Mathematical modelling of oven drying kinetics of pretreated cassava flour

ELLYAS ALGA NAINGGOLAN[1], KLÁRA URBANOVÁ[2]

[1] *Czech University of Life Sciences Prague, Fac. of Tropical AgriSciences - Dept. of Sustainable Technologies, Czech Republic , Czech Republic*

[2] *Czech University of Life Sciences Prague, Fac. of Tropical AgriSciences - Dept. of Sustainable Technologies, Czech Republic*

Abstract

Cassava (*Manihot esculenta* Crantz) is a widely available agricultural commodity and a significant source of calories in Indonesia. Cassava flour, which is processed via pretreatment and drying, is one of the derivative products of cassava. The application of heat during drying helps to achieve the good quality of the final product. The popular method for drying cassava in the tropical regions is sun drying. The disadvantage of this drying method is spending much time due to ambient temperature during dying. Some of the challenges in processing cassava flour include the presence of high-temperature heating and the reaction between sugar and protein, which can result in the Maillard reaction, which is a major concern for cassava processing in general. The purpose of this study was to determine the model of oven drying characteristics of pretreated cassava flour empirically and fundamentally. In this study, the following experimental variations were DIP (soaked in distilled water for 3 days at room temperature 24°C); DIB (soaked in distilled water for 2 days then blanched at 100°C for 3 minutes); and BDI (blanched at 100°C for 3 minutes then soaked in distilled water for 2 days). The results showed that the Midilli model satisfactorily described the drying behaviour of pretreated cassava flour with high coefficient of determination values ($R^2 = 0.9808$) and low values of sum square error (SSE = 0.02734). The Midili model could suitably express oven drying characteristics of pretreated cassava flour than the other models since it has shown best accuracy to the experimental data as compared to the other models (Newton, Two-term, Logarithmic, and Page).

Keywords: Blanching, cassava flour, modelling, oven drying, soaking

Contact Address: Ellyas Alga Nainggolan, Czech University of Life Sciences Prague, Fac. of Tropical AgriSciences - Dept. of Sustainable Technologies, Czech Republic , Kamýcká 129, 16500 Prague, Czech Republic, e-mail: nainggolan@ftz.czu.cz