

Book Reviews

requirements. The provision of a 'decision tree' for choice of analytical methods is helpful in systematizing the decision process.

It is pointed out that, although the procedures available have undergone extensive collaborative trials, the precision of the methods is not very high and that the procedures themselves are not robust and therefore personnel require training and experience. The reason for this is the complex

and diverse nature of dietary fibre. Specific preparatory steps for different materials may have to be accepted in the future development of methods.

The aim of the book – to present the options for dietary fibre analysis to the analyst in an objective manner – has without doubt been achieved. Southgate has used his extensive knowledge and experience in the field to produce a useful overview of the different methods and collabora-

tive studies. *Dietary Fibre Analysis* is strongly recommended to analysts involved in dietary fibre analysis, but it should also be on the bookshelf in any food analysis laboratory, as a source of systematic information in a field that is still the subject of much discussion and controversy.

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Free Radicals and Oxidative Stress: Environment, Drugs and Food Additives (Biochemical Society Symposium No. 61)

edited by C. Rice-Evans, B. Halliwell and G.G. Lunt, Portland Press, 1995. \$96.00/£60.00 (x + 276 pages)
ISBN 1 85578 069 0

Oxygen, oxygen, oxygen – we can't live with it and we can't live without it. In the short-term it is absolutely necessary for life, but in the long-term it brings about our demise. In normal aerobic metabolism, dioxygen is used as an electron dumping ground, being converted to nontoxic water. However, when oxygen is only partially reduced it can be dangerous. Such partially reduced oxygen species will non-enzymatically oxidize bystander molecules including proteins, lipids, carbohydrates and nucleic acids (DNA and RNA). Organisms always have a background rate of non-enzymatic oxidations occurring. Some of this oxidation is vital; but much of it is unwanted. Oxidative stress, the subject of this book, occurs when the background rate of this non-enzymatic oxidation is elevated.

It is now recognized by the research community that nearly all human health problems have an oxidative-stress component. Thus, oxidative stress is now a topic of intense investigation. In this book, 40 scientists have combined their efforts to prepare 19 chapters that address different aspects of oxidative stress. The topics discussed can be divided into four different themes: the fundamental free-radical and oxidant chemistry of oxidative stress; antioxidants; pollution and environmental factors that bring about oxidative stress; and free radicals and antioxidants in food.

The opening chapter provides an excellent overview of oxidative stress.

An introduction is given to the radical as well as to the non-radical oxidizing species that are now considered important in oxidative stress. In addition to the longtime-appreciated superoxide and hydroxyl radicals, nitric oxide (NO), nitrogen dioxide (NO₂) and peroxyxynitrite (O=NOO⁻) as well as other oxidants are introduced to the reader. The antioxidant and repair systems that are present in organisms to minimize the long-term damage of oxidative stress are then put into perspective.

This opening chapter is followed by three chapters that address in detail the newest thinking on: nitric oxide and peroxyxynitrite; thiols and thiol radicals; and alkoxy radicals in lipid peroxidation. Each chapter provides the reader with an excellent summary of what is known about these species in oxidative stress plus new insights into their importance. These chapters alone are worth the price.

To lead off the section on antioxidants, Halliwell provides an overview of antioxidants and gives detailed criteria that need to be met before a substance should be considered to be a significant biological antioxidant. The chapters on plant polyphenols and carotenoids as dietary antioxidants provide a balanced overview of these potential biological antioxidants; the possible mechanisms of antioxidant action are described and the data for and against are discussed. Reasons for apparent conflicting

scientific data are provided for the reader.

The chapters dealing with environmental factors cover the effects of the air pollutants ozone, nitrogen dioxide, sulfur dioxide (sulfite) and soot. These chapters present and summarize evidence that ozone and nitrogen dioxide may actually antagonize each others actions rather than being synergistic in lung damage, whereas sulfite and soot may have an underestimated toxic potential. Although somewhat out of place physically in the book, a brief but effective chapter summarizes the effects of UV light on skin, concentrating on the evidence and significance of the activation of the hemeoxygenase 1 gene by UV light.

Oxidative stress from drugs is discussed, with attention being given to the oxidative mechanisms for the side effects as well as the proposed mechanisms of action. Although in the limited space available the discussion cannot be comprehensive, the specific topics discussed provide a good overview of oxidative stress produced by xenobiotic metabolism.

