

Book reviews

Biotechnology Second Edition, Volume 9. eds. G. Reed and T.W. Nagodawithana, x + 804 pp., D.M. 520.00, VCH, Weinheim, 1995, ISBN 3-527-29319-6

“Biotechnology” has been defined in many ways. The editors of this book define it as an application of biological principle for the purpose of converting foodstuffs into more palatable nutritious or stable foods.

In recognition of the enormous advances in biotechnology in recent years, the editors of “*Biotechnology*” have decided to complete a more up to date and advanced edition, which has expanded from ten to twelve volumes. The first four volumes consider the fundamentals of biotechnology from biological, biochemical, molecular biological, and chemical engineering perspectives. The next four volumes are devoted to products of industrial relevance. The last four volumes are dedicated to special topics. Volume nine in this second edition series combines four distinct but related sections; these are enzymes, biomass production, food fermentation and feed fermentations.

The section on enzymes is introduced by a description of the general properties of enzymes. This is followed by a comprehensive chapter on the production of enzymes as fine chemicals, a subject which has not previously been treated in the literature in such detail. The section also includes a challenging chapter on the function of multi-enzyme systems. Finally the analytical use of enzymes is discussed in detail.

Four types of microorganisms can be used to produce biomass. These are bacteria, yeast, fungi and algae. Section two of the book reviews the production of biomass from the aforementioned microorganisms for use in human foods and feeds, and the nutritional properties of such biomass.

By far the largest section of the book covers food fermentations on a world-wide basis (Section three). It discusses the staples of our diet including wine and beer as they may also be considered staples because of their major contribution to the diets in various countries.

Fermented feeds and feed products are of major importance to the livestock and feed industry. A myriad of feed products have resulted from fermentation techniques, which are used to enhance animal health and production efficiency. In fermentation of feed stuffs (Section four) such considerations are dealt with in a single chapter.

This book is a clear concise valuable reference source for microbiologists, biochemists, molecular biologists,

bioengineers, chemical engineers, food and pharmaceutical chemists.

John F. Kennedy
Tracey A. Norris

Methods in Carbohydrate Chemistry Volumes IX and X. J.N. Be Miller and R.L. Whistler (eds.), Wiley and Sons, New York, 1994, xxviii + 529 pp., ISBN 0-471-52941-9 (vol. IX); ISBN 0-471-52940-0 (vol. X)

After a pause of several years, *Methods in Carbohydrate Chemistry* resumes publication with a new publisher. It continues the series which was first published in 1962. A testament of the good quality of the *Methods in Carbohydrate Chemistry* series is that the first volume is still in widespread use today. The aim of the series was to fill a need that existed in carbohydrate chemistry and biochemistry for reliable methods that could be used by both the specialist and nonspecialist in carbohydrates thus saving valuable time searching through voluminous literature.

The latest volumes, IX and X, certainly live up to this aim by reviewing techniques that have been developed since the halt in *Methods in Carbohydrate Chemistry* in 1980, with the publication of Volume VIII.

Volume IX of the series consists of nineteen chapters and is divided into four sections. Section one of the book concerns lipopolysaccharides. Initially, isolation techniques are examined where extraction with aqueous phenol has acquired widespread usage not only because of simplicity but also because it can be applied to many groups of bacteria. Also, three specific examples of lipopolysaccharide analysis are detailed.

Section two of the book examines various saccharide separation and analysis techniques, including chromatographic, chemical, enzymic and physical methods of analysis. This is also the largest section of the book.

Glycoproteins is the term used to describe the vast array of molecules that contain a protein and a covalently bound oligosaccharide. Methods used for their preparation and isolation are detailed in Section three.

Immobilization of biologically active components including carbohydrates is an important tool in biological research, especially in its application to affinity chromatography for purification of biological molecules. Volume IX concludes with methods for immobilization of carbohydrates on polyacrylamide gels.

Volume X of the series is primarily concerned with the use of enzymes in carbohydrate chemistry. This

volume consists of 45 chapters that have been arranged into five sections. Dealing with (I) determination of mono- and oligosaccharides and certain derivatives; (II) determination of some polysaccharides; (III) structural analysis of more complex polysaccharides; (IV) preparative methods utilising enzymes; and (V) selected methods found in other volumes.

