

Optimization of Osmo-Convective Drying of Edible Button Mushroom Using Response Surface Methodology

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Abstract

Introduction: Response Surface Methodology (RSM) was used to determine the optimum processing conditions that yield maximum water loss, minimum solid gain, maximum rehydration ratio and minimum shrinkage by osmo-convective drying of edible button mushroom.

Material & Methods: Temperature (25-40°C), immersion time (120-300 min), salt concentration (0-5%), sucrose concentration (40-60%), pressure (500-700 mbar) and drying temperature (30-60°C) were the factors investigated with respect to water loss, rehydration ratio, solid gain and shrinkage. Experiments were designed according to Central Composite Design with these six factors each at five different levels.

Results: Analyzing response surfaces and contour plots, optimum operation conditions were found to be temperature of 39°C, immersion time of 164 min, salt concentration of 14%, sucrose concentration of 53%, pressure of 600 mbar and drying temperature of 40°C.

Conclusion: At the optimum point, water loss, solid gain, rehydration ratio and shrinkage were found to be 63.38 (g/100 g initial sample), 3.17 (g/100 g initial sample), 2.26 and 7.15, respectively. Apart from the optimum condition which provides desirable products, color, texture, flavor and other quality indices might be investigated to produce higher quality products.

Keywords: Button Mushroom, Osmo-Convective Drying, Optimization, Response Surface Methodology.