Camptotheca acuminata yielding the topisomerase inhibiting camptothecin without success. This cannot be a general criticism of the book, but it serves to illustrate the wealth of drugs and compounds that waits to be evaluated deeper by scientific means. Criticism, however, starts at the point were readers cannot be sure whether they really can find what they are looking for. The book is furnished with four indexes, the index of Latin plant names probably being the most useful for Western readers. The English plant names with their inevitable ambiguity are less useful like the list of pharmacological actions which contains only Chinese plant names for each effect without translation into Latin names. A list of Chinese names with their Latin equivalents would be useful. An index of chemical compounds or groups of compounds is not given, but would be very helpful as well.

Despite of these criticisms I consider the book as a valuable compilation of Chinese drugs with the detailed listing of their evaluation by means of chemical and pharmacological studies. For those interested in phytochemicals and their effects from a scientific point I recommend this book without restriction. Individuals who received a thorough introduction into Chinese medicinal principles in addition to scientific education will find the evaluation of chemical constituents and pharmacological effects most interesting.

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Phytochemistry of Methods in Biotechnology, Vol. 10: Carbohydrate Biotechnology Protocols
C. Bucke; Humana Press, Ottowa, NJ, 1999, 337pp., ISBN: 0-896-03563-8, $79.50.

Carbohydrate Biotechnology Protocols, edited by Chris Bucke is the tenth in a series of books published under the heading, *Methods in Biotechnology*, edited by John Walker. The collection spans the subject areas of: recombinant plant proteins, downstream processing methods, natural products, biopesticides, monitoring of bacteria, biosensors, animal cell biotechnology, and aqueous two-phase systems. The present volume on carbohydrate biotechnology clearly fills the gap left vacant, at least in part, since the publication of Stephen Fry's *The Growing Plant Cell Wall: Chemical and Metabolic Analysis* in 1988 by Longman; and Dey and Harborne's volume 2, 1990, of the 10-volume series, *Methods in Plant Biochemistry*. It also complements Whistler and BeMiller's *Industrial Gums: Polysaccharides and their Derivatives* (3rd ed., ISBN 0-12-746253-8) which gives a detailed account of commercially important polysaccharides.

Carbohydrate Biotechnology Protocols compiles the practical methods that have been used for the production, modification and study of structural aspects of key commercially important carbohydrates whether they are polysaccharides or oligosaccharides of plant or microbial in origin. The contents of the book are divided into 26 chapters. The general format of each chapter being an introductory description, relevant methods used, including the reagents and equipment required, simplified protocols, and finally a set of notes that give appraisal of the experimental approaches with caution about the problems that may arise.

The introductory chapter by C. Bucke, the editor of this volume, gives a general overview of the significance of carbohydrates in biotechnology. Chapters 2–7 are on industrial polysaccharides and their derivatives. These include Xanthan gum, alginate, schizophyllan, cellulose, enzymically modified alginate and guar gum. Many of these have a high commercial value as thickening and gel-promoting agents. The method on mannuronan C-5 epimerase-catalysed modification of alginate is applied only on analytical scale. However, this chapter should provoke thoughts for future production of recombinant enzyme. Similarly, UDP-glucose-based enzymic synthesis of cellulose is also described on laboratory scale. The modification of guar gum as described, uses the enzymes galactose oxidase and catalase in contrast to α-galactosidase that has been successfully used on a commercial scale. Chapters 8–14 give an account of low molecular weight carbohydrates, such as, cyclic oligosaccharides, cyclodextins and glycolipids that have either direct or potential commercial importance. These include, enzymic production of cyclodextrins from liquified starch, microbial glycolipids, laboratory-scale starch hydrolysis to yield maltodextrins, enzymic formation of biologically active glucooligosaccharides, sucrose-derived fructooligosaccharides, innulooligosaccharides from innulin, and physologically active sialylated glyco-

conjugates. Chapters 15 and 16 deal with enzymic depolymerization of plant cell wall hemicelluloses and crustacean chitins, respectively. Chapters 17–19 are basically of fundamental interest with potential for further exploitation for example, synthesis of oligosaccharides using glycosidases, methods for structural elucidation of N-linked sugars, and the use of sucrose synthase for producing various sugars and their derivatives. Chapters 20–25 are on enzymic synthesis of maltose, mannitol and various glycosides which may be of importance in food, pharmaceutical, chemical, detergent and cosmetic industries. Lastly, Chap. 26 describes enzymic enhancement of flavour in wines and fruit juices using immobilized enzymes. This is an excellent chapter and encapsulates information for future biotechnological application.

In summary, *Carbohydrate Biotechnology Protocols* is an excellent compilation of literature for both academics as well as industrial researches requiring ready and tested methodology protocols in the field of carbohydrates. This volume is also unique in that it provides good experimental details of those unusual and essential hints that are so often lacking in research papers. Thus, Chris Bucke has done a great favour to the scientific community in the carbohydrate field by producing this volume. Another positive feature is the hardback production of the book that will certainly withstand the rigours of its extensive use on the laboratory bench. I would strongly recommend this book to all carbohydrate researchers.

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