

Book Reviews

Flavonoids, Chemistry, Biochemistry and Applications. By Ø. M. Andersen (University of Bergen) and K. R. Markham (Industrial Research Ltd.). CRC Press/Taylor & Francis, Boca Raton. 2006. xiv + 1237 pp. 7 × 10¹/₄ in. \$249.95. ISBN 0-8493-2021-6.

This excellent and timely volume on flavonoids provides a comprehensive update to the last compendium on the subject, *The Flavonoids—Advances in Research Since 1986*, edited by the late J. B. Harborne and published over a decade ago. This new book consists of 17 chapters covering more than 7000 structures in various flavonoid classes. In the preface the editors provide a brief but very interesting overview of the historic advances in the flavonoid arena. Accordingly, the choice of themes for the 17 chapters—written by authorities in the field—provides good coverage of the area and gives the reader excellent overviews of particular topics in flavonoid research.

Chapter 1 presents a brief, unified summary of general methods for extraction and preparative separation of the main categories of flavonoids. It also contains a section on analytical methods to establish chemical profiles and content of flavonoid in herbal drugs and useful tables and illustrations. The major emphasis of this chapter is the application of stand-alone and coupled HPLC. Chapter 2 reviews the different spectroscopic techniques used during the last decade for flavonoid identification. Examples of the usefulness and recent applications of different NMR techniques are emphasized, including the application of new 2D and 3D NMR techniques. This chapter provides a great deal of valuable information summarized in six tables (Tables 2.1–2.7) containing assigned ¹H and ¹³C chemical shifts characteristic of the various flavonoid classes. The chapter also contains a discussion on mass spectrometry instrumentation and techniques, including coupled methods involving mass spectrometry for the analysis of flavonoids; several tables summarize the most relevant information (Tables 2.8–2.13). Recent applications of CD, IR, and UV spectrometric techniques are also treated in this chapter. Finally, an entire section is devoted to the colorimetric analyses of flavonoids. Chapter 3 deals with molecular biology and biotechnology of flavonoid biosynthesis. The advances in this topic are well summarized throughout the chapter, which provides a complete list of over 50 flavonoid biosynthetic enzymes—for which cDNA or genes are available—and the transcription factors that regulate flavonoid biosynthetic genes for 12 plant species. At the end of the chapter there is an extensive listing of published examples of genetic modifications on flavonoid production by introduction of genes encoding transcription factors that regulate flavonoid biosynthetic genes. Chapter 4 offers an unpublished food composition database for flavonols, flavones, procyanidins, catechins, and flavanones. This database can be used to estimate flavonoid intake of populations, identify dietary sources of flavonoids, and assess associations between flavonoid intake and disease. Valuable information is provided in several tables included throughout the chapter and in Appendix 2. Chapter 5 covers newly acquired data on flavonoid composition and distribution in grapes and on flavonoid reactions in wine and structures of the resulting products. Chapter 6 records recent changes in the perceived role of flavonoids as health-promoting dietary antioxidants and places these observations in a broader context embracing other dietary phenols and mechanisms other than simple radical scavenging and radical suppression. The authors also describe the diversity of dietary polyphenols and tannins (PPT), the intake, absorption, metabolism, and pharmacokinetics of PPT, safety assessment, and future research requirements of PPT. In Chapter 7, the role of isoflavonoids in protecting human health is described. This chapter also provides useful information on metabolism and bioavailability

of some isoflavonoids; their role in cancer prevention, including clinical studies; and their protective role against cardiovascular diseases, osteoporosis, cognitive decline, and menopausal symptoms. Chapter 8 reviews the experimental evidence and theoretical considerations supporting the main hypotheses about the functions of flavonoids in plants. The functions of colorful and colorless flavonoids are discussed; these include defense, photoprotection, protection against oxidative stress, and a role as chemical messengers. Chapter 9 provides a wide overview of flavonoid–protein interactions in man and their possible implications for human health. The specific topics include the biological significance of flavonoid–protein interaction in man, molecular interactions responsible for flavonoid–protein complexation, specificity of flavonoid–protein interactions, and examples of flavonoid–protein interactions in man.

