

Plant Flavonoids in Biology and Medicine. Biochemical, Pharmacological and Structure-Activity Relationships: edited by V. CODY, E. MIDDLETON and J. B. HARBORNE. Alan R. Liss, New York, 1986. 592 pp + xxi. \$76.00.

There are, already available, a number of excellent texts dealing with the chemistry, distribution and biological activity of flavonoids so any new work covering this group of secondary metabolites must be judged against high standards. *Plant Flavonoids in Biology and Medicine*, with a series of excellent papers dealing with various aspects of the ecological biochemistry of flavonoids and their pharmacological activity in man, passes that test with ease.

In all the book contains fifty-six contributions made at a Symposium held in Buffalo in July 1985; thirty-six full chapters together with twenty short four-page contributions based on posters presented at the Symposium. The book commences with single contributions on the evolution, distribution, biosynthesis and isolation and purification which serve the purpose of putting the remainder of the papers in perspective. This is followed by a series of chapters dealing with various aspects of the allelochemic activity of flavonoids, including tannins. The standard of these contributions is generally high but I would single out those by Hagerman and Klucher (tannin-protein interactions), Butler *et al.* (dietary effects of tannins) and McClure (physiology of flavonoids in plants) as being of particular note.

The remaining two-thirds of the chapters deal with the bewildering range of biological activity that flavonoids

have been reported to possess in relation to man. These include effects on enzyme systems, ATP and ATPase activity, protein kinases, their mutagenic activity and their ability to inhibit tumour development, the anti-inflammatory and more general anti-allergenic properties of flavonoids, their potential as anti-viral agents and their anti-hepatotoxic effects. There are also interesting contributions on their metabolism in mammals and the effects that their presence can have on detoxification processes.

The authors, editors and publishers are to be congratulated on the speed with which the book has been produced (a little over six months after the symposium). Speed has been assisted by the use of camera-ready copy, and while this inevitably leads to some variability in the quality of the print and the style of individual chapters it is quite acceptable. A number of errors were noted, primarily typographical, and one or two authors could perhaps have taken a little more care in checking their work. But this is a minor criticism of what is a very worthwhile book which makes a valuable contribution to the literature of flavonoids. Anyone who has an interest in any aspect of the biological activity of flavonoids and related compounds needs to have ready access to it.

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Chemistry and Toxicology of Pyrrolizidine Alkaloids: by A. R. MATTOCKS. Academic Press, London, 1986. vii + 393 pp. £61.

It is now 18 years since the last authoritative book was published on the chemistry and biological activity of pyrrolizidine alkaloids (L. B. Bull, C. C. J. Culvenor and A. T. Dick, 1968, *The Pyrrolizidine Alkaloids*, North-Holland, Amsterdam). During this time, a colossal amount of work has been reported in this area, much of it concerned with the variety of effects of pyrrolizidine alkaloids on animals, including humans. Dr. Mattocks has performed a valuable service by using his vast knowledge and experience in this area to select and compress the available material into a readable volume.

At the beginning of the book, the structures and plant sources of most of the known pyrrolizidine alkaloids are listed. This is followed by useful information on the detection and isolation of these alkaloids and their characterization by physical and chemical properties. Representative synthetic routes to the alkaloids and important analogues are described. A number of useful practical hints for workers in this area is an important feature of the opening chapters. Perhaps I indicate some bias, but I regret that the biosynthesis of these alkaloids was squeezed into less than half a page, in view of the striking recent progress in formulating the biosynthetic

pathways to pyrrolizidine alkaloids. Greater understanding of these pathways may have important consequences for studies of the biological activities of the alkaloids in the future.

The main purpose of the early chapters is to establish the necessary background material to develop the main theme which is the critical assessment of the enormous amount of work on the biological actions of pyrrolizidine alkaloids, metabolites and analogues. The various metabolic routes of the alkaloids are described, in particular the formation of the toxic pyrrolic derivatives in the liver. The action of these metabolites on the livers, lungs and hearts of a range of animals is discussed. Many semi-synthetic pyrrolizidine alkaloids and synthetic analogues have been prepared, and their biological activities are well reviewed.

Pyrrolizidine alkaloids belong to the small class of known, naturally occurring carcinogens, and this activity is clearly documented. There is a small ray of hope that the anti-tumour activity of some of these alkaloids (as *N*-oxides) can be utilized so that compounds with useful anti-tumour activity (and less toxicity) can be developed. Humans are also exposed to the effects of pyrrolizidine alkaloids when the alkaloids contaminate food or when they are taken deliberately as medicines or herbal remedies. The effects of the alkaloids are cumulative but may not be apparent for some time after their ingestion.

Better education in this respect is wisely advised.

Following the chapters on biological activity, Dr. Mattocks is careful to relate the observed effects as far as possible to the essential structural features in the alkaloids and analogues. This book will be an indispensable aid to all practitioners in the field of pyrrolizidine alkaloids, particularly to those concerned with their toxic effects. My

review copy has already disappeared irretrievably into my research group!

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