

## Book Reviews

**Herbal Medicinal Products: Scientific and Regulatory Basis for Development, Quality Assurance and Marketing Authorisation.** By Frauke Gaedcke, Barbara Steinhoff, and Helga Blasius (Wissenschaftliche, Stuttgart). CRC Press, Boca Raton. 2003. xii + 177 pp. 17.5 × 34.5 cm. \$59.95. ISBN 0-8493-1023-7.

Alien visitors bringing superior knowledge to earthlings is a recurring science fiction movie theme. If we understood and took advantage of information from advanced cultures, then perhaps our present life could be better informed and directed. Because the U.S. medical industry largely dispensed with botanical medicines in the 1940s and 1950s, this book arrives on our shores as a message in a bottle detailing a possible future in which we embrace herbal medical products instead of shying away from them.

Without a doubt the most informative modern text to become available on the quality assurance and regulations controlling European herbal medicinal products, this 177-page book presents what was previously available only through researching relevant sections of the European Pharmacopoeia, internal company documents, specialized working groups, and a host of relevant guidance documents.

Eight chapters and an equal number of appendices cover a broad range of topics, including labeling, quality assurance, phytoequivalence, and the legal and regulatory provisions relating to herbal medicinal products. This book is now widely consulted by members of the American Herbal Products Association's technical committees, and I daresay that some of our earlier work might have gone quicker if we had this information at our fingertips.

This tidy text begins with 29 pages of definitions spanning the realm of phytotherapy, standardization, herbal medicinal products, herbal extracts, marker substances, calculations of extract ratios, and much more. This chapter lays the foundation for a thorough understanding of European herbal medicinal products and botanical extracts in general. The extract ratio concept of botanical used to the amount of extract produced is clearly explained as are the factors that influence that ratio. An understanding of this portion of the book should give pause to those who would always consider a 20:1 ratio extract as four times stronger or more potent than a 5:1 when in reality it may be only four times less efficiently produced.

The short second chapter sets forth the European requirements for labeling extracts in a sensible non-provincial treatment. Chapter 3 covers quality assurance of herbal products and describes the process from starting material through manufacturing procedures to final product with identity, purity, content, and other tests as required for each of these stages. A sample specification sheet for a dry extract of St. John's wort herb is provided, and the chapter finishes with eight pages of color reproductions of thin layer chromatographic plates to illustrate identity, quality, and stability tests on various botanical materials. The complete text is replete with practical examples, 37 black and white figures, and 30 informative tables.

Chapter 4 tackles the issue of how and when to consider different herbal extracts as therapeutically equivalent. For complex medicinal products this issue remains key for determining when clinical data generated from the use of one preparation may be justifiably applied to another similar preparation. Chapter 5 covers the European marketing authorization system of the past, present, and future, while chapter 6 covers the legal provisions of herbal products with a focus on the European Pharmacopoeia. The clear and concise presentation of the information in this chapter alone justifies the reasonable cost of this text.

Chapter 7 covers legal provisions relating to safety and efficacy including the requirements of evidence for making claims and authorizations for "traditionally used" products in a country-by-country treatment. Chapter 8 takes a global view by mentioning some relevant World Health Organization (WHO) activities. The appendices include European guidelines for herbal product quality, general monographs for teas and extracts, listings of herbs for which monographs are available (including positive and negative German Commission E monographs), and a list of WHO information resources relating to herbal medicines.

This book provides a comprehensive, exhaustive treatment of an often poorly understood field by having literally translated the well-developed European experience, practices, and requirements into English. With this text in hand there can be little doubt, and no excuse, for an uninformed approach to the topic.

This book is not just recommended, it is a requirement for anyone wishing to understand the topic, develop standards, promulgate regulations, or otherwise wishing to be informed. While it may or may not accurately predict the future of the U.S. industry, it is critical information, as the title suggests, for rational scientific and regulatory approaches to the development and quality assurance of botanical products. It arrives as a timely message well worth pulling from the bottle and reading.