The remaining chapters cover recent advances in the most important groups of flavonoids, namely, anthocyanins (Chapter 10), flavans and proanthocyanidins (Chapter 11), flavones and flavanols (Chapter 12), flavone and flavonol O-glycosides (Chapter 13), C-glycosylflavonoids (Chapter 14), flavanones and dihydroflavonols (Chapter 15), new chalcones, dihydrochalcones, and aurones (Chapter 16), and bi-, tri-, tetra-, penta-, and hexaflavonoids (Chapter 17). Especially noteworthy in these chapters are the tables and appendixes listing naturally occurring flavonoids that were discovered since 1992. Entries in each table include plant source(s) and producing organ, complete chemical name, and references to the primary literature. In addition to the tables, some of the last chapters offer valuable information regarding the chemistry, production, localization in plant cells, and chemotaxonomy of the different types of flavonoids. Unfortunately, significant pharmacological properties of some types of flavonoids were not included.

The book is well written and properly indexed and referenced (with literature coverage extending to 2004); in addition, all figures, tables, and chemical formulas are printed in a clear and consistent manner, although there are a few printing mistakes. In spite of these minor flaws, the volume is highly recommended to anyone interested in studying flavonoids from chemical, biochemical, pharmaceutical, nutraceutical, taxonomic, and economic points of view. It should also be in the library of any institution established for research in the areas of pharmacognosy, phytochemistry, and phytomedicine.

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NP068246Q

10.1021/np068246q

Bupleurum Species. Scientific Evaluation and Clinical Applications. Edited by Sheng-Li Pan (Fudan University, Shanghai). CRC Press/Taylor & Francis, Boca Raton. 2006. xiv + 257 pp. 7 × 10 in. \$99.95. ISBN 0-8493-9263-9.

Bupleurum species have played an important role in traditional Oriental medicine for over 2000 years. They have been used to treat fevers, inflammation, hepatitis, malaria, and many other illnesses. There are approximately 200 species primarily located in Asia, North Africa, Spain, and Italy. All of the contributors for this volume are leading experts from these regions. This book is the seventh volume in the series of books on Traditional Medicines for Modern Times. It is organized into six sections, covering *Bupleurum* botany, cultivation, chemistry, pharmacology, clinical applications, and patents.

After a brief introduction, a thorough botanical description of the medicinal species of *Bupleurum* in China is provided in Chapters 2 and 3. The geographic distribution of each species and the identification of 110 commercial samples of Chaihu (Chinese name for *Bupleurum* root) are conveniently provided in tables. Chapter 4 presents the chromosome study results for *Bupleurum falcatum* L. s. l., a source plant of the major Bupleuri radices from Japan, Korea, China, Russia, and some European countries. Chapters 5 and 6 examine the cultivation and environmental factors that influence the chemical constituents of the Japanese species, *B. falcatum*. Key factors for successful cultivation include selection of suitable land, weed control, and application of appropriate fertilizers. In Chapter 6, two cultivars of *B. falcatum* from Korea and Japan are compared under different environmental conditions, such as temperature, weather, soil condition, and altitude.

The third section of this book is dedicated to the chemistry and biology of *Bupleurum* species in Asia, Spain, and Italy. The primary chemical constituents of the *Bupleurum* genus are triterpene glycosides, also known as saikosaponins. Several other constituents have also been isolated and identified, such as essential oils, lignans, flavanoids, coumarins, polysaccharides, polyacetylenes, phytosterols, and phenylpropanoids. Chapters 8 and 9 examine specific biological activity of various *Bupleurum* extracts in Spain and Italy. Results regarding anti-inflammatory, antispasmodic, antimicrobial, toxicity, antifeedant, and antinematodic activities are described.

