Modeling of pancake frying with non-uniform heating source applied to domestic cookers - DTU Orbit (05/10/2019)

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The design of domestic cooking stoves is usually optimized by performing time-consuming cooking experiments, often using frying of pancakes as a standard. Simulation of cooking processes may reduce the number of experiments used in the development of the cooking stoves, saving time and resources. In this work we propose a model of contact frying of pancakes in domestic cookers, particularly in induction hobs and radiant cookers, in which the heating of the cooking vessels can be non-uniform. This non-uniformity is unavoidable in practice, but it can be reduced by optimizing the design of the cooker. The proposed model combines heat and mass transfer phenomena, and also includes the correlation between the browning development and the temperature distribution, the local water content and the cooking time. The model has been also validated through experiments using a commercial induction hob and a radiation stove. With this model the color of the cooked pancakes can be predicted, taking into account also uneven heating, and through simulations the design of the cooker can be improved.

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