



INDUSTRIAL USES OF ENZYMES

— How They Make Production Easier —



Enzymes In Industry Production And Applications

Wolfgang Aehle



Enzymes In Industry Production And Applications:

Enzymes in Industry Wolfgang Aehle, 2006-05-12 Leading experts from all over the world present an overview of the use of enzymes in industry for the production of bulk products such as glucose or fructose food processing and food analysis laundry and automatic dishwashing detergents the textile pulp and paper and animal feed industries clinical diagnosis and therapy genetic engineering The book also covers identification methods of new enzymes and the optimization of known ones as well as the regulatory aspects for their use in industrial applications Up to date and wide in scope this is a chance for non specialists to acquaint themselves with this rapidly growing field The quality is so great that there is no hesitation in recommending it as ideal reading for any student requiring an introduction to enzymes Enzymes in Industry should command a place in any library industrial or academic where it will be frequently used The Genetic Engineer and Biotechnologist

Enzymes in Industry Wolfgang Aehle, 2007-11-05 Leading experts from all over the world present an overview of the use of enzymes in industry for the production of bulk products such as glucose or fructose food processing and food analysis laundry and automatic dishwashing detergents the textile pulp and paper and animal feed industries clinical diagnosis and therapy genetic engineering The book also covers identification methods of new enzymes and the optimization of known ones as well as the regulatory aspects for their use in industrial applications Up to date and wide in scope this is a chance for non specialists to acquaint themselves with this rapidly growing field The quality is so great that there is no hesitation in recommending it as ideal reading for any student requiring an introduction to enzymes Enzymes in Industry should command a place in any library industrial or academic where it will be frequently used The Genetic Engineer and Biotechnologist Enzymes in Industry is an excellent introduction into the field of applied enzymology for the reader who is not familiar with the subject offers a broad overview of the use of enzymes in industrial applications It is up to date and remarkable easy to read despite the fact that almost 50 different authors contributed The scientist involved in enzyme work should have this book in his or her library But it will also be of great value to the marketing expert interested in the present use of enzymes and their future in food and nonfood applications Angewandte Chemie This book should be available to all of those working with or aspiring to work with enzymes In particular academics should use this volume as a source book to ensure that their new projects will not reinvent the wheel Journal of Chemical Technology and Biotechnology **Industrial Enzyme**

Applications Andreas Vogel, Oliver May, 2019-10-28 This reference is a must read It explains how an effective and economically viable enzymatic process in industry is developed and presents numerous successful examples which underline the efficiency of biocatalysis **Handbook of Industrial Chemistry and Biotechnology** James A. Kent, 2013-01-13

Substantially revising and updating the classic reference in the field this handbook offers a valuable overview and myriad details on current chemical processes products and practices No other source offers as much data on the chemistry engineering economics and infrastructure of the industry The Handbook serves a spectrum of individuals from those who are

directly involved in the chemical industry to others in related industries and activities. It provides not only the underlying science and technology for important industry sectors but also broad coverage of critical supporting topics. Industrial processes and products can be much enhanced through observing the tenets and applying the methodologies found in chapters on Green Engineering and Chemistry specifically biomass conversion, Practical Catalysis and Environmental Measurements as well as expanded treatment of Safety, chemistry, plant security and Emergency Preparedness. Understanding these factors allows them to be part of the total process and helps achieve optimum results. In for example process development, review and modification. Important topics in the energy field namely nuclear, coal, natural gas and petroleum are covered in individual chapters. Other new chapters include energy conversion, energy storage, emerging nanoscience and technology. Updated sections include more material on biomass conversion as well as three chapters covering biotechnology topics namely Industrial Biotechnology, Industrial Enzymes and Industrial Production of Therapeutic Proteins.

Microbial Enzyme Technology in Food Applications Ramesh C. Ray, Cristina M. Rosell, 2017-03-27. The aim of food processing is to produce food that is palatable and tastes good, extend its shelf life, increase the variety and maintain the nutritional and healthcare quality of food. To achieve favorable processing conditions and for the safety of the food to be consumed, use of food grade microbial enzymes or microbes being the natural biocatalysts is imperative. This book discusses the uses of enzymes in conventional and non conventional food and beverage processing as well as in dairy processing, brewing, bakery and wine making. Apart from conventional uses, the development of bioprocessing tools and techniques have significantly expanded the potential for extensive application of enzymes such as in production of bioactive peptides, oligosaccharides and lipids, flavor and colorants. Some of these developments include extended use of the biocatalysts as immobilized, encapsulated enzymes, microbes both natural and genetically modified as sources for bulk enzymes, solid state fermentation technology for enzyme production. Extremophiles and marine microorganisms are another source of food grade enzymes. The book throws light on potential applications of microbial enzymes to expand the base of food processing industries.

