

Handbook on Small & Medium Scale Industries (Biotechnology Products)

Author: Dr. H. Panda

Format: Paperback

ISBN: 9788178331713

Code: NI301

Pages: 480

Price: Rs. 1,695.00 US\$ 150.00

Publisher: Asia Pacific Business Press Inc.

Usually ships within **5** days

The Indian biotechnology industry is one of the fastest growing knowledge-based sectors in India and is expected to play an important role in small & medium enterprises industries. Biotechnology is not just one technology, but many. There are a wide variety of products that the biotechnology field has produced. Biotechnology as well all know, is the field of combination of various fields such as genetics, environmental biology, biochemistry, environmental, general, agriculture, fermentation, etc.

Biotechnology has a long history of use in food production and processing. It has helped to increase crop productivity by introducing such qualities as disease resistance and increased drought tolerance to the crops. Biotechnology used in processing of wines, beers, Coffee, Tea, Cabbage and Cucumber, etc. Fermentation is biotechnology in which desirable microorganisms are used in the production of value-added products of commercial importance. The products of fermentation are many: alcohol and carbon dioxide are obtained from yeast fermentation of various sugars. Lactic acid, acetic acid and Organic acid are products of bacteria action; citric acid, D-Gluconic acid, Coffee, Tea, Cabbage & Cucumber and Yeasts are some of the products obtained from fermentation.

The worldwide demand for biotech products is the only indication; the speed of its advance is the only set to accelerate. Indian Biotechnology industry is considered as one of the sunrise sectors in India. The industry is divided into five major segments: Bio-Pharma, Bio-Services, Bio-Agri, Bio-Industrial and Bio-Informatics. Biotechnology industry's growth in India is primarily driven by vaccines and recombinant therapeutics.

The biotechnology sector of India is highly innovative and is on a strong growth trajectory. The sector, with its immense growth potential, will continue to play a significant role as an innovative manufacturing hub. The high demand for different biotech products has also opened up scope for the foreign companies to set up base in India. Today in India there are more than 350 Biotechnology companies in India providing employment for over 20,000 scientists.

The authors cover different aspects of biotechnology such as production of fermented foods, functional foods, enzymes in food processing. The Book contains production of Wines and Beers, Production of Amino Acids, Lactic Acid, Acetic Acid and Organic Acid, Processing of Coffee, Tea, Cabbage, Cucumber, Yeasts and Photographs of Plant & Machinery with Supplier's Contact Details.

The book provides a better understanding about biotechnology production of value-added products, improve productivity, and enhance product quality in the agro food processing sector. The book is highly recommended to new entrepreneurs, professionals, existing units who wants to start manufacturing business

Contents

1. WINE

INTRODUCTION

YEASTS AND THE ALCOHOLIC FERMENTATION

A. Yeasts

1. Taxonomy, ecology
2. Industrially important yeasts
3. Killer (K) Yeasts
4. Effect of yeasts on the organoleptic character of wines.

B. YEAST NUTRIENTS IN GRAPE MUSTS

1. Composition of grape musts

Nutritional requirements of yeast and their provision in musts

C. GROWTH OF YEASTS AND ALCOHOLIC FERMENTATION

1. Growth cycle of yeasts and kinetics of the fermentation
2. Fermentation problems and their causes
3. Stimulation of the fermentation
4. Concept of the survival factor

D. BIOCHEMISTRY OF THE FERMENTATION OF GRAPE MUST

1. Primary and secondary products
2. Volatile substances contributing to the aroma of wine

LACTIC ACID BACTERIA AND THE MALO-LACTIC FERMENTATION

A. Lactic Acid Bacteria of Wines

1. Taxonomy
2. Ecology
3. The role of lactic acid bacteria in vinification

B. BACTERIAL GROWTH AND MALO-LACTIC FERMENTATION

1. Development of lactic acid bacteria during vinification; kinetics and biochemistry of the malolactic fermentation
2. Parameters affecting the development of lactic acid bacteria in wines
3. Stimulation of bacterial growth and of the malo-lactic fermentation

