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Kinetic modeling of quality changes in couscous cooked with ohmic heating at various times

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Abstract

Couscous, a type of pasta, should be consumed after cooking. Therefore, it is aimed to develop a mathematical model to predict the changes in quality properties of couscous cooked with ohmic heating (OH) as a function of different cooking times (0, 4, 8, 12, and 16 min). The current, total energy, and average power values during the cooking process of dried couscous using OH were also determined. For this purpose, couscous samples were cooked in a 0.1% salt solution to determine the effect of ohmic heating at a voltage gradient of 17 V/cm on different quality parameters (color, texture profile analysis, moisture content, cooking loss, and percent changes in weight increase (%)). The collected data in the present study were fitted to zero-order, first-order, and second-order kinetic models, and root mean squared errors (RMSE), coefficient of determination (R^2), and the Akaike information criterion (AIC) were then used to compare the models. Our finding revealed that the energy consumption raised with the increase in cooking time for the ohmic heating, but the efficacy of this heating system decreased with increase in cooking time. In addition, the second-order model was the best model to describe the changes in color parameters. Furthermore, the zero-order model was the most suitable model for fitting the experimental data observed for the cooking loss, moisture content, and weight increase (%). However, neither model produced the best fit for all TPA parameters.

Keywords: *Ohmic heating, couscous, cooking, kinetic, modeling*