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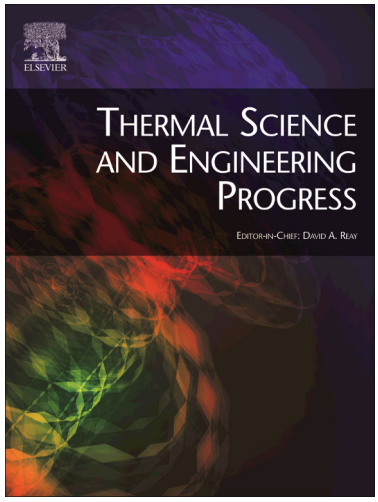

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Mathematical modelling of adsorption isotherms of Malaysian variety of purple flesh sweet potato at different temperatures

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Abstract

Purple flesh sweet potato or *Ipomea batatas* is one of the most important crops in Malaysia. Currently the crop is exclusively consumed and marketed in a dried form as traditional snacks and chips. So, understanding the moisture sorption isotherms of this crop is imperative for determining its storability and optimal shelf life of the dried product. Thus, the objective of this study was to determine the adsorption isotherms of purple flesh sweet potato experimentally and the data obtained were used to model the process at different temperatures by employing several mathematical models using non-linear regression analysis. Several mathematical models (GAB, BET, Oswin, Chung and Pfost, Peleg, Henderson, Langmuir, Caurie and Halsey) were tested and compared with the experimental data. The best fitting mathematical model for all temperatures was Caurie's equation with highest R^2 value within the range of 0.9919 and 0.9949 and lowest chi square (λ^2) values of 0.0000151 to 0.0000229 . The monolayer moisture content for optimum moisture level for safe storage can be obtained from BET, GAB and Caurie equations. The monolayer moisture content from the GAB equation were found to be 0.1314, 0.1253 and 0.1182 kg $_w$ / kg $_{DM}$ and from Caurie's

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