Current Developments in Biotechnology and Bioengineering Ashok Pandey, Guocheng Du, Maria Ángeles Sanromán, Carlos Ricardo Soccol, Claude-Gilles Dussap, 2016-09-19. Current Developments in Biotechnology and Bioengineering. Food and Beverages Industry provides extensive coverage of new developments, state of the art technologies and potential future trends compiled from the latest ideas across the entire arena of biotechnology and bioengineering. This volume reviews current developments in the application of food biotechnology and engineering for food and beverage production. As there have been significant advances in the areas of food fermentation, processing and beverage production, this title highlights the advances in specific transformation processes including those used for alcoholic beverage and fermented food production. Taking a food process and engineering point of view, the book also aims to select important bioengineering principles highlighting how they can be quantitatively applied in the food and beverages industry. Contains

comprehensive coverage of food and beverage production Covers all types of fermentation processes and their application in various food products Includes unique coverage of the biochemical processes involved in beverages production **Kent and Riegel's Handbook of Industrial Chemistry and Biotechnology** James A. Kent, 2010-05-27 Substantially revising and updating the classic reference in the field this handbook offers a valuable overview and myriad details on current chemical processes products and practices No other source offers as much data on the chemistry engineering economics and infrastructure of the industry The Handbook serves a spectrum of individuals from those who are directly involved in the chemical industry to others in related industries and activities It provides not only the underlying science and technology for important industry sectors 30 of the book's 38 chapters but also broad coverage of critical supporting topics Industrial processes and products can be much enhanced through observing the tenets and applying the methodologies found in new chapters on Green Engineering and Chemistry Practical Catalysis and Environmental Measurements as well as expanded treatment of Safety and Emergency Preparedness Understanding these factors allows them to be part of the total process and helps achieve optimum results in for example process development review and modification Other new chapters include Nanotechnology Environmental Considerations in Facilities Planning Biomass Utilization Industrial Microbial Fermentation Enzymes and Biocatalysis the Nuclear Industry and History of the Chemical Industry **Industrial Applications of Microbial Enzymes** Pankaj Bhatt, 2022-08-17 Microbial enzymes are important because they can be used for a wide variety of industrial purposes There is dispersed and scanty information available with respect to microbial enzymes and their industrial applications In this edited book leading scientists have covered the various aspects of microbial enzymes and their industrial applications Using microbial enzymes can help expedite various manufacturing processes and contribute to sustainable development which is a priority worldwide Research gaps in the entrainment of microbial enzymes with their direct application in product development are a major focus of this volume Key Features Covers microbial enzymes with comprehensive and in depth information Benefits students by describing recent advancements into microbial enzymology Provides updates regarding microbial enzymes for researchers and industrial scientists Includes findings on the microbial actions for better life **Value-Addition in Agri-Food Industry Waste Through Enzyme Technology** Mohammed Kuddus, Pramod W. Ramteke, 2023-02-08 Value Addition in Agri Food Industry Waste through Enzyme Technology Volume Three explores advances in the production of high value added products from agri food industry waste residues using enzyme technology Waste materials used in hydrogen production are categorized as agricultural waste municipal waste industrial waste and other hazardous wastes The book explores advances in value addition to waste materials and includes utilization of industrial agricultural and municipal waste for its bioconversion using enzyme technology This book assembles the novel sources and technologies involved in value added products formation from specific waste materials making it an essential reference to professionals scientists and academics in agri food and related industries Provides biotechnological tools used in

valorizing waste for the agri food industry Presents novel and eco friendly alternative processes to produce value added products by food waste utilization Discusses valuable molecules from agriculture and food industry residues as a future sustainable solution to improve public health and protect the environment **Industrial Exploitation of Microorganisms**

R. Saravanamurthu,2013-12-30 This book embodies 21 review articles contributed by subject experts of various areas of industrial microbiology The articles are devoted to pharma industries food and enzyme industries textile industry agro industry and cottage industry Yeast is one of the important microorganisms which have been used to produce beverages alcohols and fermented food commodities for a very long time In recent years it has been the first choice among eukaryotes to use in recombinant technology Yeast and Spirulina are being used and marketed as Single Cell Protein SCP Mushrooms have been used by humans down the ages In addition to a rich source of mycoprotein they have medicinal values also against many ailments Number of bioactive novel compounds is increasing with the discovery of microbial species and newer groups of microorganisms Some chapters are devoted to microbial bioinoculants used as biofertilizers because they are rich source of nitrogen and phosphorus for both legumes and non legumes They are being manufactured and sold in market with different trade names In addition several microbial enzymes have been produced and commercialized by various industries but highly active and potential enzymes produced through recombinant DNA technology hold much importance For example microbial proteases find application in detergent leather food and pharma industries and provide eco friendly technology for bioremediation Laccase has been worked out to be a good tool for bioremediation of non degradable wastes and xenobiotic chemicals Besides laccase based biosensors have also been constructed which can be used for phenol determination monitoring of lignin and plant flavonoids Various microbial phytases as feed supplemented have been used in freshwater and marine aquaculture for improving the growth performance of fishes Nowadays aquaculture is growing rapidly to meet increasing food demand throughout the world for high quality fish More than 16 000 bioactive compounds have been isolated from actinomycetes alone including antibiotics enzymes vitamins amino acids siderophores and nanoparticles Biosynthesis of nanoparticles by bacteria actinomycetes and algae has been reported and work is being done nationally and internationally

