

Optimization of Color and Thermal Properties of Sweet Cassava (*Manihot Esculenta* Crantz Var. Uvlnr 0005) Flour using Response Surface Methodology

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Background and Objective: Cassava is an essential foodstuff in the tropical regions of the world. It is high in calories and also a very good source of revenue for many countries. Present study focused on optimizing quality of cassava (UVLNR 0005) flour in terms of color and thermal qualities.

Materials and Methods: A central composite rotatable drying experiments comprising of two factors: drying temperature (60-70°C) and drying time (15-20 h) was designed using Stat-Ease design expert software. The software was also used to carry out one way analysis of variance ($P < 0.05$), regression analysis, optimization of color and thermal properties and obtain contour plots for interactions between the drying conditions, color and thermal properties.

Results: Results indicated that the drying conditions used in this study had no significant effect on color and thermal properties of cassava (UVLNR 0005) flour. The range of L^* , a^* , b^* , hue, chroma and WI were 87.67-93.57, -0.27-1.1, 8.4-11.83, 84.87-91.5, 8.4-11.87 and 82.88-89.42 respectively. The onset, peak, conclusion temperatures and enthalpy of gelatinization ranged between 93.68 to 114.21°C, 100.35 to 118.49°C, 108.73 to 123.51°C and 3.74 to 11.54°C respectively. Mathematical models obtained for the prediction of color and thermal properties at different drying temperatures and time were characterized with insignificant ($P > 0.05$) lack of fit test and high regression values. Drying conditions of 65.34°C drying temperature, 16.48 h drying time were found optimum for product quality at a desirability of 0.78.

Conclusion: It was concluded that use of the optimum drying conditions obtained in this study for drying cassava chips can help preserve the color and thermal qualities of cassava flour.

Keywords: Cassava; response surface methodology; thermal properties; flour; optimization; models; contour plots; drying

Biography:

Patrick F. Kapila, a senior lecturer in the Department of Agricultural and Rural Engineering, University of Venda, South Africa. My research interest includes agricultural engineering and farm mechanization.