Department of Safety and Quality of Cereals

MRI Max Rubner-Institut

Optimized fatty acid profiles of bakery goods via non-triglyceride-based structuring of rapeseed oil

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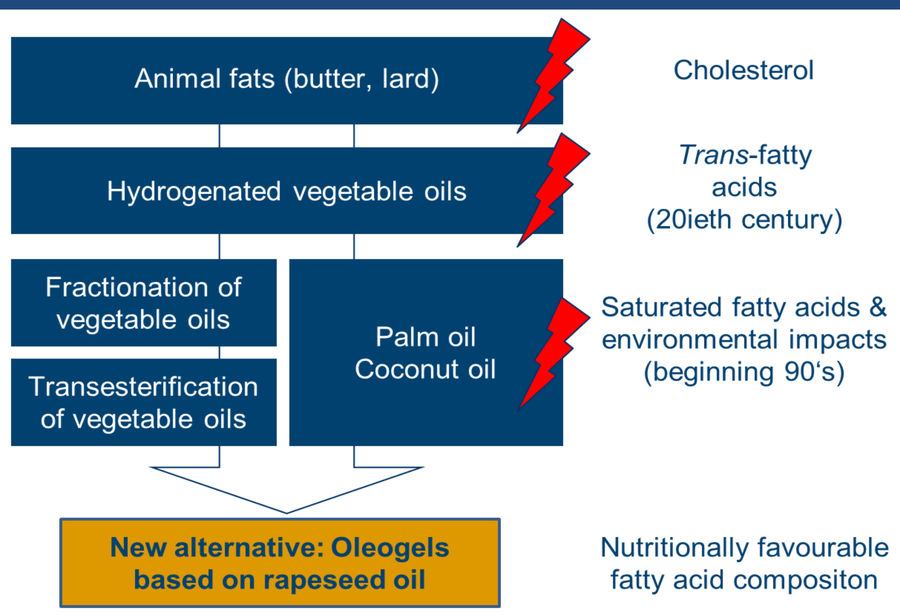
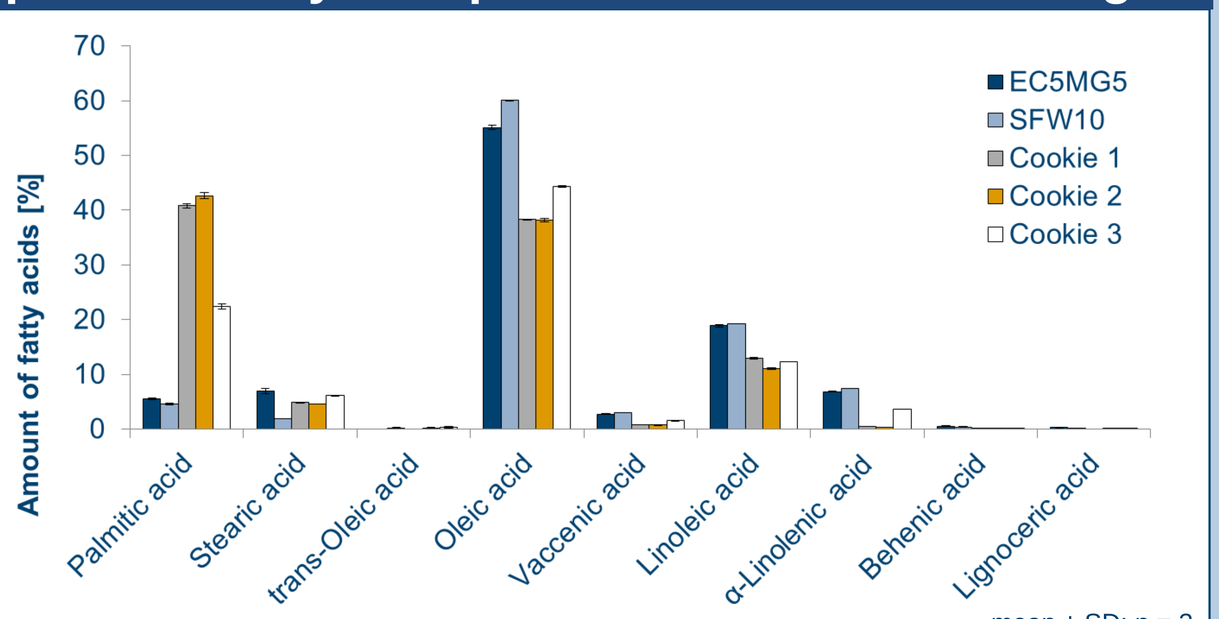
Consumer trends in the solid fat sector



Conventional solid fats are rich in saturated fatty acids and sometimes even *trans*-fatty acids. Additionally, the application of palm and coconut oil is criticized because of environmental aspects, so that rapeseed oil based oleogels are a perfect alternative.

