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A New Method for Estimation of Temperature in Food Exposed to Abuse Temperature

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A new method of estimating the temperature in a food (sausage) exposed to dynamic temperatures was developed to predict bacterial growth in the food. First, the temperatures of nodes constructed in the sausage were successfully predicted from the measured temperatures of the surface nodes using the universal heat conduction equation. Second, to apply the method to real food industry contexts, the nodes for measurement were reduced to two standard nodes, namely, the centers of the top and bottom surfaces of the food. Temperature differences between the surface and standard nodes were mostly independent of the exposure temperature. Using the difference data and the temperatures measured at the standard nodes, the temperatures in the food exposed to various patterns of temperature were also successfully predicted. This method is thought to be empirical but practical. A new alert system which predicts the growth of microorganisms contaminating foods might be developed by coupling our method with a microbial growth model.

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