Predicting freezing time for keropok lekor.

ABSTRACT

The freezing process of keropok lekor (fish sausage) has been studied experimentally and by numerical simulation of unsteady heat transfer. Core temperature history of keropok lekor samples placed in the air-blast freezer were registered. The developed numerical model utilizes the solution of the Fourier equation of heat transfer for an infinite cylinder and for a sphere with variable product enthalpy. Heat transfer coefficient was determined from the thermal history of aluminum cylinder with dimensions similar to experimental keropok lekor. The contents of water, crude protein, fat, carbohydrate and ash were determined to evaluate variations of keropok lekor thermal properties with temperature. These thermal properties, i.e, thermal conductivity, enthalpy freezing point, were obtained by using composition correlations. Calculated and experimental freezing times are in good agreement with each other, for each of the cylindrical and spherical keropok lekor samples. For 20 mm diameter cylindrical and spherical keropok lekor samples, the freezing time to achieve a frozen temperature of - 20°C were 20 min and 15 min, respectively.

Keyword: Keropok lekor; Freezing time; Thermal properties.