Free Rad. Res. Comms., Vol. 18, No. 4, pp. 249–252
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BOOK REVIEWS

OXIDATIVE ENZYMES IN FOODS by D. S. Robinson and N. A. M. Eskin. Elsevier Applied Science, 1991, X + 316 pp., £66.00/US$112.00 (ISBN 1-85-166613-3)

The book set out to fill a gap in the current literature by presenting a concise and comprehensive text on the major oxidative enzymes affecting food quality and stability. Given the current interest in free radicals and oxidative enzymes such as peroxidases and lipoxygenases in food, the editors achieved their aims.

Plant life is subjected to varying conditions which impose oxidative stress upon the cells. Oxidative enzymes in foods plants are of importance since they affect the flavour, colour and nutrient content in the food. For example, fruits, tubers, some leaves and seeds respond to wounding or tissue damage by initiating a series of complex biochemical reactions which involve the iron containing proteins lipoxygenases, which catalyse a direct reaction of polyunsaturated fatty acids with oxygen. The aroma of certain plant tissues such as sliced cucumber, chopped potato, tea and chopped tomato are due to aldehydes arising from complex reactions involving oxidative enzymes.

There are seven chapters in the book all of which are worthy of a good read.

The first chapter examined peroxidases and catalases in foods and their industrial applications. Both of these enzymes are widely distributed in plants. Peroxidase activity increases alongside the activity of other enzymes such as polygalacturonases and cellulases both of which are normally associated with the ripening process. Important considerations in the chapter include oxidation of indole-3-acetic acid, a phytohormone, oxidation of chlorophyll, and the involvement of peroxidases in lignin biosynthesis.

Superoxide dismutase (SOD), amine oxidase and amino acid oxidases, and the lactoperoxidase systems of bovine ahd human milk are discussed in Chapters 2 through to 4 respectively. The discovery of the catalytic function of SOD, the dismutation of the superoxide anion (O_2^-), by McCord and Fridovich in 1969 has been a landmark in free radical research. It is reported that indigenous SOD may have a role in the control of fruit ripening and in preventing the loss of quality due to peroxidase activity in harvested fruits and vegetables.

Chapter five considers the enzyme lipoxygenase. Lipoxygenases are found in a variety of plant and animal tissues. In food application, lipoxygenases are employed commercially to bleach wheat flour carotenoids during bread making process. But endogenous lipoxygenase is deleterious in pasta manufacture since the yellow colour of carotenoid is often a quality indicator. Controlled heat treatment of the flour to blanch the lipoxygenase overcomes this problem. Active lipoxygenase is also a major cause of off flavour production in unprocessed plant food during frozen storage, which is why vegetables like beans are carefully blanched to inactivate the lipoxygenase and other enzymes before canning. The chapter comments adequately on historical aspects of lipoxygenases, their distribution, isolation, mechanism of action and physiological role.

Chapters 6 and 7 consider polyphenol oxidases and carbohydrate oxidases respectively. Polyphenol oxidases use phenolic compounds as substrates and are involved in the browning reactions found in fruits as well as in crustaceans such as shrimps, lobsters and crabs. Carbohydrates form a major proportion of the food we eat. One notable application of carbohydrate oxidase is manufacture of sweeteners. Gluconates are not metabolised by humans, thus the inversion of sucrose to glucose and fructose and the subsequent treatment with glucose oxidase will yield gluconate/fructose. The product retains its "sweetness" but has reduced calories.

Oxidative Enzymes in Foods is indeed a very useful text, highly recommended to all those with an interest in food, from the academic scientific level to the manufacturing sector. I think the publishers could do it service by releasing a more affordable paperback version. Interest in free radicals and oxidative enzymes in food is likely to grow. For example, the structure activity relationship between lipoxygenases, cyclooxygenases and antioxidant properties of plant extracts is beginning to receive attention in nutritional science.

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ANALYSIS OF OIL SEEDS, FATS AND FATTY FOODS by J. B. Rossell and J. L. R. Pritchard, Elsevier Applied Science, 1991, XI × 558 pp., £86.00/US$148.00 (ISBN 1-85-166614-1)

In any branch of science, unanimity in analytical procedure continues to prevail. Everyone consumes food. For this reason, food will remain a useful commodity whose demand would never fall to zero. It is important to know what the food we consume is composed of. Whichever method is used in analysing food components, there is a need for the method to be dependable, reproducible within a set limit and be subject to acceptable regulation.

