

Microwave Heating Simulation of Frozen Pie

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Abstract

Adequate heating is very important for assuring high quality products like the extensively used domestic microwave oven. The ultimate goal of microwave heating is let the frozen food become ready-to-eat meanwhile assuring heating uniformity and food safety. This study is to research the thermal effect of frozen pie heated in the microwave oven. The model was analyzed in COMSOL Multiphysics® software. Here the properties of pie were derived based on its composition and imported to COMSOL. Surface temperature profile and point temperature change with time within the pie was tested by an infrared thermometer and fiber thermometer respectively. The susceptor, using for packaging the pie, which will let the pie's edge become brown and crispy in the heating process, is also analyzed with the transition boundary condition in COMSOL. The thermal effect was validated by experimental results.

Reference

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Matthew W. Lorence, Peter S. Pesheck, *Development of packaging and products for use in microwave ovens*. 2009. Woodhead Publishing Limited.

Figures used in the abstract

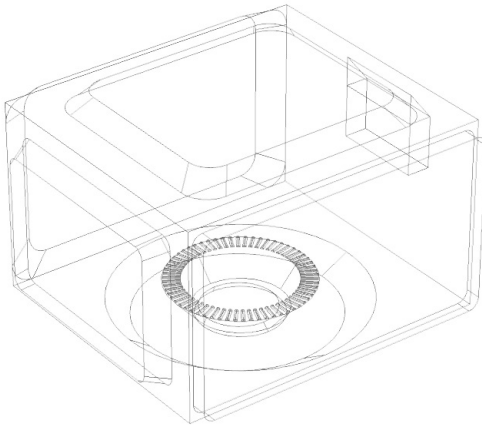


Figure 1: Pie model with microwave oven.

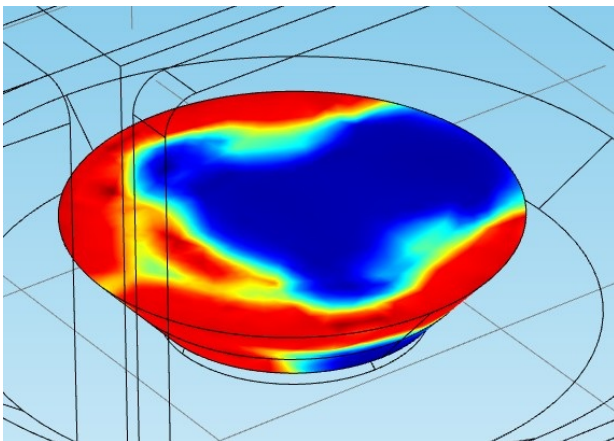


Figure 2: Surface temperature of pie.

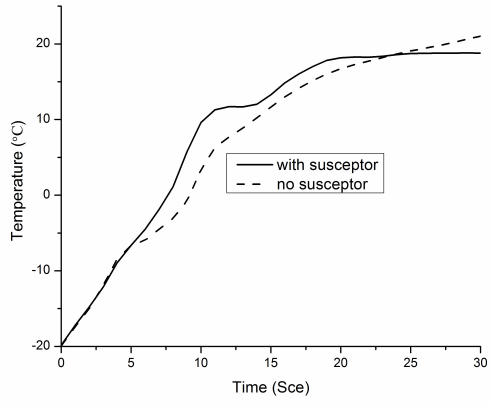


Figure 3: Point temperature changing with susceptor and without susceptor scenario.