

prehensive and updated. This book is greatly recommended to anyone who, in any way, is involved in biotechnology, mainly in the carbohydrate field. It should also be recommended to industrialists, financiers and politicians for overview reading.

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**Methods in Enzymology Vol. 161: Lignin, Pectin and Chitin (Part B).** Edited by Willis A. Wood and Scott T. Kellogg, Academic Press, Inc., San Diego, 1988. xxxi + 574 pp. ISBN 0 12 182062 9. Price: £46.50.

Enzymatic treatment of plant and crustacean biomass involves special methods due to the insolubility of the lignocellulose complex and of the chitin associations with inorganics and protein. Those methods include substrate preparation and culturing of organisms. Enzymes to be used for such purposes will be chosen for their superior catalytic capability, compatibility with the conditions of industrial processes and ample availability. There is immediate interest in the conversion of biomass polysaccharides, for instance, into fuel ethanol and products for cosmetic and medical uses.

This book is part B of a set of two volumes devoted to cellulose and hemicellulose (Vol. 160) and to lignin, pectin and chitin (Vol. 161), or, more precisely, to the enzymes that degrade these polysaccharides.

The content of each section ranges from chemical characterization of substrates to purification of relevant enzymes. Most of the book is constituted by Section 1 (Lignin) and Section 3 (Chitin) and a short section on pectin is sandwiched in between. Presentation follows the 'Methods in Enzymology' style and collates 69 short and exhaustive contributions. This review is mostly devoted to the 'Chitin' section, the closest to the reviewer's heart, but similar considerations can be made for the rest of the book.

A chapter on chitin solutions and purification opens the 'Chitin' section: surprisingly, this is confined to organic solvent systems which do not seem particularly suited for further enzymatic degradation of the dissolved chitin. In fact, modified chitins such as chitosan and glycol chitin, lend themselves to enzymatic hydrolysis better than chitin itself and have been accepted as substrates for a long time. These, together with colloidal chitin are discussed in subsequent chapters.

Radiochemical, viscosimetric and colorimetric assays for chitinases are presented in detail. Instrumental analytical techniques are dealt with in various chapters. Among these, the one on the determination of chitin structure by X-ray diffraction spectrometry seems to be unrelated to the main subject of the book and is just a summary of works amply accessible in other books (all references are at least 10 years old). The degree of deacetylation of chitins, being a critical parameter for their applications, is thoroughly treated even though recent developments are omitted, such as spectropolarimetry. On the contrary, the molecular weight determinations are disappointingly treated in an inadequate manner, ignoring laser light scattering spectrometry and extensively reproducing a 12-year old article.

Full procedures are given for the isolation and assay of several chitinases of various origins, including bean leaves, soybeans and tomato seeds. However, economical aspects related to the isolation and production are not discussed. Chitosanases and chitin deacetylases are also described and discussed: there is hope that these enzymes may represent a future alternative to chemical treatment of chitin.

The value of this book, which provides for the first time a collection of methods and data relevant to enzymes of growing importance in the technological area, should be duly underlined. The book is well produced and perfectly printed with a few minor errors (for instance, pp. 80 and 238), and is recommended not only to enzymologists but also to scientists eager to understand the technological potential of these polysaccharides.

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