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BOOK REVIEW

Polysaccharides. Structural Diversity and Functional Versatility

(Second Edition, D. Severian (ed.), Marcel Dekker, New-York, 2005, 1204 pp., $269.95)

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The 49 chapters of this book consider various aspects related to structure and function of polysaccharides.

The first chapter summarizes information on structural and functional features of polysaccharides; it includes characterization and analysis of various classes of polysaccharides and their structural links: mono-, di-, and oligosaccharides.

Chapters 2 and 3 describe structural characteristics of cellobiose and its derivatives.

Chapters 4 and 5 contain data on X-ray structure and spectral analysis of cellobiose. Chapters 6 and 7 consider the features of infrared spectroscopy and light scattering applicable to analysis of the structure of cellobiose and many other polysaccharides.

Chapters 8-10 consider various approaches for studies of structure and conformations of polysaccharides in aqueous solutions and during gel formation. These chapters include characterization of such methods as NMR, fluorescence spectroscopy, and chemometry.

Chapters 11-15 consider problems of computer modeling of polysaccharide–polysaccharide and polysaccharide–polypeptide interactions and also characteristic features of stability, degradation, and biosynthesis of polysaccharides.

Chapter 16 deals with microbial exopolysaccharides.

Chapter 17 analyzes conformational changes of a xanthan gum, which is widely used for preparation of food, pharmaceutical preparations, cosmetics, etc., where viscous solutions are required.

Chapters 18 and 19 consider structure and features of hemicelluloses and methods of their chemical modification.

Chapters 20-25 deal with the role of xylan acetylation, industrial polysaccharides, characteristics of hyaluronic acid and also chemical-physical properties of cellulose and starch.

Chapters 26-29 consider various aspects of studies of chitosans and their derivatives: structure, penetration of medical drugs through mucosa, use in pharmaceutical industry, and characterization of macromolecular complexes.

Chapter 30 deals with structure and properties of polysialic acids.

Chapters 31 and 32 are devoted to brain proteoglycans and crystal structures of glycolipids, respectively.

Chapters 33-35 consider features of synthetic and natural polysaccharides exhibiting anticoagulant properties, use of mass spectrometry for study of polysaccharides, which share structure similar to that of heparan sulfate and also enzymatic synthesis of heparan sulfate.

Chapters 36-38 consider problems of use of polysaccharide-based hydrogels in tissue engineering, application of synthetic and natural polysaccharides with marked biological activity (antitumor, anticoagulant) in medical practice, and application of fructooligosaccharides for preparations on special nutrition mixtures for patients.

Chapter 39 considers use of polysaccharides for immobilization of cells on polysaccharide gels.

Chapter 40 discusses approaches for hydrothermal degradation and fractionation of saccharides and polysaccharides.

Chapters 41-44 consider various aspects of application of polysaccharides in the following biotechnological processes: treatment of cellulose and hemicellulose, ethanol production from lignocellulose materials and other processes.

Chapter 45 deals with polysaccharide surfactants, their structure, synthesis, and surface-active properties.

Chapter 46 considers structure and functional features of membranes obtained on the basis of polysaccharide derivatives.

Chapters 47 and 48 summarize data on electron-optical properties of cellulose derivatives (including features of the cellulose-based mixtures and fillings).

Chapter 49 describes preparation and properties of cellulose bicomponent fibers.

This book contains large and diverse information on polysaccharides. It may be recommended for a wide audience of specialists in chemistry and biochemistry of carbohydrates, biotechnology, cosmetics, and pharmacology. This book will undoubtedly be useful for teachers and students of schools preparing specialists in the above-mentioned fields.

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