Chapters 10–12 explore the pharmacology of selected *Bupleurum* species. Chapter 10 covers Chaihu, and Chapter 11 concentrates specifically on the saikosaponins. Crude saponin from *Bupleurum* species has demonstrated hemolytic activity, and there are several reports in the literature about its anti-inflammatory activity, inhibitory effects on chronic hepatitis, and immunostimulating effects in *in vitro* bioassays. Chapter 12 concludes this section with a discussion of the mitogenic substances of *Bupleuri radix*. A detailed account of the fractionation procedures, structural analysis, and enzyme studies are presented.

The fifth section examines the clinical applications of *Bupleurum* root and its preventive effect against septic shock. Chapter 13 provides valuable details about the specific recipes and prescriptions for a vast number of diseases. Chapter 14 gives a detailed description and scientific evaluation of a key *Bupleurum* root medicine, Xiao-Chaihu-Tang, and its treatment of chronic liver disease and hepatic fibrosis. Chapter 15 presents more recent studies that show this same medicine to be an effective treatment for septic shock.

Finally, the book concludes with a very extensive compendium of over 500 patents containing *Bupleurum*. Sheng-Li Pan has done a remarkable job editing this comprehensive volume on *Bupleurum* species. Each chapter contains a detailed table of contents and a long list of references. This text is the first of its kind and should prove quite useful for those interested in the properties and applications of this ubiquitous natural product. It is well organized and should serve as an excellent reference for botanists, natural products chemists, and those involved with drug discovery.

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NP0682446

10.1021/np0682446

Green Fluorescent Protein: Properties, Applications, and Protocols. 2nd Edition. Edited by M. Chalfie (Columbia University) and S. R. Kain (Agilent Technologies). Wiley-Interscience, Hoboken. 2006. xv + 443 pp. 7 × 10 in. \$89.95. ISBN 0-471-73682-1.

Green fluorescent protein (GFP), originally isolated from the jellyfish *Aequorea* almost half a century ago, has arguably become one of the most useful modern research tools in the life sciences. This book is a compilation of chapters from a panel of experts about this biological marker and its uses. Every imaginable topic related to GFP and its variants (e.g., enhanced GFP, yellow fluorescent protein) is covered, including the molecular biology and biochemistry pertaining to the protein, its physical properties, proper fluorescence measurement techniques, and a variety of expression systems (cellular and whole animal). Admittedly, most of the information contained in the book could probably be gathered from a variety of other sources, but the editors have done a nice job of compiling the most recent research applications of GFP into one concise and convenient volume. A slightly disappointing aspect is the amount of color photos, which are limited to a small section in the middle of the text. Such a picturesque protein is much more appreciated when one sees it truly and accurately represented in color. However, this limitation undoubtedly keeps the book within a reasonable price range.

This book would be most useful for any natural products researcher who is planning on using, or is in the process of using, GFP or any of its variants. I would also recommend this book to anyone interested in becoming more familiar with GFP and its potential uses, as there are multiple applications for this protein of which many scientists may be unaware. There are several individual chapters that may be of particular interest to those in specific natural products fields, such as those on the use of GFP in plants, yeasts, and prokaryotes. There is also an up-to-date chapter on the potential pharmaceutical applications of GFP, which would prove interesting for anyone involved in drug discovery and may also offer some ideas for potential uses of GFP that one may not have considered. The chapters on the expression of GFP in mammalian cells and transgenic vertebrates are quite good and may also give some insight into how GFP could be used to test the effects of natural products in these systems. There is also a small section at the end of the book describing some methods and protocols for using GFP, and it may be useful in a practical sense to bench-top scientists. Last, even for individuals not utilizing GFP, this book would be appealing to anyone interested in reading about the successful story of a natural product, from its discovery to the multitude of uses generated from it.

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NP0682471

10.1021/np0682471