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**The Chemistry of Phenols, Parts 1 and 2.** Edited by Zvi Rappoport (Hebrew University). John Wiley & Sons, Ltd., Hoboken, NJ. 2003. xvii + 1658 pp. 6 × 9 in. \$1265.00. ISBN 0-471-49737-1.

Phenols are widely distributed in nature and as well have a place of prominence in the agricultural, pharmaceutical, polymer, and chemical industries. This volume covers the properties, reactions, analytical chemistry, spectroscopy, and synthetic applications of simple phenols in an encyclopedic approach. The vast amount of information included in the book required that it be divided into two parts.

Part I of the book contains 11 chapters. The first chapter provides a detailed overview of the general and theoretical aspects of phenols. The comprehensive chapter is written to set the stage for a better understanding of the reactions, spectroscopy, and chemical behavior described in subsequent chapters. In the following chapters, mass spectrometry, UV-vis, NMR, and IR spectroscopy, as well as applications and significance of each, are presented in sufficient detail with examples to be quite useful to understanding this aspect of phenols. The synthesis and synthetic use of phenols are covered in separate chapters. Although these topics are abbreviated, the authors were able to capture and provide a systematic order to these large topics to be of certain use to researchers unfamiliar with these areas. The remaining chapters satisfactorily cover the structural chemistry, thermochemistry, photoacidity, electrophilic reactions, complexes, equilibria, and rearrangements relevant to simple phenols.

Part II of this volume contains nine chapters on phenol-based antioxidants, photochemistry, radiation chemistry, oxidative and free radical chemistries, and environmental, polymeric, and calixarene chemistry. The volume also provides well-referenced examples relevant to the analytical chemistry of phenols in the environmental, food, and pharmaceutical areas.

Most of the book has been written in a concise and user-friendly manner and will be very useful to researchers in governmental, academic, and industrial settings. The book provides important insights and enough examples to ensure that the nuances of the complicated and unique chemistry of phenolic compounds are well illustrated and comprehensible to a wide audience. The scattered treatment of phenol-based natural products is to be expected, as comprehensive summaries of each class (flavonoids, polyketides, lignans, tannins, etc.) of these compounds are already readily available. The extensive references included throughout both parts provide excellent summary author and subject indices, which are useful in readily locating individual topics or researchers.

This book provides an excellent comprehensive summary of the chemistry of simple phenols, touching on all the important aspects of a very large subject, and is highly recommended to all phenol chemists. The steep price will preclude almost all individual scientists from owning a personal volume, but it is recommended to be included in all scientific libraries.

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***Pueraria*. The Genus *Pueraria*. Medicinal and Aromatic Plants—Industrial Profiles Vol. 23.** Edited by Wing Ming Keung (Harvard Medical School). Taylor & Francis, London, 2002. xviii + 290 pp. \$109.95. ISBN 0-415-28492-9.

The wide recognition of the common names *kudzu* (United States), *ge-gen* (China), and *kuzu* (Japan) by the

average person in these countries reflects the importance of the genus *Pueraria* in both the West and the East. This book's 17 chapters, although not a comprehensive review for all botanical, traditional use, and other potential topics, contain a very broad number of scholarly works on the genus *Pueraria*. Although many topics are covered, the main perspective is from the viewpoint of a pharmacognocist or natural products chemist evaluating the chemistry, pharmacology, safety, and potential as a drug- or science-based therapeutic agent. The first chapter summarizes the author's most recent taxonomic revision of the genus *Pueraria*, wherein he recognizes 15 species. It is unclear why many researchers have been slow to incorporate the latest taxonomic and nomenclatural changes by Maesen, even in many chapters of this book.

