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Black box modelling of infrared drying system for herbs dehydration

Abstract

This study focused on development of infrared dryer system for Orthosiphon Stamineus leaves drying application. In any food technology, the dryer is the key component for quality drying food and herbs etc. An oven is modified to produce high technology drying system. A mathematical model is developed based on time response characteristics of the system. A second order model is found to adequately represent the system as it gives best fit with better properties than the first order model with error between measured data and simulation data is 0.44. Validation procedures show that the derived model is indeed a good enough representation of drying system. The infrared dryer system is highly non-linear and exhibits varying model parameters. An identification system is introduced to estimate the parameters and determine mathematical model of the system. ARMAX of n_a = 2, n_b = 1 and n_c = 1 polynomial model show best fit to experimental response of PRBS input.

Keywords

Dryer; Herbs; Infrared; Modelling; Temperature