Current Titles in Biochemistry

LIGNIN BIODEGRADATION: MICROBIOLOGY, CHEMISTRY, and POTENTIAL APPLICATIONS

Edited by T. KENT KIRK, Ph.D., Research Scientist, Forest Products Laboratory, U.S. Forest Service, U.S.D.A., Madison, WI, TAKAYOSHI HIGUCHI, Ph.D., Director, Wood Research Institute, Kyoto University, Japan, and HOU-MIN CHANG, Ph.D., Professor, Department of Wood and Paper Science, North Carolina State University, Raleigh.

These volumes are a comprehensive state-of-the-art summary of a rapidly growing body of knowledge on lignin, the most abundant, unused, renewable natural resource on earth. During the past several years there has been a concentrated research effort to understand the biodegradation of this complex aromatic polymer for three major reasons: (1) to examine the possible biological processing of waste industrial lignins, (2) to determine the possible biological conversion of wood and other lignocellulosics, and (3) to understand humus, coal, and petroleum formation and wood products deterioration. Three subject areas are covered: microbiology, chemistry and biochemistry, and applications. These books will serve as a reference work, a comprehensive review, and as an orientation for those new to the field.

VOLUME I: Lignin Structure and Morphological Distribution in Plant Cell Walls. Uptake and Catabolism of Lignin-Related Aromatic Compounds and their Regulation in Microorganisms. ^{14}C-Labeled Lignins as Substrates for the Study of Lignin Biodegradation and Transformation. Microbial Degradation and Stabilization of ^{14}C-Labeled Lignins, Phenols, and Phenolic Polymers in Relation to Soil Humus Formation. Fate of Lignin and Related Aromatic Substrates in Anaerobic Environments. Comparison of Degradation of ^{14}C-Labeled DHP and Cornstalk Lignins by Micro- and Macrofungi and by Bacteria. Screening White-Rot Fungi for Capacity to Delignify Wood. Microbial Degradation of DHP. Microbial Degradation of Diliginols as Lignin Models. Stereobiochemical Approach to Lignin Biodegradation. Chemistry of Lignin Degraded by White-Rot Fungi. Subject and Chemical Indexes. 256 pp., 7 × 10, 1980, ISBN-0-8493-5459-5.

Catalog no. 5459J, $66.95
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VOLUME II: Degradation of Lignin-Related Substances by *Sporotrichum pulverulentum*. Role of Laccase in Lignin Biodegradation. Enzymatic Transformations of Lignin. Studies on Physiology of Lignin Metabolism by White-Rot Fungi. Genetic and Biochemical Studies on *P. chrysosporium* and their Relation to Lignin Degradation. Microbial Metabolism of Lignin-Related Aromatics. Isolation and Characterization of Lignocellulose-Decomposing Actinomycetes. Degradation of Lignin-Related Compounds by Several Pseudomonads. Metabolism of Lignin-Related Compounds by Bacteria. Biodegradation of Lignin-Related Polystyrenes. Microbial Decolorization and Defoaming of Pulping Waste Liquors. Regulation and Genetics of Biodegradation of Lignin Derivatives in Pulp Mill Effluents. Lignin Biodegradation and Production of Ethyl Alcohol from Cellulose. Biomechanical Pulping. Ultrastructural Changes in Wall of Spruce Tracheids Degraded by *Sporotrichum pulverulentum*. Summary and Perspectives. Subject and Chemical Indexes. 272 pp., 7 × 10, 1980, ISBN-0-8493-5460-9.

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CHEMICAL CARCINOGENS and DNA

Edited by PHILIP L. GROVER, Ph.D., Chester Beatty Research Institute, London.

These volumes deal in depth with chemical modification of DNA and ways these modifications can be made and detected using chemical carcinogens in model systems. Detailed descriptions of DNA modification by nitrosamines and nitrosamides, aromatic amines, polycyclic hydrocarbons, aflatoxins and other natural products follow. Mutagenic consequences of reactions of carcinogens with DNA are considered with the biological consequences possibly resulting from these reactions and their repair in mammalian cells. Lastly, chemical carcinogenesis as a possible consequence of nucleic acid modification is discussed.

