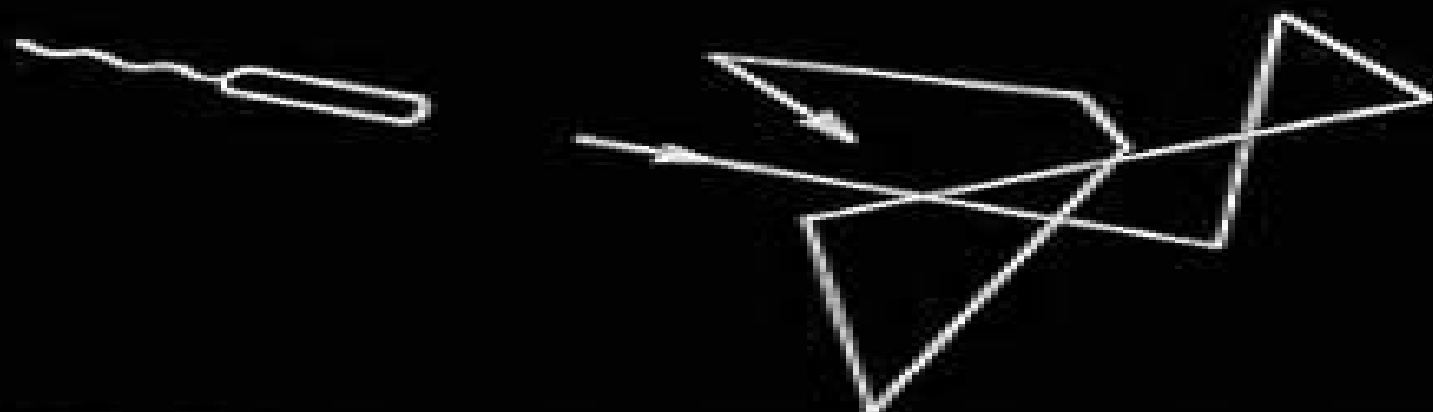

MODELING THE METABOLIC AND PHYSIOLOGIC ACTIVITIES OF MICROORGANISMS



Edited by
Christon J. Hurst

Modeling The Metabolic And Physiologic Activities Of Microorganisms

Julian W.T. Wimpenny



Modeling The Metabolic And Physiologic Activities Of Microorganisms:

Modeling the Metabolic and Physiologic Activities of Microorganisms Christon J. Hurst,1992-09-17 Describes methods for formulating models of the metabolic and physiological processes of microorganisms from a mathematical perspective The models used biodegradation individual cellular functions and environmental cycles are practical mathematical tools that enable researchers to predict and control microorganism behavior The focus is on their behavior in the natural environment with mixed populations of microorganisms and heterogeneous substrates **Mathematical**

Modeling in Microbial Ecology A.L. Koch,Joseph A. Robinson,George A. Milliken,2012-12-06 From the Chapman Hall Microbiology Series this unique resource offers specific experimental and practical applications of mathematical modeling in microbial ecology The text presents a variety of systems ranging from subcellular systems to ecosystems and shows how to test whether the models provide a good representation of the system The book also encourages further development and application of modeling to burgeoning problems associated with microbial ecology such as the pollution and destruction of pesticides and herbicides *Modeling Disease Transmission and Its Prevention by Disinfection* Christon J. Hurst,1996-11-13

Pathogenic microorganisms exploit a number of different routes for transmission and this book demonstrates how the spread of disease can be prevented through the practices of disinfection and controlling microbial growth The book is organized into four sections Manual of Environmental Microbiology Christon J. Hurst,Ronald L. Crawford,Jay L. Garland,David A.

Lipson,2007-05-14 The most definitive manual of microbes in air water and soil and their impact on human health and welfare Incorporates a summary of the latest methodology used to study the activity and fate of microorganisms in various environments Synthesizes the latest information on the assessment of microbial presence and microbial activity in natural and artificial environments Features a section on biotransformation and biodegradation Serves as an indispensable reference for environmental microbiologists microbial ecologists and environmental engineers as well as those interested in human diseases water and wastewater treatment and biotechnology Their World: A Diversity of Microbial Environments Christon

J. Hurst,2016-05-02 This volume summarizes recent advances in environmental microbiology by providing fascinating insights into the diversity of microbial life that exists on our planet The first two chapters present theoretical perspectives that help to consolidate our understanding of evolution as an adaptive process by which the niche and habitat of each species develop in a manner that interconnects individual components of an ecosystem This results in communities that function by simultaneously coordinating their metabolic and physiologic actions The third contribution addresses the fossil record of microorganisms and the subsequent chapters then introduce the microbial life that currently exists in various terrestrial and aquatic ecosystems Coverage of the geosphere addresses endolithic organisms life in caves and the deep continental biosphere including how subsurface microbial life may impact spent nuclear fuel repositories The discussion of the hydrosphere includes hypersaline environments and arctic food chains By better understanding examples from the micro