BACTERIAL SPOILAGE OF WINES

A. Spoilage by Lactic Acid Bacteria

B. SPOILAGE BY ACETIC ACID BACTERIA

1. Taxonomy, ecology
3. Effect of the metabolism of acetic acid bacteria on the quality of musts and wine

WINE TECHNOLOGY

A. Grapes and Corrective Measures for the Vintage

B. CLASSIC FERMENTATIONS

1. White wine production
2. Red wine production

C. BIOLOGICAL STABILIZATION OF THE WINE; THE ROLE OF SULFUR DIOXIDE AND SORBIC ACID

SPECIAL PROCESSES

A. Sparkling Wines

SHERRY AND PORT

C. Brandy

2. BEER

HISTORICAL

Man's First Alcoholic Drink

Man's Earliest Brewing

1. Mesopotamia and Egypt

2. Greece and Rome

3. European tribes

4. Africa

5. China

6. India

7. South America

C. Ancient Brewing and Nutrition

D. Sanitary Considerations

E. Large-Scale Brewing

BEER TYPES IN THE WORLD

A. Classical Beer Types

B. Beer-Like Beverages

C. Beer Production in the world

BEER CONSTITUENTS

A. Water

B. Alcohol

C. Carbohydrates

D. Nitrogen Compounds

E. Inorganic Constituents

F. Organic Acids

G. Carbon Dioxide

H. Other Compounds

MATERIALS USED IN BREWING

A. WATER

1. Water sources

2. Water purity

3. Water minerals

4. Heavy metals

B. BARLEY AND MALT

1. Barley

(a) Harvest and Storage

(b) Weathering

2. Malt

(a) Earliest Malt

(b) The malting process today

Steeping

Germination

Kilning

C. Brewing Adjuncts

D. Hops

1. Earliest use of hops

2. The Hop Family

3. Hop Utilization

4. Hop Chemistry

E. Brewer's Yeast

CHARACTERISTICS AND CLASSIFICATION

2. Cell morphology and Physiology
3. Yeast Metabolism
 - (a) Carbohydrate Metabolism
Glycolyses
The Pasteur and Crabtree Effect
 - (b) Metabolism of Nitrogenous Compounds
 - (c) Lipid synthesis
 - (d) Sterol Synthesis
 - (e) Sulfur Compounds
 - (f) Miscellaneous Metabolic Reactions

THE BREWING PROCESS

A. Brew house Operations

1. Milling
 - (a) Malt Milling
 - (b) Wet Milling
 - (c) Adjunct Milling
2. Mashing
 - (a) Infusion Mashing
 - (b) Decoction Mashing
 - (c) Malt Conversion
 - (d) Adjunct Conversion
 - (e) Enzyme Activity During Mashing
3. Lautering
 - (a) The Lauter Tub
 - (b) Run Off
 - (c) Sparging
 - (d) Wort Filtration
 - (e) Spent Grain Removal
4. Wort Boiling
 - (a) Heating
 - (b) Function of Wort Boiling
 - (c) Hop Extraction and Conversion
5. Wort Cooling/Trub Removal
 - (a) Hot Trub
 - (b) Wort Cooling
 - (c) Cold Trub Removal

6. BREWHOUSE AND CELLAR SANITATION

- (a) General Practices
- (b) Microbiological Precautions

B. WORT CONSTITUENTS

1. Carbohydrates
2. Nitrogenous Compounds
3. Inorganic Constituents
4. Vitamins
5. Polyphenols
6. Hop Compounds
7. Melanoidins and Phenolic Pigments
8. Lipids

C. CELLAR OPERATIONS

1. Cold Wort Aeration
2. Yeast Pitching
 - (a) Yeast Examination
 - (b) Yeast Population Count

3. PRIMARY FERMENTATION

- (a) Lager Fermentation
- (b) High Gravity Brewing
- (c) Ale Fermentation
- (b) Reuse of Yeast
- (c) Yeast Disposal
- (d) Continuous Fermentations
- (e) CO₂ Recovery

4. YEAST RECOVERY AND REUSE

- (a) Washing and Preparation

5. YEAST PURE CULTURE SYSTEMS

- (a) Culture Propagation
- (b) Laboratory Checks

6. AGING AND FINISHING

- (a) Flavor Maturation
- (b) Carbonation
- (c) Standarization
- (d) Chillproofing and Stabilizing
- (e) Clarification

MICROBIAL CONTAMINANTS IN BEER

A. Bacterial Contaminants

1. Gram Positive Bacteria

- (a) Lactobacillus
- (b) Pediococcus
- (c) Miscellaneous Cocci

2. Gram Negative Bacteria

- (a) Acetic Acid Bacteria
- (b) Zymomonas
- (c) Enterobacteriaceae
- (d) Miscellaneous Wort Organisms

B. WILD YEAST CONTAMINANTS

- 1. Beer Spoiling Yeasts
- 2. Yeast Spoilage Flavors
- 3. Killer Yeasts
- 4. Wild Yeast Control Measures

