عنوان مقاله:

Applying Artificial Neural Network for Drying Time Prediction of Green Pea in a Microwave Assisted Fluidized Bed Dryer

محل انتشار:

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خلاصه مقاله:

Drying characteristics of green pea (Pisum satium) with an initial moisture content of ۷۶% (db) was studied in a fluidized bed dryer assisted by microwave heating. Four drying air temperatures (۳۰, ۴۰, ۵۰ and ۶۰°C) and five microwave powers (۱۸۰, ۳۶۰, ۵۴۰, ۷۲۰ and ۹۰۰W) were adopted. Several experiments were conducted to obtain data for sample moisture content versus drying time. The results showed that increasing the drying air temperature resulted in up to ۵% decrease in drying time while in the microwave-assisted fluidized bed system, the drying time decreased dramatically up to ۷۸.۸%. As a result, addition of microwave energy to the fluidized bed drying is recommended to enhance the drying rate of green pea. Furthermore, in this study, the application of Artificial Neural Network (ANN) for predicting the drying time (output parameter) was investigated. Microwave power, drying air temperature, and green pea moisture content were considered as input parameters for the model. An ANN model with ۵۰ neurons was selected for studying the influence of transfer functions and training algorithms. The results revealed that a network with the logsig (Log sigmoid) transfer function and trainrp (Resilient back propagation; Rprop) back propagation algorithm made the most accurate predictions for the green pea drying system. In order to test the ANN model, the root mean square error (RMSE), mean absolute error (MAE), and standard error (SE) were calculated and showed that the random errors were within and acceptable range of ±۵% with a coefficient of determination (R۲) of ۹۸%.

کلمات کلیدی:

Green pea, Fluidized bed dryer, Microwave, Artificial Neural Network