


Effect of Maltodextrin, Sodium Chloride, and Liquid Smoke on the Mass Transfer Kinetics and Storage Stability of Osmotically Dehydrated Beef Meat

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Abstract Osmotic dehydration is a non-thermal process for water removal from foods. The aim of the present study was (i) to investigate the effect of binary (NaCl and water) and ternary (maltodextrin, NaCl, and water) osmotic solutions with or without 0.5% liquid smoke on moisture loss, solids gain, and salt content during osmotic dehydration of beef meat and (ii) to evaluate the microbiological and oxidative stability of the processed meat. Osmotic processing resulted in 8.01–13.15% water loss and 3.53–7.59% solids gain depending on the concentration of the osmotic medium. Liquid smoke did not affect mass transfer phenomena ($P > 0.05$), except for the treatment with 25% NaCl. The applied models for the estimation of the apparent coefficients demonstrated a good fit with experimental data. The simplified Fick's equations produced the best results. Osmotic treatment with binary and ternary osmotic solutions reduced total aerobic viable microbial counts ($P > 0.05$) of meat during storage at 4 °C for 9 days. Liquid smoke did not affect microbial counts, but it was very effective in inhibiting lipid oxidation during storage. The results demonstrate that osmotic dehydration with the addition of liquid smoke could effectively increase the shelf life of beef meat by at least 2 days.

Keywords Osmotic dehydration · Ternary solutions · Liquid smoke · Maltodextrin · Beef meat