

The Influence of Endothermic and Exothermic Energies on the Temperature Field of Coffee Beans during the Roasting process

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SUMMARY

The model demonstrates the shifting of temperature profiles by the latent energies. The precision is not sufficient so far, because the roast kinetic is still missing. For a more accurate simulation of the whole complex roasting process the model has to be extended by kinetic data and, if possible, combined with a mass balance describing the steam and the CO₂, leaving the coffee bean.

The model is very useful to simulate the heating of the coffee beans, particularly to determine the thermal property data (thermal conductivity, heat capacity) and also calorimetric data (reaction enthalpy, vaporization enthalpy) by comparison with experimental data presupposing that in each case all other data are known. Especially the thermal property data can be determined by fitting the experimental temperature curves in a heating procedure up to 100°C to calculated temperature curves, assuming that during those experiments the thermal property data are constant caused by a constant water content.