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8th World Congress on
Agriculture & Horticulture
and
16th Euro Global Summit on Food & Beverages

March 02-04, 2017
Amsterdam, Netherlands

Development and techno-functional sensory characterization of virtually TFA free deep-frying fats for bakery products

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Introduction: For health conscious consumers trans-fatty acids (TFA) are becoming increasingly important since they have been evidently shown to increase the risk of coronary heart diseases. Despite intense efforts of the food industry to reduce the contents of TFA in food significantly, the TFA contents of some bakery products, especially those produced by small to medium-sized bakery businesses in Germany, are still relatively high.

Aim: The aim of this project work was to generate fat blends with similar or improved techno-functional sensory properties compared to common deep-frying fats for the production of bakery products.

Methodology & Theoretical Orientation: By blending various liquid and solid vegetable fat components twelve virtually TFA free deep-frying fats were developed and characterized in terms of their techno-functional sensory properties. Foaming and splattering behavior during deep-frying, melting behavior as well as thermal and oxidation stability (measured by total polar material and polymerized triglycerides) of the fat blends were analyzed. Based on these analyses a successive reduction from twelve to six optimized deep-frying fat prototypes was carried out by means of a best-in-class principle. A long-term deep-frying study using donut-like products and quark balls serving as model bakery products was performed. Moreover, volatile rancid off-taste compounds were determined by HS-SPME-GC-O/MS. By means of NTD-GC-MS acrolein was measured.

Conclusion & Significance: The four best prototypes showed a comparable melting behavior as well as thermal and oxidative stability as the virtually TFA free deep-frying fats. The sensory characterization revealed only non-significant differences in the acceptance and preference between the deep-frying fat prototypes and both the virtually TFA free as well as the TFA rich reference. These results were used to establish a deep-frying fat toolbox that may be used for further fat blend optimizations. Finally, this research data may contribute to endorse artisan bakeries to use only virtually TFA free deep-frying fats for the production of deep-fried bakery products.

Biography

Sybille Merkle has her expertise in the Development and Evaluation of strategies to minimize trans-fatty acids in frying oils. Moreover, she is working on the development of minimizing strategies of 2- and 3-MCPD esters and Glycidyl esters in pre-fried and smoked fishery products. Her primary research work is based on the Chemical analyses of food stuffs by means of HS-GC-MS/O linking sensory data to enable qualitative and quantitative assessment. Both of the projects support small and medium-sized companies in the development of novel products.

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Notes:

J Food Process Technol 2017
ISSN: 2157-7110 JFPT, an open access journal

Agri World & Euro Food 2017
March 02-04, 2017

Volume 8, Issue 1 (Suppl)

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