biosphere we can elucidate the many ways in which the niches of different species both large and small interconnect within the overlapping habitats of this world which is governed by its microorganisms **Physiological Models in Microbiology** M. Bazin, 2018-01-18 Physiological Models in Microbiology consists of two volumes Volume I considers models of basic growth processes and the effects of environmental factors on microbial growth Volume II describes models of secondary processes in particular microbial death spore germination chemotaxis and surface growth **Handbook of Food Safety Engineering** Da-Wen Sun, 2011-11-03 This book presents a comprehensive and substantial overview of the emerging field of food safety engineering bringing together in one volume the four essential components of food safety the fundamentals of microbial growth food safety detection techniques microbial inactivation techniques food safety management systems Written by a team of highly active international experts with both academic and professional credentials the book is divided into five parts Part I details the principles of food safety including microbial growth and modelling Part II addresses novel and rapid food safety detection methods Parts III and IV look at various traditional and novel thermal and non thermal processing techniques for microbial inactivation Part V concludes the book with an overview of the major international food safety management systems such as GMP SSOP HACCP and ISO22000 **Aquatic Ecosystems: Interactivity of Dissolved Organic Matter** Stuart Findlay, Robert L. Sinsabaugh, 2003 Overviews of the source supply and variability of DOM surveys of the processes that mediate inputs to microbial food webs and syntheses consolidating research findings provide a comprehensive review of what is known of DOM in freshwater This book will be important to anyone interested in understanding the fundamental factors associated with DOM that control aquatic ecosystems BOOK JACKET **Advances in Bioprocess Engineering** Enrique Galindo, Octavio R. Ramírez, 2013-06-29 Bioprocess engineering plays a key role in the development and optimization of bioprocesses leading to the products of biotechnology A survey of the state of the art in this field is greatly needed This work covers all the essential sub areas and as such is required reading for scientists active in all the disciplines involved in bioprocess engineering This review of basic and applied approaches is brought together by a broad international group of expert authors The work is a reflection of the First International Symposium on Bioprocess Engineering June 1994 However it must be emphasized that the book cannot be perceived as a regular symposium proceedings volume a strict peer review process assures the readers of a high level of quality more than a quarter of the work consists of invited contributions while less than half of the spontaneously submitted manuscripts were accepted for publication Advances in Bioprocess Engineering belongs among the indispensable set of instruments of today s researcher in this field **Bibliography of Agriculture with Subject Index** , 1993 *Biosimulation in Drug Development* Martin Bertau, Erik Mosekilde, Hans V. Westerhoff, 2008-09-08 This first comprehensive survey to cover all pharmaceutically relevant topics provides a comprehensive introduction to this novel and revolutionary tool presenting both concepts and application examples of biosimulated cells organs and organisms Following an introduction to the role of biosimulation in drug

development the authors go on to discuss the simulation of cells and tissues as well as simulating drug action and effect A further section is devoted to simulating networks and populations and the whole is rounded off by a look at the potential for biosimulation in industrial drug development and for regulatory decisions Part of the authors are members of the BioSim Network of Excellence that encompasses more than 40 academic institutions pharmaceutical companies and regulatory authorities dealing with drug development other contributors come from industry resulting in a cross disciplinary expert reference

Revival: CRC Handbook of Laboratory Model Systems for Microbial Ecosystems, Volume I (1988) Julian W.T. Wimpenny, 2019-01-15 These volumes present the main classes of useful laboratory model systems used to study microbial ecosystems with emphasis on the practical details for the use of each model The most commonly used model the homogeneous fermenter is featured along with linked homogeneous culture systems film fermenters and percolating columns Additionally gel stabilized culture systems which incorporate molecular diffusion as their main solute transfer mechanism and the microbial colony are explained Chapters comparing model systems with microcosms are included along with discussions of the value of computer models in microbial ecosystem research Highlighted is a global discussion of the value of laboratory models in microbial ecology

Cellular Dynamics Simulation of Microbial Chemotaxis in Porous Media Jason R. Mondro, 2002

The Connections Between Ecology and Infectious Disease Christon J. Hurst, 2018-08-30 This book summarizes current advances in our understanding of how infectious disease represents an ecological interaction between a pathogenic microorganism and the host species in which that microbe causes illness The contributing authors explain that pathogenic microorganisms often also have broader ecological connections which can include a natural environmental presence possible transmission by vehicles such as air water and food and interactions with other host species including vectors for which the microbe either may or may not be pathogenic This field of science has been dubbed disease ecology and the chapters that examine it have been grouped into three sections The first section introduces both the role of biological community interactions and the impact of biodiversity on infectious disease In turn the second section considers those diseases directly affecting humans with a focus on waterborne and foodborne illnesses while also examining the critical aspect of microbial biofilms Lastly the third section presents the ecology of infectious diseases from the perspective of their impact on mammalian livestock and wildlife as well as on humans Given its breadth of coverage the volume offers a valuable resource for microbial ecologists and biomedical scientists alike