Enzymes Selim Kermasha,Michael N.A. Eskin,2020-11-27 Enzymes Novel Biotechnological Approaches for the Food Industry provides an in depth background of the most up to date scientific research and information related to food biotechnology and offers a wide spectrum of biological applications This book addresses novel biotechnological approaches for the use of enzymes in the food industry to help readers understand the potential uses of biological applications to advance research This is an essential resource to researchers and both undergraduate and graduate students in the biotechnological industries Provides fundamental and rigorous scientific information on enzymes Illustrates enzymes as tools to achieve value and quality to a product either in vitro or in vivo Presents the most updated knowledge in the area of food biotechnology Demonstrates novel horizons and potential for the use of enzymes in industrial applications **Bioprospecting of Enzymes**

in Industry, Healthcare and Sustainable Environment Hrudayanath Thatoi, Sonali Mohapatra, Swagat Kumar Das, 2021-01-23 The rapid urbanization and industrialization of developing countries across the globe have necessitated for substantial resource utilization and development in the areas of Healthcare Environment and Renewable energy In this context this resourceful book serves as a definitive source of information for the recent developments in application of microbial enzymes in various sectors It covers applications in fermentation processes and their products extraction and utilisation of enzymes from various sources and their application in health and biomass conversion for production of value added products Different chapters discuss various areas of bioprospecting in enzyme technology and describe why these are the mainstays for industrial production of value added products The rich compilation of the cutting edge advances and applications of the modern industrial based techniques hold feasible solutions for a range of current issues in enzyme technology This book will be of particular interest for scientists academicians technical resource persons engineers and members of industry Undergraduate and graduate students pursuing courses in the area of industrial biotechnology will find the information in the book valuable General readers having interest towards biofuels enzyme technology fermented food and value added products phytochemicals and phytopharmaceutical products will also find the book appealing Readers will discover modern concepts of enzymatic bioprocess technology for production of therapeutics and industrial value added products

Value-Addition in Food Products and Processing Through Enzyme Technology Mohammed

Kuddus, Cristobal Noe Aguilar, 2021-12-01 Value Addition in Food Products and Processing using Enzyme Technology offers an updated review regarding the potential impact of new enzymes and enzyme technology on the food sector The book brings together novel sources and technologies regarding enzymes in value added food development food production food processing food preservation food engineering and food biotechnology It will be extremely useful for different types of readers including food scientists academic and food biotechnologists but will also be ideal for students studying food related courses This book includes concise and up to date research information from multiple independent scientific papers from around the world This is a essential multidisciplinary text for research and development professionals research scientists and academics in food biotechnology and agriculture industries It addresses safety issues and includes the sources screening immobilization and application of food grade enzymes in food Presents research data from experts Includes emerging industry topics such as baby food and food safety Offers methodologies of enzymes in diagnostics for food testing and analysis Emphasizes enzyme technology through a microbial biotechnological lens Includes bakery and confectionery products meat and poultry products vegetables food ingredients functional foods flavors and food additives and seafood

Industrial Enzymes and Their Applications Helmut Uhlig, 1998-04-06 A comprehensive accessible up to date catalog of enzymes and their uses in modern manufacturing Enzymes have long been used by industrial product makers as major catalysts to transform raw materials into end products Now available in English for the first time Industrial Enzymes

and Their Applications is the only authoritative catalog of enzymes with in depth coverage of their varied uses the classes in which they are grouped and which chemical reagents they have replaced on current mass production lines The first section surveys general enzyme characteristics and discusses their microbiological origin including pH and temperature dependence of the activity and stability of each enzyme The next section then examines the most important industrial enzymes in use today including carbohydrate hydrolyzing enzymes proteases ester cleavage fat hydrolyzing enzymes and immobilized enzymes The last section is devoted to specific applications of technical enzymes in such areas as food processing beverage production animal nutrition leather and textiles Industrial Enzymes and Their Applications offers instant access to a wealth of key enzyme data an invaluable wide ranging resource for industrial chemists biochemists biochemical engineers and students

