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Czech J. Food Sci.

**Hoke K., Landfeld A.,
Severa J., Kýhos K.,**

Zitny R., Houska M.
**Prediction of the
average surface heat
transfer coefficient for
model foodstuffs in a
vertical display cabinet**

Czech J. Food Sci., 26 (2008): 199-210

Calculations of transient temperatures of food products after they are transferred from a warm environment into a display cabinet, require data on the surface heat transfer coefficient (SHTC). There is no forced air flow in an ordinary display cabinet, so the energy transfer is achieved mainly by free convection, conduction to a supporting plate, and radiation. Theoretical analysis of the heat transfer to a cylindrical sample demonstrates the relative influences of these mechanisms. This work investigates the apparent surface transfer coefficients with metal models. Heated models were placed individually (bare) in containers with and without lids. Each model was surrounded by identical containers filled with water. These were

initially at the same temperature as the model or at the mean cabinet temperature. There were one, two, or three layers of these water containers. From the measured time-temperature histories of the model and the air surrounding the model, the SHTCs were calculated as functions of time and transformed into the dependencies between SHTC and temperature difference. The highest SHTCs were observed when the model was placed directly on the metal shelf of the display cabinet. The models surrounded by cool water containers showed lower SHTC values. The lowest SHTC values were found with the models placed in the middle of three layers of warm water containers. Placing the model on an insulating base leads to a lower SHTC. This effect confirms that the heat conduction through the substrate increases the heat transfer from the model and thus increases the average value of the apparent SHTC.

Keywords:

SHTC; vertical display cabinet; correlations; food safety

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