C. BREWERY PREVENTIVE MEASURES

PACKAGING OPERATIONS

A. Bottling Operations

- 1. Filling
- 2. Pasteurization
- 3. Light Struck Beer

B. CANNED BEER

- 1. Can Filling
- 2. Pasteurization
- 3. Shelf Life of Packaged Beer

- (a) Oxygen
- (b) Temperature

C. DRAFT BEER

- 1. Cooperage
- 2. Racking

QUALITY ASSURANCE

A. Physical and Chemical Measurements

- 1. Cleaning and Sanitation

2. Raw Materials Acceptability
3. Biological Survey of Beer “in process”
4. Analysis of the Finished Beer
- B. Flavor Measurements
1. Tasting beer
- C. Tastable Beer Defects

1. Diacetyl
2. Metallic Tastes
3. High Air Beer
4. Light Struck Beer
5. Old, Oxidized Beer
6. Medicinal Odors
7. Grainy, Harsh, Astringent, Bitter
8. Flavor Depression

3. AMINO ACID

INTRODUCTION

MICROBIAL PRODUCTION OF AMINO ACIDS

- A. Production of Amino Acids by Wild Strains
- B. Production of Amino Acids by Auxotrophic Mutants
- C. Production of Amino Acids by Regulatory Mutants
- D. Production of Amino Acids from Biosynthetic Precursors

ENZYMATIC SYNTHESIS OF AMINO ACIDS

A. Hydrolytic Enzymes

1. L- α -Amino-ε-caprolactam hydrolase
2. 2-Amino-D2-thiazoline-4-carboxylate hydrolase
3. Hydantoinase

B. Ammonia Lyases

1. Aspartase
2. Phenylalanine Ammonia Lyase

C. Arginine Deiminase

D. Pyridoxal 5'-Phosphate Enzymes

1. Aspartate β-decarboxylase
2. β-Tyrosinase

N

3. Tryptophanase
4. Cysteine Desulfhydrase
5. Tryptophan Synthase
6. β-Chloro-D-alanine hydrogenchloride lyase
7. L-Methionine γ-lyase
8. Serine Hydroxymethyltransferase
9. L-Threonine Aldolase

