A B S T R A C T

Prediction of Heating Curves of Canned Model Systems With Mixed Convection-Conduction Behaviour

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This work presents empirical relationships for the prediction of time-temperature histories and nutrient retention as a function of positional dimensionless coordinates during the thermal processing of food model systems showing mixed convection-conduction behaviour. The experimental verification of the mathematical model is carried out in food models of various nature canned in different can sizes and processing conditions. Multiple regression analysis of the heat penetration data showed that it is possible to differentiate three periods during the heating process: Convection, Transition and Conduction.

The proposed mathematical model predicts the temperature during the heating and cooling process, at the can geometrical center, within $\pm$ 10 °F, while at points located above and below the transverse horizontal plane the mean prediction error is within $\pm$ 12 °F at those times defining the end of each heating period. Most of the theoretically predicted values of thiamine retention are within the 95 % interval of confidence.