Techniques of Lipidology: Isolation, Analysis and Identification of Lipids (2nd Revised Edition)

MORRIS KATES
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Lipid biochemists will need no introduction to this excellent book. My copy of the first edition is now quite battered by frequent use in the laboratory. The second revised edition has more references and a bigger index. Outdated techniques have been removed, but new lipids and new methods have increased the overall size by about 140 pages. Emphasis is placed on the long-chain hydrocarbons, alcohols, aldehydes and fatty acids, and their derivatives, glicerides, wax esters, phospholipids, glycolipids (including gangliosides) and sulfolipids. There is also brief treatment of the fat-soluble vitamins, sterols and carotenoids.

The first chapter deals with the structures of those various lipids and their distribution in the living world. The second chapter covers materials and equipment, including a useful list of sources of reference lipid standards. Chapter 3 describes extraction procedures for lipids and the removal of water-soluble contaminants.

The fourth chapter is on general analytical methods, for instance lipid P, nitrogen, esters, total sugars, total fatty acids, plasmalogens, choline, glycerol and glycerophosphate. Spectroscopic analyses, ultraviolet, infrared, nuclear magnetic resonance and mass spectrometry (including electron impact, chemical ionization and desorption ionization techniques), are also covered and there are tables giving the main absorption bands. Surprisingly, a microbiological assay is recommended for inositol. Most workers would now prefer Sweeley's gas chromatography of the trimethylsilyl derivative, which is mentioned for sugars but not specifically for inositol.

Chapter 5 deals with separation of lipid mixtures by solvent fractionation and chromatographic methods. Valuable practical details are given for column chromatography including high-performance liquid chromatography, thin-layer chromatography and gas-liquid chromatography. A chapter on radioisotope techniques follows. This covers labelling methods, separation and counting of labelled lipids and autoradiography or scanning of chromatograms. The final and longest chapter brings together the methods described in the previous chapters, showing how naturally occurring lipid mixtures can be resolved and identified. This includes identification of molecular species of glicerides and phospholipids and is perhaps the most valuable chapter in the book. It shows, for instance, how the individual phospholipids of a tissue can be identified, including plasmalogen and alkyl-acyl forms. Use is made of a variety of methods, for instance separation by thin-layer chromatography of the intact phospholipids, paper chromatography of their deacylated products and confirmation by enzymic hydrolysis of the original compounds. An appendix lists addresses of companies supplying equipment or reference lipids.

No laboratory where lipid work is done should be without this excellent book.

J. N. HAWTHORNE

Autoxidation of Unsaturated Lipids

H. W.-S. CHAN (Editor)

Every book reviewer likes to feel that he is producing a piece that will entertain, as well as giving a constructive account of the merits and faults of the book. It taxes the mind how to be witty and stimulating about a book entitled Autoxidation of Unsaturated Lipids, but this may be more the fault of the reviewer than the book.

The editor is a leader in his field and well qualified to compile a comprehensive and authoritative account of the state-of-the-art in this subject. His objectives, set out in the preface, were to update us on recent advances in understanding lipid autoxidation reactions and the effects of such reactions in biological tissues 'with particular emphasis on their significance in the stability of food and biological systems'. In my view he has only partly succeeded.

The book is not for the general reader with little knowledge of lipid chemistry and biochemistry and of free-radical mechanisms. The very basic concepts are quickly dealt with in chapter 1. The first part of the book then deals with the chemistry of lipid hydroperoxides (chapter 2), their conversion into high-molecular-mass (chapter 3) and low-molecular-mass (chapter 4) end-products. There is a danger of overlap between authors since basic mechanisms are common, and I did find some tedious repetitions that added unnecessarily to the length. Only Dr Gardner (chapter 3) had taken trouble to cross-reference other chapters. Indeed, I found this one of the most readable chapters, comprehensive and logically constructed, although I would have liked slightly less on mechanism and a little more on relevance to real food.

The preface suggests that 'as systems become more complex, the discussion changes from mechanistic to phenomenological so as to give an overall view that includes observations that may be of practical value'. The contrast between Gardner's mechanistic chapter 3 and Grosch's thorough tabulation of low-molecular-mass products (chapter 4) was striking. I found the linking of the pattern of low-molecular-mass products to flavour characteristics of foods helpful.

My major criticism of this book is its apparent imbalance. Basic mechanisms, though important, are overemphasized and the promise of relating lipid peroxidation to practical issues of lipid oxidation in foods and the living body is never quite fulfilled. Professor Eriksson gives us a competent and readable chapter 6 on 'Oxidation of Lipids in Food Systems' which occupies 24 pages while the mechanistic background has taken 206 pages. Likewise, Dr O'Brien spends 47 pages on 'Oxidation of Lipids in Biological Membranes and Intracellular Consequences'. In an era when there is increasing interest in the ideas that uncontrolled lipid peroxidation may play a significant role in such diverse diseases as kwashiorkor, cancer and atherosclerosis, I would have welcomed more guidance from the author on how we are to relate observations on cellular membranes and 'model membranes' to events in the living animal. An additional chapter on modern concepts of the role of free radicals in disease processes would have enhanced the book considerably.

Typographical errors were not too obtrusive, but, once in a while, there were errors that should not have escaped the