

Fatty Acids in Foods and Their Health Implications

edited by

Ching Kuang Chow

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Preface

Fatty acids constitute over 90% of total edible fats and oils. There are many naturally occurring fatty acids with very different chemical and physical characteristics. Also, unsaturated fatty acids, particularly those with more than one double bond, are susceptible to changes and alterations caused by chemical and physical factors. Oxidation and isomeric products of fatty acids can be formed during processing, refining, storage, and cooking.

In addition to being a concentrated source of energy, fatty acids and substances derived from them such as prostaglandins and leukotrienes carry out many important physiological functions. However, dietary fatty acids, when in excess, can have undesirable consequences. Also, oxidized and isomeric fatty acids, when consumed, may exert different biological effects from those of fatty acids that occur naturally.

In recent years there has been expansion in our knowledge of dietary fats and oils in general, and polyunsaturated fatty acids in particular. The possible roles of fats and oils in health and disease have received considerable public attention. Increasing evidence indicates that types and levels of fats and oils consumed have a significant influence on the well-being of the general population. Dietary lipids have been found to play a significant role in the pathogenesis of cardiovascular diseases, cancer, and other disorders. The mechanisms by which dietary lipids are involved in the etiology of these disorders, however, have yet to be elucidated.

Considerable information concerning various aspects of fats and oils has been accumulated during the past decades. Publications dealing primarily with the chemistry and composition of fatty acids in foods are available. There are also books specifically addressing the biological and health effects of fats and oils. This volume is unique because it covers both the chemistry and composition of fatty acids in foods and their biological and health effects. It provides readers with comprehensive in-depth knowledge of fatty acids in foods as they are consumed, as well as their possible health implications. It is not, however, the

intention of this volume to make dietary recommendations or set guidelines for fatty acids. Also, since the precise roles of fatty acids in cellular functions and the development of injury and disease states have yet to be delineated, no attempt was made to present these subject areas with a unified view.

The nomenclature of fatty acids, especially unsaturated ones, has been a source of confusion for many. Among the nomenclature systems suggested, ω (omega) and n systems are used by most investigators today. Recently the term omega-3 fatty acids has been used by the media and lay publications to represent polyunsaturated fatty acids, eicosapentaenoic acid, and docosahexaenoic acid, found in ocean fish. The ω and n systems are very similar in that they refer to the position of the first double bond from the terminal methyl carbon irrespective of the carbon length and are almost completely interchangeable. Detailed information regarding nomenclature and classification of fatty acids is given in Chapter 1.

I am very grateful to all the authors for their excellent contributions and cooperation. Without their participation this project would not have been possible. I also would like to thank Ms. Deborah J. Hope and Ms. Deirdre Griesse of Marcel Dekker, Inc., for their assistance and cooperation. It has been a pleasure working with both of them. Ms. Hope made the initial contact and provided me with the opportunity to prepare this volume. While I initially accepted the offer with some skepticism due to time constraints, it turned out to be a great learning experience. Finally, I would like to dedicate this work to my wife, Lily Shukwei Chow, for her understanding, patience, and support over the past quarter century.

Ching Kuang Chow

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Fatty Acids in Foods and Their Health Implications

Contents

<i>Preface</i>	<i>iii</i>
<i>Contributors</i>	<i>ix</i>
1. Fatty Acid Classification and Nomenclature	1
<i>Kelly Lobb</i>	
2. Chemical and Physical Properties of Fatty Acids	17
<i>John M. deMan</i>	
3. Application of Gas-Liquid Chromatography to Lipid Separation and Analysis: Qualitative and Quantitative Analysis	47
<i>Robert G. Ackman</i>	
4. Fatty Acids in Meats and Meat Products	65
<i>Ki Soon Rhee</i>	
5. Fatty Acids in Milk and Dairy Products	95
<i>Robert G. Jensen</i>	
6. Fatty Acids in Poultry and Egg Products	137
<i>Eric A. Decker and Austin H. Cantor</i>	
7. Fatty Acids in Fish and Shellfish	169
<i>Robert G. Ackman</i>	

8. Fatty Acids in Vegetables and Vegetable Products	185
<i>Andrew C. Peng</i>	
9. Fatty Acids in Oilseeds (Vegetable Oils)	237
<i>Pamela J. White</i>	
10. Fatty Acids in Fruits and Fruit Products	263
<i>Basil S. Kamel and Yukio Kakuda</i>	
11. Fatty Acids in Food Cereal Grains and Grain Products	297
<i>Robert Becker</i>	
12. Genetic Alteration of Food Fats and Oils	313
<i>Earl G. Hammond</i>	
13. Antioxidants in Dietary Fats	329
<i>Hemmige N. Bhagavan and Padmanabhan P. Nair</i>	
14. Effects of Processing and Storage on Fatty Acids in Edible Oils	337
<i>Vickie Tatum and Ching Kuang Chow</i>	
15. Factors Affecting Stability and Nutritive Value of Fatty Acids: Culinary Practices	353
<i>Sharyn G. Armstrong and James G. Bergan</i>	
16. Fatty Acid Isomers in Foods	363
<i>Margaret C. Craig-Schmidt</i>	
17. Commercial Applications of Fatty Acid Derivatives	399
<i>Ronald J. Jandacek</i>	
18. Reappraisal of the Essential Fatty Acids	429
<i>Robert S. Chapkin</i>	
19. Dietary Fatty Acids and Lipid Metabolism	437
<i>Gary J. Nelson</i>	
20. Interaction of Dietary Fatty Acids, Carbohydrates, and Lipids on Carbohydrate Metabolism	473
<i>Béla Szepesi</i>	
21. Dietary Fatty Acids and Minerals	501
<i>Henry C. Lukaski and Phyllis E. Johnson</i>	
22. Dietary Fatty Acids and Thermogenesis: Implications for Energy Balance	517
<i>Paul Trayhurn</i>	
23. Fatty Acids and Membrane Function	531
<i>Carolyn D. Berdanier</i>	

Contents	vii
24. Dietary Fatty Acids and Eicosanoids	545
<i>Daniel Hwang</i>	
25. Absorption and Transport of Dietary Lipid: Effect on Some Lipid-Related Health Problems	559
<i>Vernon A. Welch and Jürgen T. Borlakoglu</i>	
26. Xenobiotic-Induced Aberrations of Lipid Metabolism	613
<i>Jürgen T. Borlakoglu and Vernon A. Welch</i>	
27. Biological Effects of Polyunsaturated Fatty Acids	631
<i>Geza Bruckner</i>	
28. Biological Effects of Palm Oil in Humans	647
<i>Randall Wood</i>	
29. Biological Effects of Geometrical and Positional Isomers of Monounsaturated Fatty Acids in Humans	663
<i>Randall Wood</i>	
30. Biological Effects of Oxidized Fatty Acids	689
<i>Ching Kuang Chow</i>	
31. Dietary Fat, Immunity, and Inflammatory Disease	707
<i>Gilbert A. Boissonneault and Michael G. Hayek</i>	
32. Fatty Acids and Cardiovascular Diseases	735
<i>Geza Bruckner</i>	
33. Dietary Fatty Acids and Cancer	753
<i>Howard P. Glauert</i>	
34. Fatty Acids and Renal Disease	769
<i>Stuart K. Ware and Geza Bruckner</i>	
35. Fatty Acids and Neuromuscular Disorders	801
<i>Jeffrey K. Yao</i>	
36. Fatty Acids and Diabetes	823
<i>Sam J. Bhathena</i>	
37. Safety and Health Effects of Isomeric Fatty Acids	857
<i>J. Edward Hunter</i>	
Index	869