Oxidative stability of PUFAs under food processing conditions

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Abstract

In this day and age, nutrition plays an essential role in our lives. There is an increasing desire for foods which have a health-promoting and disease-preventing effect. The attention of consumers is brought to the ratio of unsaturated ω-3 and ω-6 fatty acids (PUFAs) within food.

Rapeseed oil has a higher content of linolenic acid in comparison to other vegetable oils. In conjunction with the research project (NutriAct[1]), we are investigating the oxidative stability of rapeseed oil in various food matrices and under different process conditions.
Unsaturated fatty acids rapidly degrade to volatile compounds. Hence, the stability of oil in food systems must be investigated, especially if food is enriched with ω-3 and ω-6 fatty acids, so that the health promoting effects remain. The degradation products formed by lipid oxidation are of interest because they decisively influence the quality of food. By using various analytical methods, the oxidative deterioration can be observed. For example the volatile compounds are analysed by using GC-MS and the technique of Headspace (HS). The rancidity of rapeseed oil is characterized by certain marker substances: Hexanal, 2-Hexenal, 2,4-Decadienal, among others.
The research focus is on the various influences on lipid oxidation. The external parameters consider temperature, storage time or water content, whilst the internal parameters consider the composition of oil and interactions with other food compounds. The rate of oxidative deterioration is predominantly affected by temperature and the content of antioxidants, such as tocopherols and sinapinic acid.

The aim of the study of the food matrix is to ensure the highest possible oxidative stability of the essential ω-3 and ω-6 fatty acids during the production, storage and treatment of foods as well as to characterise the chemical interactions of degradation products of lipid oxidation with other food ingredients.

Keywords – *lipid oxidation, NutriAct, PUFAs-Polyunsaturated fatty acids, volatile compounds*

Professional Biography

Sandra Grebenteuch has studied food chemistry at the Technical University of Munich. Presently, she is doing a PhD at the Berlin Institute of Technology. As part of the NutriAct cluster, she investigates the oxidative stability of polyunsaturated fatty acids in model and food systems.

“NutriAct” means: Nutritional Intervention for Healthy Aging: Food Patterns, Behavior, and Products. Its ambitious aim is to transform research results on consumer’s food choices and its consequences into a substantial improvement of dietary intake of the adult population through both, a behavioral strategy and new products (http://www.nutriact.de).



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