



Book reviews

Biodiversity and Natural Product Diversity

Francesco Pietra; Pergamon, 2002, ISBN: 0-08-043706-0, \$45

This book is different from many others on Natural Product Diversity as it departs from the usual format of looking at compound diversity via taxonomic groups: insects, plants, fungi etc. or by compound type alkaloids, terpenoids etc. Instead, the author provides an overview of the diversity of compounds in different ecosystems (oceans, terrestrial and freshwater biomes) as well as at what the author calls “functional levels” (signalling, antifeedants, food additives as well as fragrances and cosmetics). The author also provides information about the diversity of compounds in endangered taxa and then goes on to compare the diversity of natural and synthetic compounds. The last section of the book deals with the sustainable exploitation of natural product resources. Thus the volume, which forms part of the Tetrahedron Organic Chemistry Series, covers a wide scope of subjects but none in any detail. This is a shame as the concepts covered by the author, especially in the section on ecosystem diversity are challenging and could have been developed further. For example, the author presents “complexicity metric values” to describe the diversity of compounds in the different biomes or with different uses but provides no real insight as to what these values really mean and whether they have any relevance to different ecological systems or differences in biochemical pathways. However, the author does sow the seed for others to develop hypotheses. Because the author has tried to cram so much into a small volume, the quality of the production has suffered and varies from chapter to chapter. The publishers should have ensured that the quality of presentation throughout the book was high. For example, in the chapters dealing with compound diversity in different ecosystems, the compounds are

presented in small charts that are difficult to read, along with the use of a small font for the text that provides information about the compounds, whereas in the chapters covering the functional role of biodiversity the compounds are presented in well-constructed tables.

Examples of the diversity of compounds that have different biological properties the organisms they come from and the habitats the organisms live in are illustrated in these tables. These tables are therefore a rich source of information but the author does not attempt to synthesise the information in these tables in the text. Therefore, the reader moves from one topic to another with very little guidance. This lack of interpretation might limit the usefulness of the book. A few more sentences about the different biochemical pathways that have evolved to provide the biodiversity of compounds would have been a useful addition.

In order to write the book, the author has had to synthesise information about where plants’ microbes that contain the compounds of interest were collected. This type of formation is not always provided in natural product papers and if chemists were screening extracts from collections they might not have had this information. The author should be congratulated on the task undertaken. It has shown that biomes beyond the rain forests justify further study.

The book will be of interest to those studying different aspects of natural product diversity, chemical diversity as well as chemical ecologists. Despite the limitation of the book, it is not overpriced and many students or scientists involved in drug discovery projects should be able to afford to buy a copy.

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Plant Biotechnology: The Genetic Manipulation of Plants

Adrian Slater, Nigel Scott, Mark Fowler; Oxford University Press, Oxford, New York, 346 pages, ISBN 0199254680, GBP 19.99

This is a comprehensive and well-written textbook aimed at graduate and undergraduate students in plant

sciences. The authors set the scene with a chapter on plant genomes, genes and the control of gene expression. They then cover the methodology of plant transformation with chapters on plant tissue culture, techniques for plant transformation and the vectors used. These are followed by several chapters that cover in depth the applications of plant genetic modification,

including herbicide tolerance, pest and disease resistance and quality improvement.

The book is well illustrated and is accompanied by an excellent companion web site from which both text and illustrations can be downloaded (academic staff marking essays beware!). The authors have also provided key facts and issues in boxes throughout; clearly considerable thought and care has gone into the design of the book.

A slight criticism is that in some sections the distinction between current and possible future applications of GM technology in agriculture is not clear; a reader trying to find out what the present cultivated GM crops are could struggle. Furthermore, a section on the legislation

covering the use of GM crops and the issues that have lead to the use of GM crops in agriculture being so controversial is relatively brief and could have been more detailed, while the subjects of plant tissue culture and binary vectors are given a whole chapter each.

I certainly would not recommend this book for the non-specialist. Nevertheless, it is likely to be a popular and useful textbook.

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Methods in Polyphenol Analysis

Editors: C. Santos-Buelga and G. Williamson, 2003. Royal Society of Chemistry, Cambridge, ISBN 0-854-580-5, xiv + 384 pages, £99.50

This volume has its origins in POLYBIND a European Union Framework V project on polyphenols, bioavailability and colon cancer. However, it is much more than a cobbled together series of articles based on the proceedings of a conference and contributions have been obtained from investigators who were not part of the Framework V project. The 16 chapters contain a wealth of information on the extraction, purification and analysis of the major flavonoids and hydroxycinnamates, in foodstuffs and biological samples such as plasma and urine.

At first glance polyphenolic compounds should be relatively simple to analyse, especially in plant tissues where, as the products of secondary metabolism, they often accumulate in sizable quantities. Scratch the surface and it soon becomes apparent that things are not so straight forward because the wide variety of structures have diverse chemical and physical properties, some form oligomeric and polymeric derivatives and in most instances standards are not available from commercial sources. To complicate matters, following ingestion many of these compounds are metabolised forming glucuronide, methyl and sulphonated analogues. Many of the problems associated with polyphenol analysis and the various practical solutions to these problems are discussed in detail in the various chapters of this book.

The first chapter by Escribano-Bailón and Santos-Buelga deals with the extraction of polyphenols from foods. Day and Morgan then discuss the specialised problems associated with extraction and purification of polyphenols in biological samples and fluids and provide much useful information on methods of hydrolysis to

release aglycones, the problems of analysing sulphate conjugates and the stability of samples during storage. The contribution by de Pascual-Teresa and Rivas-Gonzalo summarises the use of HPLC-MS for the identification of anthocyanins, catechins and proanthocyanidins, and finally flavonols and their metabolites. This is a rapidly developing field and the authors provide a useful insight into the value of MS coupled with HPLC in that it can not only detect low nanogram quantities of analytes but can also provide invaluable structural information that can facilitate identification in circumstances that might otherwise be much more difficult to achieve.

There is an article on the use of HPLC with coulometric detection for the analysis of flavonoids by Monach. This includes a number of worked examples including the analysis of rat plasma after ingestion of a grape seed extract and quercetin-3-glucoside, and human urine after soya consumption. Although not providing the structural information like MS, coulometric detection is highly selective and among the topics discussed and illustrated are its use to demonstrate the absence of quercetin glucosides in plasma and how to predict some elements of the structure of an unknown metabolite. There is copious practical and theoretical information in the chapter which will be of value to the experienced investigator and anyone about to use an electrochemical detector for the first time. Likewise the chapters on HPLC with photodiode array detection by Santos-Buelga et al. and HPLC-NMR by Wolfender et al. These are followed by a chapter entitled "Polyphenols: measurement and calculation of their physical chemistry properties" by Cren-Olive and Rolando that deals primarily with the free radical chemistry, and acid-base and redox properties of flavan-3-ols.

Plumb and colleague contribute a chapter in vitro enzyme synthesis of quercetin glucuronides and glucosides which describes the use of enzymes derived from a