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Emperical Correlation for Measurement of Thermal Diffusivity of Spherical Shaped Food Products under Forced Convection Environment

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Abstract : The present work is the development of an experimental method for determining the thermal diffusivity variations with temperature of selected regular shaped solid fruits and vegetables subjected to forced convection cooling. Experimental investigations were carried on the sample chosen (potato and brinjal), which is approximately of spherical geometry. The variation of temperature within the food product is measured at several locations from centre to skin, under forced convection environment using a deep freezer, maintained at -10°C.This method uses one dimensional Fourier equation applied to regular shapes. For this, the experimental temperature data obtained from cylindrical and spherical shaped products during pre-cooling was utilised. Such temperature and thermal diffusivity profiles can be readily used with other information such as degradation rate, etc. to evaluate thermal treatments based on cold air cooling methods for storage of perishable food products.

Keywords : thermal diffusivity, skin temperature, precooling, forced convection, regular shaped
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