The last section comprises chapters that deal with the problems produced by free radicals in food and during food treatment. An excellent summary of the use of added antioxidants in food as well as in food packaging is provided. An interesting chapter on the free radicals produced in food products by ionizing radiation is included. It is focused on the detection and dosimetry aspects of food irradiation, but it is interesting to note that food irradiation actually produces far fewer changes in food than does cooking.

This new addition to the literature on free radicals and oxidative stress will be of interest to a broad range of scientists because the topics addressed have overlap with many disciplines:

free-radical chemistry, lipid chemistry, food science, xenobiotic metabolism, nutrition and free-radical biology, to name a few. Many of the chapters do emphasize the authors' own work, but they are well referenced; moreover, those topics that have been considered are timely. The

subject index is complete and quite useful.

Of particular convenience is a combined list of abbreviations that are used in all chapters, which is given at the beginning. The font used is clear but small and the page size facilitates reading.

In summary, this 276-page book will be of benefit to newcomers as well as to experienced scientists in the field of free radicals and oxidative stress.

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The topics covered in this book are generally timely. There is a good mix of modern analytical chemistry techniques applied to fruit metabolism and the biochemistry of different components. The various subjects relate many of the common items of interest both to food scientists and to plant scientists involved in post-harvest research. For example, discussions of the effects of external environmental conditions (e.g. anaerobic) on the aromatic and sensory properties of fruit volatile biogenesis clearly describe the current state of analytical knowledge of this subject area. Even included is a step-by-step, laboratory-manual-style procedure for the extraction, purification and PCR amplification of DNA from chestnut, which should be applicable to other fruit.

The editors' careful selection of knowledgeable authors versed in the subject matter is apparent, as the reader becomes aware of the many wise words contained in the text of the various chapters. The four-page introductory remarks are quite detailed for a book this small, but the mixture of topics is extremely unusual. Topics are generally written in the style of a research article; however, some different formats, which detract from the overall uniformity, have been used.

The book covers some important subjects that have not been widely

Modern Methods of Plant Analysis, Vol. 18: Fruit Analysis

edited by H.F. Linskens and J.F. Jackson, Springer, 1995. DM 168.00 (xvi + 160 pages)
ISBN 3 540 59118 4

published. For instance, the commercial importance and analytical methodology of the bitter components in citrus juices, which have received much less attention than the volumes of research concerning volatile flavors, have been thoroughly reviewed here. Also, there is a chapter on the analytical techniques for the isolation and characterization of volatile and non-volatile flavor glycoside esters from various fruit (notably grapes and citrus fruit), which have only recently become available. Some of these compounds may have future significance for those who recognize the important contributions that certain food components may play in health and nutrition. Outside of the Far East, it is difficult to find compiled in one source a complete analytical discussion of tannin astringency in the economically important persimmon.

This book also contains relevant discussions of the quality and properties of fresh and dried apricots, enzyme systems of peach phenolics and compositional studies of almonds, all

fruit for which literature citations are not numerous. This benefits the casual reader scanning the literature as well as the more intense student of specific subject matter. The quite detailed chapter on photoacoustical measurements is right on target with current worldwide interest in non-destructive computer-based machine methods for the grading and quality evaluation of many fruit. In fact, applications of some techniques are being commercially practiced for measuring both internal quality and external blemishes of several fruit types.

In summary, this book is a research text that is recommended to the interested scientist for personal possession and as an important addition to a good university, industrial or government library.

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Advances in Food Colloids provides a discussion of some of the areas of research that the study of food colloids is moving into. Because some of these areas are difficult to conceptualize, as well as difficult to find information on, this book is welcome. The authors have not attempted to be comprehensive: as they point out, it is virtually impossible to define the boundaries of the field of food colloids.

Instead, the authors have considered the subject from 'one particular

standpoint', and they metaphorically refer to their vantage point as a 'snapshot'. Although I believe they have done an excellent job, my own snapshot would have been different. This I want to discuss, because I found myself sometimes wishing the authors

had written on things other than those on which they did, if for no other reason than because they write so well.

First, however, I want to comment on the quality of what they did write; they have a real ability to take difficult ideas and make them understandable.

Advances in Food Colloids

by Eric Dickinson and D. Julian McClements, Blackie, 1995. £69.00 (x + 333 pages) ISBN 0 7514 0203 6