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Book reviews

Carbohydrate Metabolism in Plants: by C. M. DUFFUS AND J. H. DUFFUS, Longman, London and New York, 1984, xii + 183 pages, £7.50.

This book aims to provide an introduction to the main features of carbohydrate metabolism in plants, and, in so doing, to integrate physiological processes with biochemical events. To this end, the first chapter opens with a brief discussion of how plant-cell structure relates to function, followed by an outline of the synthesis and fate of precursor molecules produced by the chloroplast in photosynthesis, and a description of some of the structural and physiological changes accompanying plant growth and development. There follow chapters on the structure and function of the principal plant-carbohydrates, the metabolic fate of photosynthetic products, the synthesis and metabolism of sucrose, the role of respiratory processes, mechanisms involved in polysaccharide synthesis and degradation, and the role of intermediates in, and the overall regulation of, carbohydrate metabolism. The final chapter gives a summary of techniques available for carbohydrate analysis, with emphasis on the characterization of polysaccharides.

The book is directed to undergraduates in agriculture, biochemistry, and various branches of biology, for whom the authors assume some elementary knowledge of botany and biochemistry, together, presumably, with some organic chemistry. The question is thus raised as to how far carbohydrate chemistry and biochemistry can be presented in a meaningful way against a very limited chemical background. The authors are clearly most at home in biological topics, and much of the descriptive material is presented in a readable and interesting way. However, in common with too many biological texts, the chemical structures of co-enzymes, nucleotides, and metabolic intermediates are offered in the code language of NAD^+ (although the positive charge is consistently omitted), NADH, ATP, *etc.*, which, without a vocabulary, becomes only slightly more meaningful than a list of telephone numbers.

Those sections dealing with carbohydrate structures and stereochemistry are the least satisfactory, and, given the uncertain chemical background of the readership, some of the effort may be misplaced. Furthermore, in these sections, there are too many statements that are either misleading, or factually incorrect, for the authors to be regarded as reliable guides. A treatment of configurational isomerism in acyclic compounds is of limited value unless the three-dimensional nature of D-glyceraldehyde and the acyclic forms of sugars are shown clearly in perspective, or defined in Fischer projection formulae. We are told that "the existence of mutarotation is explained by the different *solubilities* of the α- and β-forms"!

Elsewhere, alginic acid is said to contain L-mannuronic and D-guluronic acids, whilst the authors aver that pectin contains chains of (1→4)-linked β-D-galacturonic acid residues.

The book has laudable objectives, and succeeds in giving a readable account of the importance of carbohydrates in plants. It could, therefore, be read with profit by carbohydrate chemists seeking a broad background in plant biology, provided that they bring a chemical-correction kit, but, for reasons already given, the book cannot be regarded as a reliable, undergraduate text. A more satisfactory treatment of much of the same subject material, although directed less exclusively to plant carbohydrates, is given in "Biological Functions of Carbohydrates" by D. J. Candy*.

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Topics in Enzyme and Fermentation Biotechnology: Volume 8, edited by A. WISEMAN, Horwood, Chichester, 1984, 179 pages, £21.00.

This volume continues the important series of reviews on Enzyme and Fermentation Biotechnology topics that are of interest both to academics and industrialists working in this area. The interdisciplinary approach that is required in any biotechnology venture is reflected in the nature of the reviews published in this series. In Vol. 8, of immediate interest to carbohydrate workers is an article on xylanases, but a chapter on the use of computers and microprocessors in the fermentation industry will be useful to anyone interested in the production of microbial polysaccharides with increased efficiency and at reduced cost.

A chapter on xylanases (D-xylanases) by J. Woodward is concerned with the controlled degradation of the hemicellulose component of hardwoods and softwoods. In this concise review, the author discusses the functions and properties of this group of enzymes. The chapter, surprisingly and refreshingly, brings together information on the sources, production, physiological role, and characterization of xylanases, as well as discussing the chemical aspects of the action of these enzymes. In a section on the biotechnology of xylanases, the author comments on their potential for the production from D-xylans of D-xylose for subsequent use in fermentation to ethyl alcohol. Although some potential for such an application may exist for this venture, it is clear from the review that considerable work lies ahead before commercial viability will be achieved.

The second chapter, by M. Winkler, is an extensive review on a topical, biotechnological subject, *i.e.*, the biological control of nitrogenous pollution in

*For a review, see *Carbohydr. Res.*, 92 (1981) c10.