and entropy change were positive. These results indicate that this extraction process was spontaneous, endothermic, and irreversible in nature.

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