

Microwave vacuum drying of kachkal (*Musa* ABB) banana and its value added products

Abstract

Kachkal banana (*Musa* ABB) was dried in a microwave-vacuum drier up to a final moisture content of around 8% to 10 % (db). The effect of microwave power level (400 to 800 W), vacuum level (380 to 680 mm Hg), and slice thickness (4 to 8 mm) on drying efficiency and some quality attributes (color, %scavenging activity, rehydration ratio) of dehydrated banana were analyzed by means of ANN modeling and optimized by Genetic Algorithm. A 3³ factorial in the central composite design was employed for the optimization process. The system pressure strongly affected color, rehydration ratio and % scavenging activity of dehydrated banana. A high vacuum level during drying resulted in better product quality. Optimum was found to be 4mm thickness, 405 watt power level and 636 mm Hg pressure. The optimum condition was used to dry banana chips to make into powder. The kachkal powder is used in combination of wheat flour to make biscuit. The combination in the range of 90:10 (R.W.F:K.P) up to 30:70 (R.W.F:K.P) is found to be acceptable as obtained from the sensory data analyzed using fuzzy logic. An attempt was made to find out the empirical equation of effective moisture diffusivity of banana slices in different drying condition. A total of 15 combinations at power level 400, 500, 600, 700 and 800 W and vacuum level 380, 530, 680 mm Hg was taken. The empirical equation along with their coefficients was found out. The sorption isotherm of the biscuit was also determined by fitting in eight models. In the mathematical modeling of moisture sorption isotherm, the models that best fitted the experimental data were Pelleg, Caurie, BET, GAB and Smith, all having R² values greater than 0.97.