



## Book Reviews

**Starches**

D.J. Thomas, W.A. Atwell; Eagan Press, St. Paul, MN, 1999, vi + 94 pages, ISBN 0-891127-01-2 (US\$ 59-00)

Starches (and modified starches) from various botanical origins, such as corn, wheat, rice, potato, tapioca, and sago, are often utilised to control and/or modify the physicochemical properties and characteristics of many foods (e.g. gelation, thickening, adhesion, binding, moisture retention, stabilisation, texturisation, film formation and antistaling). 'Starches' is a single source of practical information about starches, their functions, and their applications in food processing. This convenient, ingredient handbook is divided into nine concise chapters, the first of which discusses the structure of starch, covering basic carbohydrate chemistry, starch polymer biosynthesis, the properties of amylose and amylopectin, and starch granule composition and structure.

Over the years, instruments and methodologies have been developed that have led to a better understanding of the basic structure of starch and of the changes that occur in the presence of water, heat, or other food ingredients. The second chapter of this volume is thus devoted to starch analysis methods, and includes discussion of microscopic techniques, X-ray crystallography, viscosity measurements, starch contents, and amylose:amylopectin ratios, whilst the third chapter focuses upon gelatinisation, pasting, and retrogradation. The pastes and gels produced by native starches are often cohesive (gummy) or rubbery, the functional properties of these starches can be improved by modification. The fourth chapter therefore discusses chemical (derivatisation and crosslinking) and physical (pregelatinisation and heat treatment) modification of starches. There are numerous factors to consider in the choice of a starch for use in a particular food system.

The desired properties of the food (e.g. texture, mouthfeel, and viscosity), the method of processing, and the distribution parameters, especially storage temperatures, must all be examined. An up-front strategy in which the various requirements of the food product are reviewed before selection of a starch saves time, frustration, and probably money in the product development process. The fifth chapter of this volume therefore presents the matching of starches to applications and covers such criteria as sensory, pH, formula-related, processing, distribution and end-use considerations. The next five chapters are devoted to specific application areas and cover the use of starches in a variety of foods, confections, dairy products, grain-based

products (bakery products, fillings, icings, batters and breadings), sauces, gravies, soups, dressings, and meat products. The final chapter encompasses special topics, such as fat replacement, emulsion stabilisation, encapsulation, and resistant starch.

'Starches' is part of the Eagan Press Handbook series, which was developed as a series of practical guides serving the interests of the food industry. The series aims to offer a practical approach to understanding the basics of food ingredients, applications, and processes. Presented contents aim to bridge the gap between highly specialised information presented in the scientific literature and the product-specific information available from suppliers. Eagan Press is the food science publishing imprint of the American Association of Cereal Chemists (AACC).

In conclusion, this handbook is presented in a straightforward, user-friendly, essentially non-technical format with definitions of terms, examples, illustrations, tables, and trouble-shooting tips included throughout, making it clear and understandable for individuals at any level. It is therefore recommended as an asset to a variety of food industry professionals, including new product developers, quality assurance personnel, technical sales representatives, food scientists and students.

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**Human Biology, Third Edition**

C. Starr, B. McMillan; ITP Europe, London, 1999, xxvii + 624 pages, ISBN 0-534-55105-X, £27.50

The biological perspective on human life is a valuable educational tool that helps individuals cut through the overwhelming information concerning medical, environmental, and social issues that confront us as part of our every day life. This introductory text presents human biology in an easy to read manner, highlighting key concepts, current understandings, and research trends. The structure and function of tissues, organs and organ systems, i.e. the anatomy

and physiology of the human body are explained in sufficient detail to facilitate building of a working understanding and vocabulary about life's parts and processes.

The volume is essentially divided into four major sections. The first section begins with an overview of basic concepts and scientific methods, followed by chapters discussing the underlying principles of biochemistry and cell structure and function. The next section, which is by far the largest, deals with body systems and functions, and includes chapters on tissues and organ systems, the musculoskeletal system, digestion and nutrition, circulation and blood, immunity, respiration, salt–water balance and body temperature, the nervous system, sensory perception, the endocrine system, reproduction, development, and sexually transmitted diseases. The penultimate section outlines the principles of inheritance, and includes chapters on cell reproduction, observable patterns of inheritance, chromosome variations and medical genetics, DNA structure and function, cancer, and recombinant DNA and genetic engineering. The final section introduces and discusses the principles of evolution and ecology, including the fascinating and still-unfolding story of the emergence of modern *Homo sapiens*. Chapters in this section cover the principles of evolution, human evolution, ecosystems, and the impacts of human populations.

The presentation utilised in this volume is of the highest standard and helps readers visualise difficult concepts and complicated biological structures. In every chapter each concept is presented as a two-page concept spread with summary sentences containing the information needed to understand a concept. Selected illustrations incorporate zoom sequences, from macroscopic to microscopic views, showing the specific location of structures or processes. Visual summaries break down difficult processes using a combination of text and illustration, with step-by-step descriptive sequences. Physiological systems summaries describe the major body systems, all major structures and the function of each structure. Focus on health boxes discuss health concerns such as the role of antioxidants, fad diets and eating disorders, use of anabolic steroids, and exercise physiology. A CD-ROM is also included which presents *Interactive Concepts in Biology*. In summary, this is an excellent volume that will be of invaluable use to any individuals wishing to gain a comprehensive understanding of the core concepts of human biology.

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### Molecular and Supramolecular Chemistry of Natural Products and their Model Compounds

Jürgen-Hinrich Fuhrhop, Claus Endisch; Marcel Dekker, Inc., New York, 2000, ix + 602 pages, ISBN 0-824-78201-1, US\$ 195.00

Carbohydrates are the most abundant group of natural products. The abundance of carbohydrates and glycoconjugates in nature and the understanding of some of their biological roles has prompted research into utilizing simple monosaccharides as starting materials for a range of high value compounds, offering a renewable alternative to current starting materials. The field supramolecular or non-covalent natural product chemistry has been scientifically fruitful for several decades, and is presently exploited for the development of molecular devices and machinery as well as for medical applications.

Classical experiments with natural compounds include their isolation, purification, elucidation of molecular structure and total synthesis. The most important by-products of the analytical and synthetic work to date, is the knowledge about the stereochemistry and reactivity of natural compounds. The mastery and application of this knowledge has enormous potential in the production of organised and finally functional molecules.

This text contains nine chapters, which deal with the eight classes of natural products common in biological organisms and simple model compounds. The book leads from the less reactive, chiral molecules (useful membrane components, lipids, steroids, carbohydrates) to molecules that react reversibly with light and electrons and are helpful in energy conversion (carotenes, porphyrins, redoxative vitamins). Finally, helical and reactive biopolymers (nucleic acids and proteins) are covered. The chapters initially discuss relevant structural and dynamic details, followed by important synthetic strategies and typical reactions, ending with the assumption that one central goal of contemporary natural compound chemistry is the reversible production of non-covalent molecular assemblies and membranes (synkinesis).

*Molecular and Supramolecular Chemistry of Natural products and their Model Compounds* summarizes the known properties of natural compounds to determine their usefulness and synkinesis, and also investigates new techniques such as cryo-electron and scanning force microscopy and solid state NMR spectroscopy of membrane systems. This thorough, comprehensive text is aimed for advanced students in chemistry and biochemistry, and may also be of interest to research chemists. It contains over 900 references and more than 500 detailed illustrations.

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