VOLUME I: Approaches to Chemical Dosimetry in Mutagenesis and Carcinogenesis: the Relevance of Reactions of Chemical Mutagens and Carcinogens with DNA. In Vitro Modification of Nucleic Acids by Indirect-Acting Chemical Carcinogens. Use of Radioactive Carcinogens to Detect DNA Modifications. Fluorimetric Detection of DNA-Carcinogen Complexes. Nucleic Acid Modificatin by *N*-Nitroso Compounds. Carcinogenic Plant Products and DNA. Fungal Toxins, Aflatoxins and Nucleic Acids. 256 pp., 7 × 10, 1979, ISBN-0-8493-5303-3.

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VOLUME II: Metabolic Activation of Aromatic Amines and Amides Interactions with Nucleic Acids. Polycyclic Aromatic Hydrocarbon Metabolites: Their Reactions with Nucleic Acids. Conformational Changes in Nucleic Acids Modified by Chemical Carcinogens. Mutagenic Consequences of Chemical Reactions with DNA. DNA Repair and Carcinogenesis. 224 pp., 7 × 10, 1979, ISBN-0-8493-5304-1.

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STRATEGIES for SHORT-TERM TESTING for MUTAGENS/CARCINOGENS

By BYRON E. BUTTERWORTH, Ph.D., Chief of Genetic Toxicology, Chemical Industry Institute of Toxicology.

Critical reviews of the state-of-the-art of bacterial and mammalian cell mutagenicity assays, cell transformation systems, DNA damage and repair assays, and testing for genetic damage in whole animals are presented by key scientists working in the field. Practical guidelines for using and interpreting assay results follow each major proposal. Also included are hypothetical test cases depicting typical situations that arise when attempting to formulate a course of action in response to results of short-term tests.

CONTENTS: Critical Reviews of the State-of-the-Art for Short-Term Tests. Practical Guidelines for Use and Interpretation of Short-Term Testing for Mutagens/Carcinogens. Discussion of Possible Courses of Action Given Several Hypothetical Test Cases. 160 pp., 7 × 10, 1979, ISBN-0-8493-5661-X.

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CRC Handbook of ELECTROPHORESIS

Edited by L. A. LEWIS, Ph.D., Consultant, Division of Laboratory Medicine, Cleveland Clinic, Clinical Professor of Chemistry, Cleveland State University, Cleveland, and J. J. OPPLT, M.D., Ph.D., Director of Clinical Chemistry Laboratories, Metropolitan General Hospital, Associate Professor of Pathology, Case Western Reserve University, Cleveland.

The field of electrophoresis of proteins and its multiple applications has expanded so rapidly that ready access to much of the information is impossible. *CRC Handbook of Electrophoresis* is planned to provide basic background on principles of different types of electrophoresis. The significance of electrophoretic procedures to the biochemist and clinical chemist is reflected in increasing demand for up-to-date information. A distinguished international advisory board and world-renowned scientists in the field have contributed valuable guidance and scientific material for this Handbook.

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CONTENTS: Lipoprotein Changes Induced by Physiological and Disease Processes. Familial Hyper-α-Lipoproteinemia. Electrophoresis in the Determination of Plasma Lipoprotein Patterns. Lipoprotein Electrophoresis in Differentiating Type III Hyperlipoproteinemia. Lipoprotein Changes in Undernutrition and Overnutrition. Hormonal Effects on Serum Lipoproteins. Electrophoresis of Serum Lipoproteins in Proven Coronary Artery Disease. Changes in the Plasma Lipoprotein System Due to Liver Disease. Lipoprotein Changes in Renal Diseases. Plasma Lipoproteins in Diabetes. Hyperlipidemia and Hyperlipoproteinemia in Patients with Gout. Serum Lipids and Lipoproteins and their Relationship with Thyroid Function. Lipoproteins in Autoimmune Hyperlipidemia and in Multiple Myeloma. Lipoproteins and Neoplastic Diseases. Lipoprotein Literature. Bibliography of Lipoprotein Literature. 400 pp., 7 × 10, 1980. ISBN-0-8493-0572-1.

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HORMESIS with IONIZING RADIATION

By T. D. LUCKEY, Ph.D., Dept. of Biochemistry, University of Missouri, Columbia, MO.

Hormesis is physiologic stimulation by low doses of any potentially harmful agent. This work collects scattered information of stimulation by low levels of ionizing radiation into a unified concept which both conforms to and gives confirmation to the thesis of hormesis.

