Process modelling and optimization of osmotic dehydration assisted drying of red bell peppper

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Abstract

Osmotic dehydration (pretreatment) of red bell pepper in hypertonic salt (NaCl) solution and drying was studied. A 4×4×4 factorial experiment in a Randomized Complete Block Design (RCBD) was used for the pretreatment and pretreated samples were later dried in a fabricated laboratory dryer. Process variables considered were four levels each of osmotic process durations (30, 60, 90 and 120 min), osmotic solution concentrations (5, 10, 15 and 20 % w/w of sodium chloride) and osmotic solution temperatures (30, 40, 50 and 600C) with each trial conducted in triplicates while a drying temperature of 600C was used throughout the experiment. Drying rate was estimated for all test runs while vitamin C, vitamin A, ash content, water loss and solid gain were estimated as quality parameters. Model equations were developed with Essential Regression (ESSREG) software package which related output parameters to process variables and validated. Results gave optimum drying rate (maximized), vitamin C (maximized), vitamin A (maximized), water loss (maximized), solid gain (maximized) and ash content (minimized) of 4.26 g/h, 152.82 mg/100g, 1.42 mg/100g, 0.24 g/g, 0.91 g/g and 8.04 % respectively.

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