

Effect of Drying on Microstructure, Color, Water Absorption and Pasting Properties of Millet based Pasta

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Abstract—The aim of this work was to study drying kinetics and to analyze effect of drying temperature on different quality attributes of functional pasta. Drying characteristics of developed millet based pasta were investigated at a temperature range of 50°C to 80°C in a convective tray drier at constant air velocity of 0.05m/s. Results indicated temperature significantly affected drying process of pasta. Drying of pasta samples took place during falling rate period. Different mathematical models were evaluated for goodness of fit by comparing coefficient of determination (R^2), chi square (χ^2) and root mean square error (RSME) parameters. Comparability of statistical parameters led to conclusion that logarithm model showed the best results for describing drying behavior of pasta. Effective moisture diffusivity (D_{eff}) of samples increased with increase in drying temperature and ranges from $2.01-2.86 \times 10^{-9} \text{ m}^2 \text{ s}^{-1}$. Activation energy (E_a) value evaluated was 15.23 kJ/mol. Quality parameters like water absorption and color of dried pasta are significantly ($P < 0.05$) affected with drying temperature. Scanning electron microscopic observations showed that pasta microstructure was affected by temperature as pasta dried at 80°C seems to have denser and more continuous gluten network.

Keywords: Effective moisture diffusivity; Activation energy; Scanning electron microscopic; water absorption; color.