Single-layer Drying Model for Longan (*Dimocarpus longan* Lour.)

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Abstract

Dried longan, using deep-bed dryer, is an important product in Thailand since 2000. To prevent the non-uniform product, information about moisture content of the product of each layer during drying are important. The modelling of this dryer is not reached due to the complexity of drying single fruit and single layer model. Semi-empirical and empirical models of single layers were used for simulation of the single layer inside the bulk dryer. In this work, based on standard of ASABE, 15 single-layer models were used on nonlinear fitting programming on MATLAB. The coefficient of each model was calculated by fitting with drying curve of drying experiment at different drying conditions. Effect of size of fruit and also temperature, air velocity and relative humidity of drying air to coefficient was studied. The evaluated index of model was defined in term of Residue Sum of Square (RSS), Standard Error of Estimation (SEE) and R^2. As results of all models showed highly fitting with experiment data, RSS is the best index for evaluate model because this index give the different result of each model while this was not found in SEE and R^2 index. For the reason of low coefficients that show low RSS index, Modified Page's model is the simplest model for modelling the moisture content of each single layer in the bulk of longan. There are no effect of air velocity and relative humidity to drying curve and coefficient of each model but these has correlation with temperature and size of fruit. The model with coefficients that are a function of temperature and the size of fruit are widely use in the industries.

Keywords: Drying, fruit, longan, model