CONTENTS: Introduction. Ionizing Radiation. Physical Characteristics of Ionizing. Radiation Measurement. Background Ionizing Radiation. Chemical Reactions from Ionizing Radiation. Perception of Ionizing Radiation. Biologic Effects of Ionizing Radiation. Is Ionizing Radiation Essential for Life? Hormesis. Nomenclature. Hormesis Thesis. Related Concepts. Electromagnetic Radiation. Corpuscular Radiation. Mixed Radiation Hormesis. Mechanisms of Radiation Hormesis. Biochemical Mechanisms. Perspective. Summary. Applications. Conclusions. Index. 232 pp., 7 × 10, 1980, ISBN-0-8493-5841-8.

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PLANT TISSUE CULTURE as a SOURCE of BIOCHEMICALS

Edited by E. JOHN STABA, Ph.D., Professor and Director Graduate Studies in Pharmacognosy, College of Pharmacy, University of Minnesota, Minneapolis.

Plant tissue culture techniques are being used throughout the world to rapidly and uniformly propagate many plants, including economically valuable plants containing steroids and pyrethrins. The major objective of this book is to inform pharmacologists, biochemists, botanists, and cell biologists of the progress made in growing aseptic plant cell suspension cultures for biochemical production.

Scientists in academic, government, and industrial research and development laboratories that study and produce tissue culture techniques for biochemical products will find the contents of this book valuable. The contributions of the authors equip the research and development staff with pertinent parameters on the establishment and development of suspension cultures, including: specific techniques and conditions for growth; nutrition in plant cell cultures; recipes for media; environmental effects on and storage of cultures; production, yield, cost analysis, and utility of biochemically available pharmaceuticals.

Because plant biochemical systems are now available for use in a chosen, controlled environment, the potential to produce biochemicals industrially and to produce plant substances independently of restrictive environmental conditions has far-reaching implications and benefits for the future in agriculture and horticulture as well as in pharmacology.

CONTENTS: Laboratory Culture. Nutrition and Metabolism. Secondary Metabolism and Biotransformation. Selection of Plant Cell Lines Which Accumulate Compounds. Storage of Plant Cell Lines. Environmental Factors: (A) Light and (B) Temperature, Aeration, and pH. Mass Culture Systems for Plant Cell Suspensions. Industrial and Government Research. Product Cost Analysis. Products. 304 pp., 7 × 10, 1980, ISBN-0-8493-5557-5.

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CLINICAL IMPLICATIONS of DRUG USE

Edited by T. K. BASU, M.Sc., Ph.D., Lecturer in Human Nutrition, Dept. of Biochemistry, University of Surrey, England.

Most drugs are metabolized by enzyme systems primarily located in liver microsomes. The rate of metabolism is affected by a variety of factors including age, sex, nutritional status, pregnancy, disease, environment, genetic disorders and preadministration of drugs. Realization of the effects of these factors on drug metabolism is of prime importance in assessing the therapeutic effects and toxicity of drugs. A thorough discussion of these and other aspects makes this reference valuable to anyone involved in drug evaluation, especially the physician who is bombarded by the vast array of drugs now on the market.

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DIVERSITY of BACTERIAL RESPIRATORY SYSTEMS

By CHRISTOPHER J. KNOWLES, Ph.D., Senior Lecturer in Biochemistry, University of Kent at Canterbury, GB.

Although wide differences occur in composition and function of mitochondrial respiratory systems, there are also distinct and fundamental similarities, whether they originate from plants, animals, or microorganisms. Depending on degree of evolutionary sophistication of the organism and their habitat, bacterial respiratory systems vary enormously in both composition and function; from very simple to complex mitochondrial-like systems. This work reviews a wide range of topics selected either because they are of current interest, have not been reviewed recently, or have never been reviewed.

VOLUME I: Growth Yield Values in Relation to Respiration. Electron-Transfer-Driven Solute Translocation Across Bacterial Membranes. Temporal Diversity of Bacterial Respiratory Systems: Membrane and Respiratory Development During the Cell Cycle. The Respiratory System of *Escherichia coli*. Oxygen Reactive Hemoprotein Components in Bacterial Respiratory Systems. Respiration in Methanogenic Bacteria. Respiration in Methylotrophic Bacteria. 272 pp., 7 × 10, 1980, ISBN-0-8493-5399-8.

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SPECTROSCOPY in BIOCHEMISTRY

Edited by J. ELLIS BELL, D.Phil., Assistant Professor of Biochemistry, University of Rochester Medical School, Rochester, NY.