Whilst the enzymic methodology for the first two sections is straightforward, that dealing with the structural analysis of polysaccharides is variable in complexity. Some articles describe the use of one or more enzymes which give valuable information on a particular polysaccharide, e.g. the fine structure of amylopectin. Other articles illustrate the use of enzymic methods for the examination of fine structure of polysaccharides which serve as models for work on unknown polysaccharides. Examples include work on xanthans and yeast cell wall β -glucans.

Section four describes the preparation of some mono- and oligosaccharides mainly using the enzymic depolymerisation of certain polysaccharides of known primary structure.

Volume X contains an easy-to-follow index of methods found in the previous volumes of *Methods in Carbohydrate Chemistry*.

Volumes IX and X of *Methods in Carbohydrate Chemistry* continue the excellent series providing reliable methods for carbohydrate chemistry. They attain the high standard set by previous volumes and are an excellent source of reference for anyone interested in the subject.

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Biopolymer Mixtures. J. Mitchell and S. Hill (eds.), Nottingham University Press, Nottingham, 1995, xi + 499 pp., price £70.00, ISBN 189767247

When two molecules are mixed together in an aqueous environment one of three things can happen: nothing; phase separation; or the molecules can interact. "Biopolymer Mixtures", which is based on the 56th Easter school held at the University of Nottingham examines the affects caused by mixing macromolecules together in an aqueous environment.

The book consists of 21 chapters that are divided into two sections, phase separation phenomena and interacting systems. Section one is introduced with a review of the principles of phase separation. This theme is continued (Chapter two) by examination of the factors that cause phase separation of mixed polymer systems, which can be explained by consideration of short range and polyelectrolyte effects.

Biopolymer solution demixing is currently of widespread interest especially when dealing with separation

and purification. Chapter three focuses particularly of the gel aspect of biopolymer demixing, but does not include a review of sheer-induced effects that one would expect of real processing situations. These are covered in Chapters four and five which review the rheological behaviour of biopolymer mixtures.

Then follow a series of chapters describing the application of a range of techniques used to investigate the phase separation phenomena of mixed systems, including NMR, microscopy, and FTIR.

Section one concludes with an investigation of one particular macromolecular system, namely starch and the separation phenomena involving its components amylose and amylopectin.

Section two concentrates more on molecules which exhibit "sticking together". The term "synergism" is re-evaluated in terms of these sticking-together phenomena, looking specifically at the area of polysaccharide-polysaccharide interactions (Chapter 13). A theme which is continued in Chapter 14 with a review of interactions involving two particular polysaccharides, glactomannans and glucotomannans.

Before corresponding protein systems are considered, the bridge is provided by a chapter on protein-polysaccharide interactions, where phase separation is the norm. Certain mixed proteins systems can also give rise to phase separation phenomena. Many lead to synergistic interactions and sometimes aggregation or precipitation. All such considerations are discussed in detail in Chapter 16. Mixed biopolymers and their organisation at interfaces are considered in Chapter 17, with specific attention directed towards the role of protein-protein and protein-polysaccharide interactions in relation to the stability of emulsions and foams in food systems. The application of protein-polysaccharide interactions is also important in other areas of commerce. Chapter 18 reviews such interactions with reference to the pharmaceutical industry. Mucoadhesion (adhesion involving a mucosal surface) is a medical phenomena where favourable interactions are sought. There are however medical phenomena where interactions are undesirable. Chapter 19 describes the procedure of "PEGylation" of proteins and liposomes to render them non-antigenic and non-immunogenic.

The volume concludes with two chapters considering favourable interactions occurring between biopolymers and small sugars.

Throughout this book there are approximately 150 different combinations of biopolymer mixtures considered (a separate index is provided), and over 30 techniques described for their investigation. Gels, foams, emulsions, glassy states and plasticizers self-association, complex formation phenomena aggregation, precipitation and phase separation are all considered. A whole range of applications with particular relevance to the food and drug industries is covered, and workers in