

Book reviews

Nutraceuticals, 2nd revised edition, Brian Lockwood. Pharmaceutical Press (2007). ISBN 978-0853696599, 408pp + Index, price \$75.00/£39.95.

This scholarly work on Nutraceuticals is a fascinating read. The subject and literature are vast, and the author is to be complimented for his thorough coverage from defining the nature of the nutraceutical, market trends, manufacturers' claims, sources and manufacturing processes, followed by the meat of the book (some 250 pages) devoted to the metabolism, bioavailability and pharmacokinetics of the nutraceuticals subdivided with regard to the ailments they are supposed to alleviate. The categories include joint health, cardiovascular health, eye health, mental health, sleep enhancement, cancer prevention, bone health, respiratory health, women's health, weight management, skin health, oral health, enhancement of sporting performance and animal health. This collection of data is followed by chapters dealing with a critical analysis of the results of published clinical trials, an examination of claims for synergy, and an account of 'minor nutraceuticals'. There are very important chapters dealing with safety, adverse effects and interactions of nutraceuticals, and the analysis and quality of commercial preparations, and a final section drawing the subject to a close with the author's conclusions. These are generally positive, especially with regard to future developments.

The magnitude of the material covered while a very real strength of this book makes this review difficult to write – it is impossible to cover every aspect, and many are in any case outside the reviewer's expertise, so the examples that follow must be accepted as relating to just a tiny selection of the topics covered.

There are a vast number of references, suitably up-to-date, and these have been assessed critically in reaching a considered conclusion. It is no fault of the author that the conclusion regarding efficacy must often be, 'wait and see, more good quality work required' but it is a refreshing change to find that the over-extrapolation seen in so many papers reporting *in vitro* studies, animal studies, or poorly designed volunteer studies, is described exactly thus. However, this is no diatribe against nutraceuticals – the conclusions are carefully considered and avoid hyperbole and while some claims for benefit are dismissed, it is good to note that where the weight of the evidence currently available suggests that modest benefit might be established unequivocally by future well-designed studies, this also is clearly stated. For example, the author concludes that methylsulphonylmethane and *S*-adenosylmethionine show

promise of enhancing joint health. Similarly there appear to be several treatments that may enhance cardiac health but here the situation is very complex because there are many facets to heart and vascular disease differing markedly in their underlying physiology and pathology and an individual treatment may be effective only in one specific condition.

Even where there is promise of benefit the author points out that it may be very difficult accurately to define an effective dose of a supplement as many of the relevant nutraceuticals may be obtained also from the diet, and commercial supplements can vary in composition. In a few cases there may be a risk of adverse effects from excessive doses, or undesirable combinations of supplements perhaps also with prescription medicines. Some doses suggested by manufacturers (>1 g several times a day) are large enough to be difficult or unpleasant in compliance, but in other cases such as dehydroepiandrosterone concern has been expressed about possible masculinisation in women and increased risk of prostate cancer in men. Self-medication by the poorly informed is at best unwise and at worst potentially dangerous, just as for mainstream pharmaceuticals.

With regard to dose, the world production of tea (some 3×10^9 kg) would provide only about 1×10^9 kg of tea polyphenols. This is not enough to supply the manufacturers' recommended dose of 100 mg per day to a world population of 6×10^9 even if it were all encapsulated and none drunk in the traditional way.

Because of the broad (but not superficial) coverage of this book, those who specialise in one small area will doubtless be able to point to some favourite topic that is not covered, or not covered to their satisfaction, but this reviewer can say that in his area very few errors were detected – the structure on page 38 described as procyanidin B2 should be described as B1 and the reference on page 46 to genistein- β -glucuronide should probably be to the glucoside. Most importantly, one has the clear impression that this high quality applies throughout the book.

The book is recommended to researchers, postgraduates and final year undergraduates whose studies encompass or impinge upon the area, and to professionals in medicine, pharmacy, nutrition and dietetics, who may have to respond to patients' requests for information or who wish to recommend nutraceuticals. Manufacturers and suppliers of nutraceuticals could also benefit from reading it.

It will be interesting to see future developments discussed in the third edition that I am sure will be required in a few years.

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Plant Secondary Metabolites Occurrence, Structure and Role in the Human Diet, A. Crozier, M.N. Clifford, H. Ashihara. (Eds). Blackwell Publishing Ltd. pp. 384. GBP 99.50, ISBN 13: 978-1-4051-2509-3.

This text is edited by three highly respected experts in the areas of plant biochemistry, human nutrition and food safety. As such, this book surveys the chemistry and biochemistry of a comprehensive group of secondary metabolites with nutritional and pharmacological activities. The first five chapters describing the plant metabolites of interest, detail the distribution and biosynthesis of the major examples of interest, and highlights the dangers associated with particular metabolites such as the glucosinolates, acetylenes and the psoralens. The following three chapters describe the human intestinal flora and the effects of dietary composition, including the effects of consumption of pro- and pre-biotics, the wide range of secondary metabolites found in dietary constituents of plant origin, and the absorption and metabolism of a large number of these entities.

An additional area of economic and nutritional interest is the coverage of genetic manipulation of constituents of flavonoid biosynthesis, with a view to improving levels of beneficial constituents.

The major problem in writing a text of this breadth of data are to be able to satisfy two often disparate groups of readers, those who look for phytochemical knowledge, and those who require relevant data on biological activity. Such a book stands or falls on the appropriate balance between these fields. There are numerous books on either side of this divide, but this satisfactorily strikes the right balance, almost seamlessly integrating the two fields within individual chapters.

The problems inherent with an edited text include incomplete coverage of the total knowledge base encompassed within the title of the book and the constituent chapters, plus different styles of writing and different depths of coverage of data within the specialist areas. Again, the text copes well with this problem and provides comprehensive coverage of the major classes of secondary metabolites. Of particular interest is the chapter on acetylenes and psoralens, which are often overlooked in similar texts on phytochemicals.

The style of this book is not only informative, but also a joy to read, particularly due to the introduction of

numerous unexpected facts which occur regularly throughout the text; typical examples include – the possible demise of red squirrels is due to their intolerance to tannins, and coffee diterpenes are responsible for elevated cholesterol levels.

Detailed biosynthetic pathways including enzymatic data give a fuller picture of the knowledge base than many similar texts. There are detailed sections on therapeutic activity and mode of action of selected phytochemicals. Inclusion of a wide range of food plants broadens the horizons of those used to reading about a restricted group of phytochemicals as often found in Pharmacognosy texts.

The discussion concerning the growth of interest in herbal remedies, their regulation and risk assessment, in Chapter 3 (Terpenes) sits oddly with biosynthetic data. This could have been included in a general chapter on activities. There is some duplication of information presented in Chapter 7 and other chapters in the book. Unfortunately, the Introduction to the book appears to have been subsumed into Chapter 1 (p. 1).

The quality of presentation is very high; the use of red for highlighting compounds in the biosynthetic pathways allows the reader to quickly find a particular structure and follow pathways. Throughout, there are very few typographical errors, and the Index is comprehensive and mainly accurate.

Overall, this is an excellent book, providing up-to-date material derived from a mixture of primary sources, plus high quality reviews. Few internet databases have been referenced, but where this is the case, their URLs are current, and easily found if changes occur in future.

The book should be of interest to all phytochemists, pharmacognocists and food chemists, and provides excellent background information for those involved in researching the beneficial effects of dietary phytochemicals.

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