Computational fluid dynamic analysis of olive oil in different induction pots

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ABSTRACT

Induction cookers are popular in modern families around the world, because they present several advantages in cooking over gas and electrical resistance stoves such as higher energy efficiency, higher heating rates and safety. However the appropriate performance of these devices for induction heating (IH) depends directly on the coupled system cooker-cookware. Differences in the energy efficiency and temperature distribution during heating and cooling are related to the configuration of the pot and the different materials of the pot. In case of cooking processes, the natural convection of the different fluids may affect to the microbiology, safety, food quality and cooking times. This study aims to perform a convection and temperature distribution of olive oil analysis of three different induction cookware configurations of aluminium, enameled iron and stainless steel body cookware. The experimental data was analyzed using computational fluid dynamic (CFD) software in order to understand the thermal processes in the different pots. These results were compared with the results obtained by a thermographic camera. Differences in convection flow distribution during IH were observed on the measurements and CFD analysis and these are related with the materials configuration of the pot bottom.