# Mathematical Modelling Heat and Mass Transfer in Frying Process of Starchy Food

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## Abstract

*Simultaneous heat and mass (moisture and oil) transfer process that occured during the frying process is modeled mathematically using the basic principal heat and mass transfer processes. Heat transfer within material was predicted by FourierÃ¢â‚¬â„¢s law of the conduction heat transfer mechanism, while mass transfer within material was formulated with FickÃ¢â‚¬â„¢s law of diffusion mechanism. The objective of this study was to develop mathematical model of the heat, moisture and oil transfer that occur simultaneously on the starchy food during the frying process. Solution of the model with numerical analysis using implicit finite difference method of Crank-Nicolson. The simulation output the model was presented as temperature, moisture and oil profiles during frying process.. Slabs of dried dough corn powder were fried in the fresh coconut oil at 180$^0$C during 36 minutes . Temperature of material was recorded with datalogger during frying process, and some of sampel were taken from deep fryer at certain time for being measured its moisture and oil content. The model was verified with experimental data of temperature, moisture and oil profiles. It was obtained from this research that the simulation output and the experimental data was in a good agreement.*

**Key words :** Frying process, mathematical model, heat and mass transfer