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Numerically Simulations the Germinated Parboiled Thunya-sirin Glutinous Rice under a Combined Far infrared Radiation and Air Convection Drying

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The objective of this study was to describes the development of a three-dimensional (3-D) mathematical model, which was used to during drying of germinated parboiled Thunya-sirin glutinous rice product under dryer. The three-dimensional mathematical models were solved numerically using the finite element method; additionally the mathematical model was validated by comparing the simulated results with the experimental. In this study, the following drying parameters were set for investigation: Far infrared intensities at 3 to 5 kW/mˆ2 were combined with a 40oC temperature and 1 m/s air velocity. The results showed that the mathematical model can be satisfied to predict the evolutions of germinated parboiled Thunya-sirin glutinous rice product. An increase of the applied intensity from 3 kW/mˆ2 to 5 kW/mˆ2 resulted in the shorter drying time and the reduced energy consumption by 70 min and 5.29 kWh/kg water removed, respectively. The average effective moisture diffusivities of the germinated parboiled rice were in the ranges 1.25 x10ˆ10 −3.48x10ˆ10 mˆ2/s.

Authors: Dr SAROBOL, Mali (Rajabhat Maha Sarakham University); Mr SAROBOL, Preedok

Co-authors: Ms TEETA, Suminya (Rajabhat Maha Sarakham University); Dr PHARANAT, Wanida (Rajabhat Maha Sarakham University); Mr DEEJING , Konlayut (Rajabhat Maha Sarakham University)

Presenters: Dr SAROBOL, Mali (Rajabhat Maha Sarakham University); Mr SAROBOL, Preedok

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