# Mathematical modeling of drying kinetics of the kiwifruit pastille

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**Abstract**

In this study, a novel product of kiwifruit named fruit pastille based on kiwi, was produced. The aim of this study was to investigate the effects of different concentrations of hydrocolloids including agar (0.25 and 0.5%) and guar (0.25 and 1%) on drying kinetics at 70, 80 and 90°C. The achieved drying curves of the experimental data were fitted to eight models of the drying thin layer models. All mathematical drying models were compared according to coefficient of determination ($R^2$), sum of squared error (SSE) and Root Mean Squared Error (RMSE). Result indicated that as temperature increased, the drying time decreased. Agar had no effect on the drying of the samples. On the other hand, as guar concentration increased, moisture content of the samples decreased. Of the whole fitted mathematical models, the Midilli model with $R^2$ of 0.9999 was selected as the best one. In addition, the temperature dependence of the effective diffusivity coefficient was expressed by an Arrhenius type relationship. The effective diffusivity varied between $1.83\times10^{-9}$ and $2.29\times10^{-9}$ $m^2/s$ with activation energy of 11.722 kJ/mol.

***Keywords:*** ***Activation energy, Agar, Drying kinetics, Effective diffusivity, Fruit pastille, Guar***