

Title Computer simulation of high pressure cooling of pork
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Abstract

A computer simulation was used to develop and evaluate two-dimensional axi-symmetrical of cooling of pork under high pressure (HP) processing conditions. The whole cooling process was divided into three stages of cooling: a preloading stage, a pressure build-up stage (compression) and a pressure hold stage (constant pressure), and the modeling domain covered the pressurization fluid, the sample holder and the pork sample. Modeling performance was evaluated by comparing the predicted and experimental temperatures at four locations: three within the pork sample and one for the high pressure fluid medium. Model generated images were used for visual observations of temperature distribution and movement of the pressure fluid, and transient temperature curves were generated for the four specified locations. Results indicated that the developed model well matched experimental results, especially for temperatures at the central area. The thermal conductivities of pork under pressure conditions: 100, 150 and 200 MPa were estimated by the model using error trials. The model provides a valuable tool for studying the pressure cooling behavior of test samples and for designing the pressure shift freezing process.