*Pueraria* has been used on a large scale for erosion control, fiber, and starch and as an ingredient in a variety of Traditional Chinese and Kampo medicines. The final chapter in the book *Friend or Foe? Changing Cultural Definitions of Kudzu* gives a good analysis of how kudzu in the 20th century has gone through an enthusiastic period, then a disenchantment period, and now is in a period of tempered enthusiasm. It would be accurate to summarize the current state of the science of the potential health benefits of kudzu (*P. montana* var. *lobata* or *P. lobata*) and related species such as *P. mirifica* and *P. tuberosa* reviewed in this volume as "tempered enthusiasm", since most of the evidence is based on chemistry and preclinical and very small clinical trials for specific indications. The book has brought together in one small volume a summary of much of the chemistry and pharmacology of kudzu and related species, including the potential benefits concerning alcohol abuse, hepatoprotection, cardiovascular function, and estrogen-related disorders such as the possible chemopreventive effects for estrogen-related cancers and osteoporosis as well as *P. tuberosa* contraceptive efficacy and toxicity.

The book also includes some of the diversity of uses in Traditional Chinese Medicine and Chinese patent medicines as well as information related to the quality of TCM and patent medicines. In addition, the volume includes chapters on ethnobotany and economic uses, including food and fiber products. However, the ethnobotany, economic botany, ecology, and plant taxonomy of *Pueraria* are covered only briefly in comparison with the current literature and should be seen as background for the main theme of the chemistry and pharmacology of the genus. For example, a botanist wishing to learn whether the fast growing kudzu is destroying the plant diversity of the American south will not find the answer in this book.

The treatment of *Pueraria* chemistry is not comprehensive, but does cover the isoflavonoids (the chemical class that is the source of most of the reported biological activity) in the most depth. The book includes chapters on *Pueraria* isoflavonoid biosynthesis, mammalian metabolism, and specific pharmacological activities. The index is helpful for locating chemical compounds and biological activity, but ethnobotanists and economic botanists trying to locate information on traditional and economic uses will find the index of almost no value. This volume contains many excellent chapters that will be of most value for university libraries and natural products researchers interested in

the potential of *Pueraria* as a science-based therapeutic agent.

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**Handbook of Thin Layer Chromatography, Chromatographic Science Series, Vol 89, 3rd edition.** Edited by Joseph Sherma and Bernard Fried (Lafayette College). Marcel Decker, New York, NY. 2003. xvii + 1016 pp. 7 1/4 × 10 1/4 in. \$250.00. ISBN 0-8247-0895-4.

Thin layer chromatography is often discounted as a useful tool in today's automated, computerized, HPLC-dominated laboratories. While lacking the high plate count and resolving ability of a 3  $\mu$ m HPLC column, unable to give a computerized readout complete with percentages under the curve for each component, and unsexy in the age of computer-driven science, TLC still has unique strengths and uses, e.g., in rapid field screening for certain compounds, and can often be very cost-effective. In this 1000-page volume, the editors, with 32 contributors each writing on their own special area of expertise, have reviewed the recent literature to bring the reader up to date in TLC equipment and advances in techniques.

Part I leads off with a compulsory 35-page digest of TLC principles and practice that will be useful for novices to the technique. Then follows chapters on theory of TLC separation, sorbents, apparatus, optimization methodologies, detection techniques, and preparative and radio chemistry, altogether occupying 13 chapters and 370 pages. The contributors often focus on new developments in equipment such as overpressure layer chromatography, or scanning and documentation apparatus. Taken as a whole, this provides a reasonably comprehensive review of the science and art of thin layer chromatography, as well as an introduction to equipment not often seen in most research labs.