It is against this background that the full benefit of this book may be realised. The book contains eleven chapters all of which address analysis issues. Chapter 1 by Pocklington discusses the precision and accuracy of analysis; standardisation of analytical methods. The ISO (International Organisation for Standardisation) guidelines are adequately discussed.

Chapter 2 by Pritchard discusses analysis and properties of oil seeds. The commercial importance of a seed as an oil seed is based on the quantity and composition of the triglyceride oil present. Commercial oil seeds are grown and traded under contracts and/or rules and specifications issued by Trade Associations. Oil seed contracts contain clauses covering sampling and analysis (as well as methods to be used for the analysis). Oil content is a major factor when assessing product value of oil seeds. The chapter also presents a good account of the properties of common oil seeds, from Babassu nuts through sunflower seeds to walnuts. Among the new oil seeds discussed are evening primrose, blackcurrent, mango kernels and winged bean.

Chapter 3, also by Pritchard, discusses oil seed residues, their analysis and properties. The bulk of residues remaining after processing for oil is used for animal feeding stuff. These are subject to governmental controls in most developed countries.

The chapter defines oil seed residues (including methods for their analysis) and presents details of amino acid and mineral compostions.

Chapters 4 through to 9 discuss, respectively, methods of analysis for mycotoxins (by Scott), glucosinolates in seeds and residues (by Daun and McGregor), extraction of fats from fatty foods and determination of fat content (by Lumley and Colwell), vegetable oils and fats (by Rossell), animal carcass fats and fish oils (by Enser), and yellow fats (by Wilbey). The term yellow fats is used to cover the range of butters, margarines and other spreads sold in the retail market. The chapter by Wilbey considers mainly the nature and properties of milk fat and associated methods of analysis.

Chapter 10 by McGinley discusses analysis and quality control for processing and processed fats. To ensure high quality final products, quality control has to start with raw materials; refiners have to contend with the variations in properties of oils and fats. The chapter considers components of a quality control system covering refining, analysis for feedstock quality, bleaching and testing methods to control quality and concludes with the applications of processed oils and fats. The book concludes with a chapter on sampling for analysis.

The book is about analysis. As such, it should be an essential addition to the library of laboratories and/or of individuals actively engaged in nutrition research and the food industry. It remains a useful addition to my group's book collection.

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Trace Elements, Micronutrients, and Free Radicals
Edited by I.E. Dreosti
Humana Press Inc: New Jersey, 1991, 231 pages
ISN 0896031888.

The idea of preparing a book under this title should be warmly congratulated as timely and most welcome. Thirteen authors have responded to the invitation by writing nine chapters; the first of which is an excellent introduction to the basic chemistry of free radicals. This chapter is followed by discussions of free radicals and their relevance to tissue injury; the biology of iron, dietary pro-oxidants, antioxidant processes, vitamins, the genome, cancer, aging and malnutrition. Most presentations are succinct reviews reflecting the authors' specialist interests in free radicals. However, most chapters are not particularly well integrated into the main theme of the book. For example, there is considerable and unnecessary overlap in Fenton chemistry, lipid peroxidation, and antioxidants, together with some confusion in listing singlet oxygen ('O2), hydrogen peroxide (H_2O_2) and lipid peroxides (ROOH) as free radicals, and further suggesting that caeruloplasmin functions as a superoxide dismutase. Many new researchers will be equally confused by the inconsistent representation of hydroxyl radicals ($^{\cdot}OH$, OH., $OH^{\cdot}$), superoxide ($0_2^{\cdot-}$, $0_2^{\cdot}$, $0_2^{\cdot}$), and hypochlorite ion ($C10^{\cdot}$, OCL^{-}, OCI^{-}).

An introductory discussion of the important trace elements and micronutrients, and their important differences in free radical related diseases, of man and animals would have been helpful. One of the most exciting current areas of micronutrient research is the suggested link between radicals, dietary antioxidants and the development of atherosclerosis. Unfortunately, this topic was not covered in any depth in the book.

Many readers will find this compact book full of useful information; but a "vade mecum" it is not.

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