

LIPID OXIDATION REACTIONS IN FAT-RICH FOODS: IS THE CURRENT ANALYTICAL TOOLBOX SUFFICIENT?

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Improving the shelf life of oil-based food products by delaying the onset of lipid oxidation is a challenge that the Food Industry has been facing already for decades. Despite that, the understanding of the complex multitude of reactions that occur simultaneously over the shelf life of the products is still rather limited. For the development of new products this means large numbers of time consuming (accelerated) shelf-life studies are needed, which unfortunately not always are good indicators for actual product stability. A better understanding of the lipid reactions occurring is needed. Analytical chemistry can help here. Good progress has been made as will be shown, but more work remains needed. In the current presentation we will discuss the wide range of analytical methods we have developed over the years to monitor chemical changes in fatty foods over time. Our toolbox includes sensor technology to monitor oxygen consumption, NMR based methods for rapid assessment of hydroperoxides, LC-MS methods for measuring non-volatile intermediates and end-products, size exclusion chromatography to monitor partial glyceride formation and polymerisation, GC for monitoring disappearance of unsaturated acids and volatiles release etc. Through joint deployment of this vast array of methods combined with advanced data reduction and -processing methods we can study lipid oxidation simultaneously from many different chemical perspectives. The application of this approach will be exemplified using the specific case of lipid oxidation in an important food emulsion: mayonnaise.

Keywords: *Lipid oxidation, Food emulsions, Mayonnaise, Analytical methods*

Acknowledgement: *All people who contributed to the analytical work are kindly acknowledged.*