Modeling Processes and Their Interactions in Cropping Systems Lajpat R. Ahuja, Kurt C. Kersebaum, Ole Wendroth, 2022-08-09 Modeling Processes and Their Interactions in Cropping Systems A complete discussion of soil plant climate management processes In Modeling Processes and Their Interactions in Cropping Systems Challenges for the 21st Century a team of distinguished researchers delivers a comprehensive and up to date scientific textbook devoted to teaching the modeling of soil plant climate management processes at the upper undergraduate and graduate levels The book emphasizes the new opportunities and paradigms

available to modern lab and field researchers and aims to improve their understanding and quantification of individual processes and their interactions The book helps readers quantify field research results in terms of the fundamental theory and concepts broadly generalizable beyond specific sites as well as predict experimental results from knowledge of the fundamental factors that determine the environment and plant growth in different climates Readers will also discover An introduction to water and chemical transport in the soil matrix and macropores Explorations of heat transport water balance snowpack and soil freezing Discussions of merging machine learning with APSIM models to improve the evaluation of the impact of climate extremes on wheat yields in Australia Examinations of the quantification and modeling of management effects on soil properties including discussions of tillage reconsolidation crop residues and crop management The book will be essential reading for anyone interested in the 2030 breakthroughs in agriculture identified by the National Academies of Sciences Engineering and Medicine

Environmental Chemicals, the Human Microbiome, and Health Risk National Academies of Sciences, Engineering, and Medicine, Division on Earth and Life Studies, Board on Life Sciences, Board on Environmental Studies and Toxicology, Committee on Advancing Understanding of the Implications of Environmental-Chemical Interactions with the Human Microbiome, 2018-03-01 A great number of diverse microorganisms inhabit the human body and are collectively referred to as the human microbiome Until recently the role of the human microbiome in maintaining human health was not fully appreciated Today however research is beginning to elucidate associations between perturbations in the human microbiome and human disease and the factors that might be responsible for the perturbations Studies have indicated that the human microbiome could be affected by environmental chemicals or could modulate exposure to environmental chemicals Environmental Chemicals the Human Microbiome and Health Risk presents a research strategy to improve our understanding of the interactions between environmental chemicals and the human microbiome and the implications of those interactions for human health risk This report identifies barriers to such research and opportunities for collaboration highlights key aspects of the human microbiome and its relation to health describes potential interactions between environmental chemicals and the human microbiome reviews the risk assessment framework and reasons for incorporating chemical microbiome interactions

Advances in Microbial Physiology, 2007-09-06 Advances in Microbial Physiology is one of the most successful and prestigious series from Academic Press an imprint of Elsevier It publishes topical and important reviews interpreting physiology to include all material that contributes to our understanding of how microorganisms and their component parts work First published in 1967 the editors have always striven to interpret microbial physiology in the broadest context and have never restricted the contents to traditional views of whole cell physiology Now edited by Professor Robert Poole University of Sheffield Advances in Microbial Physiology continues to be an influential and very well reviewed series

U.S. Antarctic Program, 1995 Women in Microbial Physiology and Metabolism: 2023 Jie Xiao, Ilana Kolodkin-Gal, Maria Filippa Addis, 2024-06-24 After the well received 2022

collection Frontiers in Microbiology is proud to host this Research Topic celebrating women's work and achievements in the field of Microbial Physiology and Metabolism. Alongside International Women's Day and Women's History Month 2023, we will collectively embrace equity in the microbiology community. There is continued gender disparity within core STEM subjects. According to UNESCO Institute for Statistics, just 33% of the world's researchers are women. While the number of women attending university is growing, they still represent the minority of doctoral students and researchers. Women remain underrepresented in the highest level of academia, holding just 26% of full professorships. This is even more skewed in industry, with just 3% of STEM industry CEOs being women. As highlighted by UNESCO, science and gender equality are essential to ensure sustainable development.

Model Ecosystems in Extreme Environments, 2019-05-29. Model Ecosystems in Extreme Environments, Second Edition, examines ecosystems at the most extreme habitats and their interaction with the environment, providing a key element in our understanding of the role and function of microorganisms in nature. The book highlights current topics in the field, such as biodiversity and the structure of microbial communities in extreme environments, the effects of extreme environmental conditions on microbial ecosystems, and ecological and evolutionary interactions in extreme environments, among other topics. It will be a valuable text for faculty and students working with extremophiles and/or microbial ecology, and researchers including astrobiologists, biologists, evolutionary scientists, astronomers, geochemists, and oceanographers. Explores in detail how microbial ecosystems thrive in extreme environments. Highlights the relevance of extremophiles as model ecosystems to the study of microbial ecology. Examines how extreme ecosystems can help our search for life on other planets.

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