

# **Engineering approach for standardization of frying processes in household fryers**

Knut Franke, Ulf Strijowski, German Institute of Food Technologies  
Quakenbrück, Germany

Frying of potato products, e.g. industrially par-fried French fries, in household fryers still remains a popular cooking method. However, there exists a broad range of equipment for household frying differing in oil content, heating power and others. Due to the broad variance of household fryers, frying results vary distinctly with respect to quality, e.g. browning, as well as food safety, e.g. acrylamide contents. Because of this variability, establishment of recommendations being generally valid for household frying is not possible so far. Therefore, a new engineering approach based on generalized process parameters for frying was developed to enable a better control of household frying processes.

For this purpose, five household fryers varying in oil capacity and specific heating power were tested with respect to frying process parameters, e.g. oil temperature settings, heat transfer, but also resulting quality of French fries.

At first, “real” oil temperatures and their local distribution in the fryer were measured and an unexpected range of temperature deviations for same settings of fryer control was found. After adjustment of temperature variations, influences of frying process parameters, e.g. product/oil-ratio or frying time, on product quality, e.g. browning or water content, were determined using a model potato product. Additionally, each frying process was analyzed applying typical engineering methods, e.g. energy balance around the fryer. Based on these results, a ‘standard frying process’ (SFP) was developed leading to a defined product quality in all fryer types included in the investigations. The SFP was further improved by frying investigations on different potato products. It could be concluded that the SFP represents a tool which allows a better evaluation of frying processes in different household fryers and the derivation of process parameters to obtain a desired final product quality and safety. The method for the development of the SFP and examples for its application will be shown in the presentation.