The range of spectroscopic techniques available to biochemists runs the whole spectrum, from Mossbauer spectroscopy to nuclear magnetic resonance. In this book emphasis is placed on biochemical applications of the major forms of spectroscopy which are readily available and applicable to biochemical systems. The work will be of use to the biochemist or biologist who does not have a background in spectroscopy, but desires to find out what sort of information spectroscopy can provide. Part of the techniques described deal with: intrinsic and extrinsic chromophores; soluble systems-proteins; nucleic acids; polysaccharides; particulate systems-polynucleotides; membranes, lipids; intrinsic and extrinsic fluorophores; solvent exposure; hydrophobicity; micro- and macro-mobility; membrane microviscosity; membrane-ligand interactions; spin labelling; and protein-ligand interactions. Theoretical treatments are given when necessary to understanding of the principles involved. Guidance in the interpretation of spectroscopic results which includes potential limitations and pitfalls, is provided in each chapter.

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GENETIC DIFFERENCES in CHEMICAL CARCINOGENESIS

Edited by R. E. KOURI, Ph.D., Head, Dept. of Biochemical Oncology, Microbiological Associates, Bethesda, MD.

Chemical carcinogenesis is a multi-step process. Therefore, control or regulation potentially resides in each step. Hypothetically, cancer can be regulated at a level of (a) limitation of exposure to carcinogens, (b) uptake and distribution, (c) metabolic activation/inactivation, (d) binding of the active form to the biological target, (e) virus expression, (f) repair of the lesion, (g) promotion of the transformed cell, and (h) immune capacity of the host. The role of genetic differences in the study or potential control of each level is the subject of this work. The final chapter attempts to answer the important question: do these factors play a role in cancer susceptibility in man.

CONTENTS: Exposure, Uptake and Distribution of Chemical Carcinogens. Metabolism of Chemical Carcinogens. Repair of Chemical Carcinogen-Induced Lesions. Inheritance of Murine Endogenous RNA Viruses. Two-State Carcinogenesis: Possible Role of Promoters. Tumor Immunology and Chemical Carcinogenesis. Host-Environmental Interaction and Carcinogenesis in Man. 240 pp., 7 × 10, 1980, ISBN-0-8493-5285-1.

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AMPHETAMINES and RELATED STIMULANTS: Chemical, Biological, Clinical, and Sociological Aspects

Edited by JOHN CALDWELL, Ph.D., B. Pharm., Department of Biochemical and Experimental Pharmacology, St. Mary's Hospital Medical School, London.

Explores historical, chemical, biological, clinical, and sociological aspects of amphetamines and related stimulants with reference to legitimate medical use and abuse.

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FIBRINOLYSIS

By DANIEL L. KLINE, Ph.D., Chairman, Department of Physiology, College of Medicine, University of Cincinnati, Ohio, and K. N. N. REDDY, Ph.D., Biochemistry Department, Los Angeles County — University of Southern California Cancer Center, Los Angeles, California.

Describes and evaluates the current status of biochemical and physiological knowledge of enzymes and inhibitors of fibrinolysis and possible future developments of thrombolytic therapy. Includes references to important papers and reviews. A valuable source for scientists and clinicians and an excellent introduction for experimenters.

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PREDICTING PHOTOSYNTHESIS for ECOSYSTEM MODELS

By JOHN D. HESKETH, B.S., M.S., Ph.D., AR-SCA, USDA, University of Illinois and JAMES W. JONES, Ph.D., Agricultural Engineering, University of Florida.

Focus is on 4 methods to predict photosynthate production in plant stands, a major goal of most ecosystem models. Each method has both merits and deficiencies. In the future, all 4 methods might be used simultaneously to cross-check predictions. These methods involve several disciplines. Addressed directly is the problem of adaptation to environment where leaf responses differ dramatically with adaption.

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VOLUME II: Analysis of CO_2 Exchange Assumptions: Feedback Control. Modeling C_3 Respiration in the Light. Interfacing Leaf and Canopy Light Interception Models. Predicting Dark Respiration in the Soil-Plant System. Predicting Leaf Expansion. Predicting Flowering and Subsequent Leaf Expansion. Leaf Growth and Senescence. Concepts of Translocation with Special Reference to Assimilation of Nitrogen and its Movement into Fruits. Paradox of No Correlation Between Leaf Photosynthetic Rates and Crop Yields. Predicting Primary Productivity for Forest and Desert Ecosystem Models. COTCROP: A Computer Model for Cotton Growth and Yield. 304 pp., 7 x 10, 1980, ISBN-0-8493-5336-X.

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