Intensification of Biobased Processes Andrzej Górak, Andrzej Stankiewicz, 2018-06-18 In recent years bioprocessing has increased in popularity and importance however bioprocessing still poses various important techno economic and environmental challenges such as product yields excessive energy consumption for separations in highly watery systems batch operation or the downstream processing bottlenecks in the production of biopharmaceutical products Many of those challenges can be addressed by application of different process intensification technologies discussed in the present book The first book dedicated entirely to this area Intensification of Biobased Processes provides a comprehensive overview of modern process intensification technologies used in bioprocessing The book focusses on four different categories of biobased products bio fuels and platform chemicals cosmeceuticals food products and polymers and advanced materials It will cover various intensification aspects of the processes concerned including bio reactor intensification intensification of separation recovery and formulation operations and process integration This is an invaluable source of information for researchers and industrialists working in chemical engineering biotechnology and process engineering

Industrial Enzymes Julio Polaina, Andrew P. MacCabe, 2007-05-16 Man's use of enzymes dates back to the earliest times of civilization Important human activities such as the production of certain types of foods and beverages and the tanning of hides and skins to produce leather for garments serendipitously took advantage of enzyme activities Important advances in our understanding of the nature of enzymes and their action were made in the late 19th and early 20th centuries seeding the explosive expansion from the 1950s and 60s onward to the present billion dollar enzyme industry Recent developments in the fields of genetic engineering and protein chemistry are bringing ever more powerful means of analysis to bear on the study of enzyme structure and function that will undoubtedly lead to the rational modification of enzymes to match specific requirements as well as the design of new enzymes with novel properties This volume reviews the most important types of industrial enzymes covering in a balanced manner three interrelated aspects of paramount importance for enzyme performance three dimensional protein structure physicochemical and catalytic properties and the range of both classical and novel applications The material covered will be of interest to undergraduate and graduate students in biochemistry biotechnology and applied

microbiology in addition to researchers and industrialists

Microbial Enzymes: Roles and Applications in Industries

Naveen Kumar Arora, Jitendra Mishra, Vaibhav Mishra, 2020-04-28 Microbial Enzymes Roles and applications in industry offers an essential update on the field of microbial biotechnology and presents the latest information on a range of microbial enzymes such as fructosyltransferase laccases amylases lipase and cholesterol oxidase as well as their potential applications in various industries Production and optimisation technologies for several industrially relevant microbial enzymes are also addressed In recent years genetic engineering has opened up new possibilities for redesigning microbial enzymes that are useful in multiple industries an aspect that the book explores In addition it demonstrates how some of the emerging issues in the fields of agriculture environment and human health can be resolved with the aid of green technologies based on microbial enzymes The topics covered here will not only provide a better understanding of the commercial applications of microbial enzymes but also outline futuristic approaches to use microbial enzymes as driver of industrial sustainability Lastly the book is intended to provide readers with an overview of recent applications of microbial enzymes in various industrial sectors and to pique researchers interest in the development of novel microbial enzyme technologies to meet the changing needs of industry

Handbook of Amylases and Related Enzymes

The Amylase Research Society The Amylase Research Society o, 2014-06-28 This handbook published to mark the 20th anniversary of The Amylase Research Society of Japan presents a concise account of the properties and applications of amylases and related enzymes Enzymes are discussed with reference to their source isolation method properties inhibition kinetics and protein structure This information is then applied in the description and interpretation of their use in industry As well as amylases other enzymes capable of catalyzing reactions with starch and glycogen and the further conversion of amylase reaction products for industrial applications are discussed The text is supported by numerous explanatory figures and tables and each section is fully referenced

Textbook of Biotechnology Prakash S. Lohar, 2019-06-07 Introduction Genetic Engineering Animal cell and Tissue Culture Plant Tissue Culture Gene Transfer Technology Transfection Biotechnology in healthy Care Enzyme Technology Single Cell Protein Fermentation Technology BioFuel Technology Environmental Biotechnology Agro Biotechnology Genetically Modified Organisms

Enzymes in Food Technology

Robert J. Whitehurst, Maarten Van Oort, 2009-09-03 The second edition of this successful book highlights the widespread use of enzymes in food processing improvement and innovation explaining how they bring advantages The properties of different enzymes are linked to the physical and biochemical events that they influence in food materials and products while these in turn are related to the key organoleptic sensory and shelf life qualities of foods Fully updated to reflect advances made in the field over recent years new chapters in the second edition look at the use of enzymes in the reduction of acrylamide in fish processing and in non bread cereal applications such as flour confectionery Genetic modification of source organisms GMO has been used to improve yields of purer enzymes for some time now but the newer technology of protein engineering PE of enzymes has the potential to produce purer more targeted products without

unwanted side activities and a chapter is also included on this important new topic. Authors have been selected not only for their practical working knowledge of enzymes but also for their infectious enthusiasm for the subject. The book is aimed at food scientists and technologists, ingredients suppliers, geneticists, analytical chemists and quality assurance personnel.

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Enzymes In Industry Production And Applications Introduction

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