E. Other Enzymes

1. Amino Acid Dehydrogenases
2. Glutamine Synthetase

IV. Enzymatic Resolution of Racemic Amino Acids

A. Introduction

B. Enzymatic Methods

1. Resolution by Enzymatic Asymmetric Derivatization
2. Resolution by Asymmetric Hydrolysis

(a) Esterase Method

(b) Amidase Method

(c) Aminoacylase Method

USE OF AMINO ACIDS

A. Use for Food

PRODUCTION FIGURES AND ECONOMIC ASPECTS

4. COFFEE PROCESSING

INTRODUCTION

THE COFFEE PLANT

PROCESSING AND FERMENTATION OF THE COFFEE FRUIT

MICROORGANISMS INVOLVED IN COFFEE FERMENTATION

A. LITERATURE DATA

B. Isolation and Characterization of Microorganisms from Zaire Coffee

THE SUBSTRATE FOR FERMENTATION: COFFEE MESOCARP

MESOCARP DEGRADATION DURING FERMENTATION

A. General

B. Are Plant Enzymes Involved in Coffee Fermentation?

C. Are Microbial Enzymes Involved in Coffee Fermentation?

CONCLUSIONS

5. TEA PROCESSING

WHAT IS TEA?*

A. Origins of Tea

B. Types of Tea

C. Physical and Chemical Characteristics of Tea Leaves

BLACK TEA MANUFACTURE

A. Harvest of Tea Shoot Tips

B. Withering

C. Tissue Maceration (Rolling)

D. Fermentation

E. Firing

F. Grading and Storage

GREEN TEA MANUFACTURE

OOLONG AND POUCHONG TEA MANUFACTURE

FLAVORED TEAS

INSTANT TEA

CONCLUSION

6. CABBAGE & CUCUMBER PROCESSING

GENERAL INTRODUCTION

CABBAGE

A. Introduction

B. Cabbage Varietals

1. Crop Distribution

2. New Hybrids

C. Mechanical Operations

1. Mechanical Harvester

2. Grading

3. Core Removal

4. Trim

5. Shredding

6. Salting

7. Conveyance

8. Fermentation Tanks

Tank Closure

D. Fermentation

E. Product Defects

1. "Off" Flavor

2. Color Defects

3. Processing Defects

F. PROCESSING

1. Bulk Sauerkraut

2. "Hot Fill" Method

3. Chemical Preservatives

CUCUMBERS

A. Production and Consumption

B. Varietals and Harvesting

C. Grading

D. Fermentation

1. Salt Stock

(a) Development of Flora

(b) Defects

(c) Controlled Fermentation

2. Dill Pickles

3. Spoilage

4. Preservation

7. LACTIC ACID

BIOSYNTHESIS

MICROORGANISMS

TECHNICAL PRODUCTION

A. Fermentation

B. Isolation

C. Economic Aspects

SOME OTHER APPLICATIONS OF LACTIC ACID FERMENTATION

8. ACETIC ACID

INTRODUCTION

A. General

B. Bases of Acetic Acid Fermentation

C. Raw Materials

D. Water for Processing

E. Nutrients

MICROORGANISMS AND TAXONOMY

A. Summary and Basic Problems of Classification

B. Industrially Used Strains

BIOCHEMISTRY

A. Ethanol

B. Sugar

C. Acetate

D. Carbon Dioxide

E. Nitrogen

F. Growth Factors

PHYSIOLOGY

A. Oxygen Demand and Total Concentration

B. Lack of Ethanol

C. Specific Growth Rate

D. Specific Product Formation

E. Changes in Concentration

F. Overoxidation

INDUSTRIAL PROCESSES

A. Submerged Vinegar Fermentation

1. The Frings Acetator

2. Other Processes

- 3. Abandoned processes
- B. Surface and Trickle Processes
 - 1. History and Surface Process
 - 2. Older Trickle Processes
 - 3. The Frings Generator
- C. Production of Concentrated Acetic Acid
- 9. ORGANIC ACID OF MINOR IMPORTANCE
- INTRODUCTION
- Itaconic Acid
- EPOXYSUCCINIC ACID
- Malic Acid
- OXOGLUCONIC ACIDS
 - A.2-Oxogluconic Acid
 - B.5-Oxogluconic Acid
 - C.2,5-Dioxogluconic Acid
 - D.2-Oxogulononic Acid
- PROPIONIC AND BUTYRIC ACIDS
- TARTARIC ACID
- 2-OXOGLUTARIC ACID
- FUMARIC ACID
- FURTHER ORGANIC ACIDS
 - A. Succinic Acid
 - B. Pyruvic Acid
 - C. 2-Oxogalactonic Acid
 - D. Kojic Acid
- 10. D-GLUCONIC ACID
- INTRODUCTION-HISTORY
- BIOLOGICAL FUNDAMENTALS
- FERMENTATION PROCESSES INVOLVING
 - Calcium Gluconate Fermentation
 - B. Sodium Gluconate Fermentation
- PRODUCT RECOVERY AND PROCESSING
- BACTERIAL GLUCONIC ACID FERMENTATIONS
- CONSUMPTION AND PRODUCTION FIGURES
- 11. CITRIC ACID
- Biological Fundamentals
 - A. Strains
 - B. Fermentation Medium
 - C. Other Factors
 - D. Biochemistry and Enzyme Regulation
- PRODUCTION PROCEDURES
 - A. Production Strains
 - B. Spore Propagation for Inoculation
 - C. Raw Materials
 - D. The Koji Process
 - E. Surface Process
 - F. Submerged Process
- PRODUCT RECOVERY
- CITRIC ACID FROM OTHER SUBSTRATES AND ORGANISMS
- COMPARISON OF PROCESS KINETICS
- PROCESS ECOLOGY
- UTILIZATION OF CITRIC ACID
- PRODUCTION FIGURES

12. YEAST

FORMATION OF BIOMASS FROM CARBOHYDRATES

A. Introduction

B. Reactions from Glucose to Cell Material

Some Early Observations

2. Evaluation of the Reactions from Glucose to Cell Material

Yeast Saccharides

Yeast Protein

Nucleic Acids

Neutral Fat

Phospholipids

Sterols

Equation for Yeast Growth on Glucose

C. Flux of the Substrate During Yeast Growth

BIOMASS FROM MOLASSES

A. Composition and Properties Molasses

B. Compressed Yeast from Molasses

1. The Evolution of Baker's Yeast Production

2. Aspects of the Biochemistry of Baker's Yeast

3. Requirements for Baker's Yeast Production

4. Outline of the Manufacturing Process

5. Analysis and Quality Control of Baker's Yeast

C. Active Dry Yeast

D. Wine Yeast Cultured on Molasses

E. Feed Yeast from Molasses

BIOMASS FROM SPENT SULFITE LIQUOR

A. Spent Sulfite Liquor

B. Biomass from Spent Sulfite Liquor

1. Candida Yeasts

2. Baker's Yeast from Spent Sulfite Liquor

3. Pekilo Process

BIOMASS FROM WHEY

BIOMASS FROM STARCH

13. PHOTOGRAPHS OF PLANT & MACHINERY

WITH SUPPLIER'S CONTACT DETAILS

About NIIR

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

NIIR PROJECT CONSULTANCY SERVICES , 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** npcs.india@gmail.com **Website:** NIIR.org

Tue, 20 Feb 2018 10:56:07 +0530