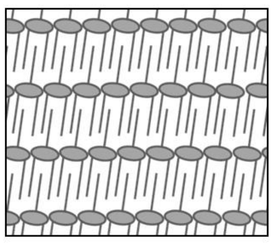
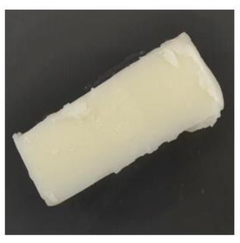
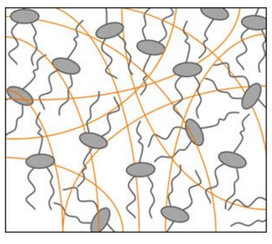
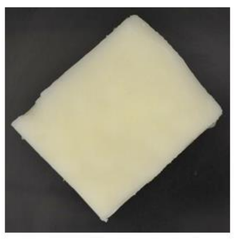
Optimized fatty acid profile of cookies via oleogels



mean ± SD; n = 3

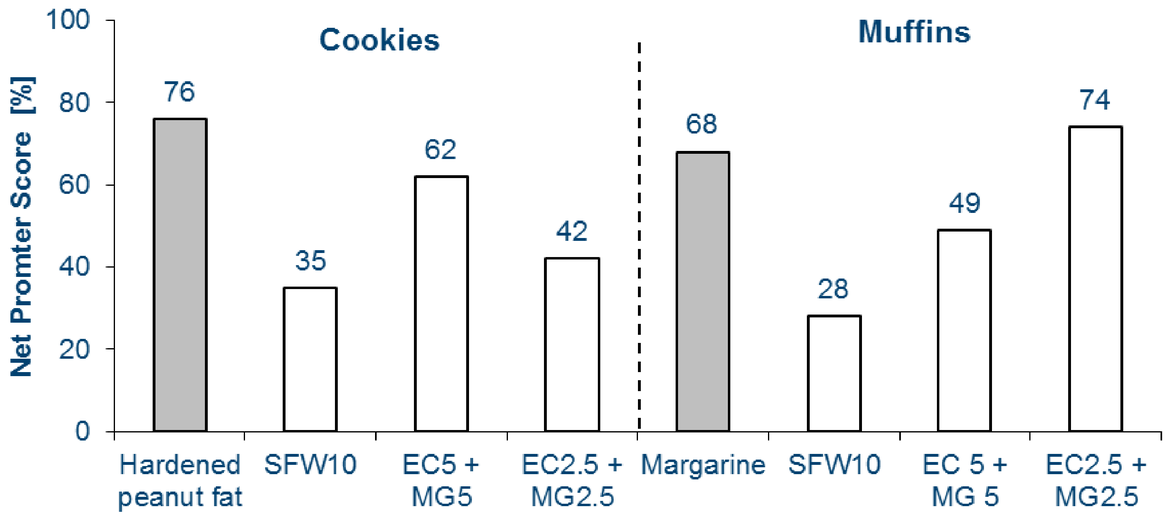
The application of oleogels significantly reduces the amount of saturated fatty acids by about 50 % and increases the proportion of monounsaturated and polyunsaturated fatty acids by at least 22 % compared to cookies with conventional fats (cookie 1-3).

