

Chemicals by Enzymatic and Microbial Processes

Recent Advances

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CHEMICALS BY ENZYMATIC AND MICROBIAL PROCESSES

Recent Advances

Edited by J.I. Duffy

NOYES DATA CORPORATION

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1980

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VACCINE PREPARATION TECHNIQUES 1980

Edited by J.I. Duffy

Worldwide vaccination programs have the eradication of specific diseases as their goal, and basic immunization with killed or inactivated antigens has become standard practice.

Precipitated or adsorbed preparations, as shown in this book, are more stable and will induce a longer-lasting immune response than pure fluid preparations, although both types are usually administered by injection.

Influenza vaccines, whether killed or live, have not so far been very successful, but new substances, like interferon and the transfer factor, may be instrumental in conferring an immunity that goes far beyond the antigen-antibody response of traditional vaccine technology.

Animal husbandry has received a decided boost with many of the advances in vaccines against animal diseases. Methods of increasing antibody production in the colostrum is a focus of many of the processes described here in detail.

A summarized table of contents follows here with **chapter headings and examples of subtitles**. Numbers in () are numbers of topics.

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FOREWORD

The detailed, descriptive information in this book is based on U.S. patents issued since January 1975 that deal with recent advances in the manufacture of chemicals by enzymatic and microbial processes.

This book is a data-based publication, providing information retrieved and made available from the U.S. patent literature. It thus serves a double purpose in that it supplies detailed technical information and can be used as a guide to the patent literature in this field. By indicating all the information that is significant, and eliminating legal jargon and juristic phraseology, this book presents an advanced commercially oriented review of the manufacture of chemicals by enzymatic and microbial processes. This title supersedes our previous title *Chemicals by Fermentation*, published in 1973.

The U.S. patent literature is the largest and most comprehensive collection of technical information in the world. There is more practical, commercial, timely process information assembled here than is available from any other source. The technical information obtained from a patent is extremely reliable and comprehensive; sufficient information must be included to avoid rejection for "insufficient disclosure." These patents include practically all of those issued on the subject in the United States during the period under review; there has been no bias in the selection of patents for inclusion.

The patent literature covers a substantial amount of information not available in the journal literature. The patent literature is a prime source of basic commercially useful information. This information is overlooked by those who rely primarily on the periodical journal literature. It is realized that there is a lag between a patent application on a new process development and the granting of a patent, but it is felt that this may roughly parallel or even anticipate the lag in putting that development into commercial practice.

Many of these patents are being utilized commercially. Whether used or not, they offer opportunities for technological transfer. Also, a major purpose of this book is to describe the number of technical possibilities available, which may open up profitable areas of research and development. The information contained in this book will allow you to establish a sound background before launching into research in this field.

Advanced composition and production methods developed by Noyes Data are employed to bring these durably bound books to you in a minimum of time. Special techniques are used to close the gap between "manuscript" and "completed book." Industrial technology is progressing so rapidly that time-honored, conventional typesetting, binding and shipping methods are no longer suitable. We have bypassed the delays in the conventional book publishing cycle and provide the user with an effective and convenient means of reviewing up-to-date information in depth. The table of contents is organized in such a way as to serve as a subject index. Other indexes by company, inventor and patent number help in providing easy access to the information contained in this book.

16 Reasons Why the U.S. Patent Office Literature Is Important to You

- 1.** The U.S. patent literature is the largest and most comprehensive collection of technical information in the world. There is more practical commercial process information assembled here than is available from any other source. Most important technological advances are described in the patent literature.
- 2.** The technical information obtained from the patent literature is extremely comprehensive; sufficient information must be included to avoid rejection for "insufficient disclosure."
- 3.** The patent literature is a prime source of basic commercially utilizable information. This information is overlooked by those who rely primarily on the periodical journal literature.
- 4.** An important feature of the patent literature is that it can serve to avoid duplication of research and development.
- 5.** Patents, unlike periodical literature, are bound by definition to contain new information, data and ideas.
- 6.** It can serve as a source of new ideas in a different but related field, and may be outside the patent protection offered the original invention.
- 7.** Since claims are narrowly defined, much valuable information is included that may be outside the legal protection afforded by the claims.
- 8.** Patents discuss the difficulties associated with previous research, development or production techniques, and offer a specific method of overcoming problems. This gives clues to current process information that has not been published in periodicals or books.
- 9.** Can aid in process design by providing a selection of alternate techniques. A powerful research and engineering tool.
- 10.** Obtain licenses—many U.S. chemical patents have not been developed commercially.
- 11.** Patents provide an excellent starting point for the next investigator.
- 12.** Frequently, innovations derived from research are first disclosed in the patent literature, prior to coverage in the periodical literature.
- 13.** Patents offer a most valuable method of keeping abreast of latest technologies, serving an individual's own "current awareness" program.
- 14.** Identifying potential new competitors.
- 15.** It is a creative source of ideas for those with imagination.
- 16.** Scrutiny of the patent literature has important profit-making potential.

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INTRODUCTION

Fermentation processes can probably rank as man's first attempt at controlling chemical reactions to produce useful products. Although the mechanisms involved were not understood until relatively modern times (indeed the role of microorganisms was not even recognized until the work of Pasteur), the benefits derived from microbial processes have been widespread through the ages, notably in the wine-making and brewing industries.

With the increasing sophistication and progress of the chemical industry, man is turning more and more to the use of microorganisms to produce an ever-growing list of chemical products. Utilizing microbes and their enzymes, reactions can be carried out with a speed and efficiency that could not be attained in their absence, if in fact the reaction could be accomplished at all.

Progress in developing new microbial processes has proceeded along a number of pathways. A better understanding of the mechanisms involved, new strains of microorganisms, and easier identification and separation of the desired product are only a few ways in which techniques have improved in the last years.

The food industry has probably been the major recipient of recent advances in this field. Amino acid and protein supplementation has been the focus of much attention, and the large number of patents on this subject attest to this fact. New strains of microorganisms have been developed by chemical and physical mutations of the parent strains which produce these substances in higher yield and more efficiently than was heretofore possible.

The large number of processes to produce a wide variety of carbohydrates, from simple sugars to the high molecular weight polysaccharides, also reflect the desire of the industry to use to advantage the wide spectrum of microorganisms available, mainly through isomerization techniques to convert one form of sugar to another, or the use of enzymes to break down polysaccharides and starches to their components.