Preface

Lipids are a condensed source of energy; therefore, decreasing the lipid content of foods has been one of the main strategies to combat obesity. Obesity is an increasingly serious problem, especially in the more affluent parts of the world. However, decreasing the lipid content of foods has had only limited success, mainly because of adverse sensory effects that make such foods less attractive. To develop more successful strategies to replace lipids with less energy dense alternatives, a good understanding of the sensory contribution of lipids is required.

In foods, lipids occur as emulsions or as free oil/fat dispersed in a solid matrix. Lipids contribute to both the flavor and texture of foods. The contribution of lipids to flavor is due to volatile oxidation products as well as to the taste of short-chain free fatty acids, and because the microstructure of lipid emulsions affect flavor release. Moreover in human's brain, taste, flavor, and texture are integrated in the orbitofrontal cortex to give rise to overall perception associated with a certain food, or its attractiveness to various degrees. In other words, to improve our understanding of the contribution of lipids to the sensory appreciation of foods, it is necessary to understand its effects on all sensory modalities (taste, flavor, texture, and other trigeminal sensations) and their interactions. This book focuses on the main sensory modalities that are affected by lipids and their interactions, namely flavor, texture and flavor–texture interactions.

To understand the relation between the composition of a food emulsion and its sensory perception, knowledge of the microstructure of the emulsion, its physicochemical properties, and what happens in the mouth while eating is essential. Although flavor release under static conditions is determined mainly by molecular diffusion, during eating flavor release is primarily controlled by the rate of surface renewal.

From a microstructural viewpoint, emulsion properties affecting sensory perception can be divided into factors associated with the discrete phase (phase volume and droplet size distribution), those associated with the adsorbed layer (composition and quantity) and those associated with the continuous phase (viscosity, solution composition, and properties). The partitioning of flavor-active components between the discrete and continuous phase of a food emulsion plays an important role in the perception of the overall sensory properties.

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Shahidi and Weenen; Food Lipids
ACS Symposium Series; American Chemical Society: Washington, DC, 2005.

This book contains contributions on a variety of subjects representing a state-of-the-art knowledge on flavor and texture of lipid-containing foods. Of the six chapters in the "Flavor" section, four chapters focus on the contribution of volatiles to the overall flavor of various foods (beef, mutton, peanuts, and French fries), one on the contribution of non-triacylglycerols to the flavor quality of oils, and one on the formation of odor-active compounds generated upon heating of aqueous dispersions of phospholipids.

The five chapters in the "Texture" section include discussion of the formation of an oral coating when eating a lipid-containing emulsion, the role of fats in oral friction and lubrication, the nature of creaminess, and the chemistry and rheology of cheese.

The section on "Flavor and Texture" starts with a review on how lipids influence flavor perception, release of flavor from emulsions under dynamic sampling conditions, and microstructural control of oral texture, taste, and aroma in reduced oil systems. The effect of various triacylglycerols on flavor release is also presented.

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Hugo Weenen
Numico Research and Development
WTC Schiphol Airport, Tower E
Schiphol Boulevard 105
1118 BG Schiphol Airport
The Netherlands

Fereidoon Shahidi
Department of Biochemistry
Memorial University of Newfoundland
St. John's, Newfoundland A1B 3X9
Canada

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