Replacement of solid fats via oleogels

	Structure of triglycerides (TAG)	Schematic structure	Product
Conventional solid fats	Glycerol with saturated fatty acids (SFA) 	Compact structure of SFA 	
Structured oils - oleogels	Glycerol with mono-/poly unsaturated fatty acids (UFA) 	Lipidic continuous phase and 3D-network of building blocks 	

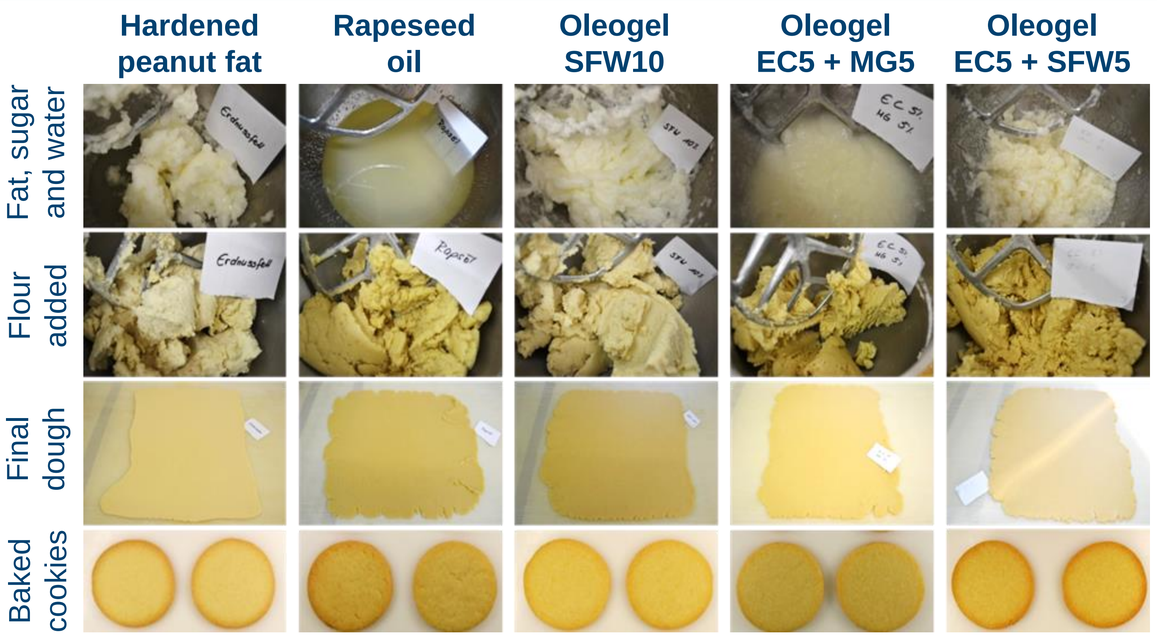
Instead of conventional TAG oil structuring, sunflower wax (SFW), ethyl cellulose (EC) or monoglycerides (MG) can be used as structurants or building blocks, which stabilize the rapeseed oil based lipidic continuous phase in a gel-like structure.

Consumer acceptance of cookies and muffins



The Net Promoter Score (NPS), which represents the probability that the consumer will recommend the product, was evaluated for different oleogel based bakery products. Whereas the structure and elasticity of products with SFW oleogels was too tight and hard, cookies and muffins based on oleogels with EC and MG are comparable or even better accepted by the consumer than cookies with conventional solid fats.

Solid fat and rapeseed oil vs. oleogel cookies



The handling and processability of rapeseed oil based oleogels with 10 % SFW or 5 % EC + 5 % MG or 5 % EC + 5 % SFW during dough preparation is comparable to conventional solid fats. These oleogels can be used for the preparation of cookies.

Summary

Rapeseed oil is recommended by nutritional physiologists because of its low amount of saturated fatty acids and its favourable ratio between linoleic and linolenic acid. Structuring of rapeseed oil with e.g. 5 % ethyl cellulose and 5 % monoglycerides results in oleogels, which are perfectly suitable for the preparation of cookies with optimized fatty acid composition. In addition, the reformulated baked goods are well accepted by the consumer, which underlines that the application of oleogels in bakery products has great potential to become marketable.

Funding

… a Project of the ***Industrial Collective Research (IGF)***

supported by/via:

IGF Industrielle Gemeinschaftsforschung

Bundesministerium für Wirtschaft und Energie aufgrund eines Beschlusses des Deutschen Bundestages

AiF Forschungsnetzwerk Mittelstand

FEI FORSCHUNGSKREIS DER ERNÄHRUNGSINDUSTRIE E.V.

This IGF Project of the FEI is/was supported via AiF within the programme for promoting the Industrial Collective Research (IGF) of the German Ministry of Economic Affairs and Energy (BMWi), based on a resolution of the German Parliament.

With support from

Federal Ministry of Food and Agriculture

ptble Projektträger Bundesanstalt für Landwirtschaft und Ernährung

by decision of the German Bundestag

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