

Modelling of Moisture Loss and Oil Uptake during Deep-Fat Frying of Plantain

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Abstract : A predictive mathematical model based on the fundamental principles of mass transfer was developed to simulate the moisture content and oil content during Deep-Fat Frying (DFF) process of dodo. The resulting governing equation, that is, partial differential equation that describes rate of moisture loss and oil uptake was solved numerically using explicit Finite Difference Technique (FDT). Computer codes were written in MATLAB environment for the implementation of FDT at different frying conditions and moisture loss as well as oil uptake simulation during DFF of dodo. Plantain samples were sliced into 5 mm thickness and fried at different frying oil temperatures (150, 160 and 170 °C) for periods varying from 2 to 4 min. The comparison between the predicted results and experimental data for the validation of the model showed reasonable agreement. The correlation coefficients between the predicted and experimental values of moisture and oil transfer models ranging from 0.912 to 0.947 and 0.895 to 0.957, respectively. The predicted results could be further used for the design, control and optimization of deep-fat frying process.

Keywords : frying, moisture loss, modelling, oil uptake

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