Part 2 consists of 19 chapters each focusing on a topic, which may be a chemotype such as lipids or a category such as pesticides. If one of these topics is of special interest in your work, then you will find much useful information in the review, with a lengthy listing of citations at the end of the chapter. There is a 30-page chapter on the analysis of herbal drugs, ways of extraction, and detection of marker compounds, a topic long of interest in Europe and recently developing in the United States. As an example of the detail given, the chapter on antibiotic separation includes a table listing the *h*Rf values for 30 cephalosporin-like molecules in seven solvent systems and follows methods of visualization by 8 reagents and limit of detection for 7 cephalosporins. Other topics in this same chapter are aminoglycosides, macrolides, tetracyclines, quinolones, peptide antibiotics, sulfonamides, and some miscellaneous categories. In the chapter on Natural Toxins only 15 lines have been devoted to the topic of toxins from the marine environment, which hardly does justice to the number and diversity of marine toxins now known. Most of the authors give basic information on extraction and sample preparation, and in some cases simple examples are included which would serve as laboratory exercises for students. But in some cases I fear trying to repeat a method as given would

lead to disappointment. Listing a method of extraction for samples rich in lipid, without mentioning the difficulties lipids can cause if directly spotted onto a TLC plate, nearly guarantees poor chromatography and inaccurate quantitation. If you are looking for a ready reference to visualization reagents, you will not find it. Those are tucked away in each chapter. But even at 1000 pages this volume cannot hope to be a complete reference to all types of compounds; for example, there is no chapter on alkaloid separations.

As a quick digest of a large amount of TLC information, *Handbook of Thin Layer Chromatography* can be useful in the lab. It provides an up-to-date reference source to those already familiar with the technique and a good primer for those just learning.

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**Reactive Intermediate Chemistry.** Edited by R. A. Moss (Rutgers University), M. S. Platz (Ohio State University), and M. Jones, Jr. (Princeton University). Wiley-Interscience, Hoboken, NJ. 2004. viii + 1072 pp. 16 × 24 cm. \$95.95. ISBN 0-471-23324-2.

This publication is a timely work on the chemistry of reactive intermediates of which no true compilation has been published for the past 15 years. During this period, remarkable advances in techniques and progress in theory have resulted in rapid evolution ("revolution", in the editors' words) of this field. This book updates the chemistry of reactive intermediate species, which have been investigated through the traditional product-based research and, through recent advances in instrumentation, by "direct" observation. In addition, different technical approaches that have been utilized in very recent investigations are described.

The first part of this book consists of 16 chapters covering the reactive intermediates by type: carbocations, carbanions, radicals, carbenes, nitrenes, silylenes, arynes, and others. The chapters vary in the length and arrangements, whereas the contents of each chapter are neatly established by appropriately using sections and subsections. Almost all chapters contain sections describing the structure, generation, and behavior of, as well as the reactions involving, the aforementioned intermediates. An example from the first half of the book is the discussion of "borderline"  $S_N1/S_N2$  nucleophilic substitutions as presented by Amyes et al. in Chapter 2. He accomplishes this through reviews of two research topics that have been popular in the field in the past two decades: azide ion substitution at benzylic positions and nucleophilic substitution at tertiary carbon sites. A second example is the discussion by Doyle in Chapter 12, where he describes chemistry of synthetic carbenes and nitrenes in detail. Specific topics include the classification of metal carbenes by reactivity and their synthetic applications, including cyclopropanation and metathesis. Additionally, there is a discussion of a limited number of reactions of metal nitrenes.

The second part covers recent techniques and theories to analyze and survey reactive intermediates. Matrix isolation, laser flash photolysis, and some spectroscopic techniques for structural characterization are represented

along with a strong discussion of theory for each technique. An outline of equipment and experimental examples can be found in Chapters 17 through 20. In Chapters 21 and 22, two computational approaches are described: potential energy surfaces and reaction dynamics, both with regard to electronic structure calculations.

This book can be recommended as a graduate level textbook for students interested in reactive intermediate chemistry as well as a useful reference for practicing organic chemists. The appropriate formulas, schemes, and figures that accompany the detailed descriptions of each concept are great assets for the reader. Each chapter

includes not less than 10 suggested readings and a number of appropriate references. These are very helpful for the reader to appreciate more deeply the content of the individual chapters.

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