

# Handbook on Fine Chemicals, Vitamins, Amino Acids and Proteins

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Fine chemicals are the chemicals which are produced in comparatively small quantities and in relatively pure state. In chemical technology, a distinction is made between bulk chemicals, which are produced in massive quantities by standardized reactions, and fine chemicals, which are custom produced in smaller quantities for special uses. Amino acid is any organic acid which has one or more substituent amino groups. In many instances the amino acid is more readily isolated from proteins than by resolution of the synthetic product. For the purpose of obtaining the best yields, it is always desirable to use protein material which is especially rich in the amino acid which is to be isolated. Some of the examples of amino acid are glycine, d glutamic acid, l tyrosine, l tryptophane, l hydroxyproline, thyroxine, serine, d lysine etc. Large quantities of potential protein rich foods of vegetable origin, e.g., oil seed meals and pulses, are available in the country and by suitable processing and fortification with vitamins and minerals, it should be possible to prepare, on a large scale, low cost processed protein foods which can be used as supplements to the diets of low income groups of the population. There are two forms of vitamin A; vitamins A and A2. All mammals, birds and fish which have been investigated, utilize vitamin A. Vitamin A requirements of animals other than mammals are less well known. Birds apparently need vitamin A in an amount of magnitude as mammals. It vitamin B1 is present in many plants. Vegetable, fruits and nuts contain small amounts; ripe peas and beans are rich sources; but vitamin B1 is found outside bran coats of grains (rice) and in yeast. Vitamin B2 (Riboflavin) is very widely distributed over the entire animal and plant kingdom. It seems that each and every animal and plant cell contains small amounts. Regular dietary intake of riboflavin is necessary for all members of the animal kingdom and for some microorganisms. Vitamin B6 as a free base is colourless crystalline powder, has a slightly bitter taste and melts at 160 degree Celsius. Of the entire living world only man, the other primates, the guinea pig a few microorganisms are known to require an external supply of vitamin C.

Some of the fundamentals of the book are the constitution and synthesis of the amino acids, methods of analysis and reactions of the amino acids and proteins, production of protein isolate from groundnut, production of protein isolate from groundnut, chemical constitution of vitamin b2: degradation reactions, vitamin b6 (pyridoxine), effect of different treatments on vitamin c and microbial sterility of canned drumstick (*moringa oleifera*), conversion of provitamins d to vitamins d, compound and species specificity of known vitamins d, the group of vitamins e, vitamin p, physiology of plants and microorganisms etc.

The aim of this book is to present in a single volume an up to date account of the manufacture of Fine Chemicals, Vitamins, Amino Acids and Proteins. The book includes several new information which comprise important threads in the industrial total fabric. This book contains

the constitution and synthesis of the Amino Acids, the Isolation of the Amino Acids from Proteins, the preparation of Amino Acids and Proteins, Vitamins and Fine Chemicals with Method of analysis and reactions etc. The book is very helpful for new entrepreneurs, technocrats, researchers, institutional libraries etc.

## 1. THE CONSTITUTION AND SYNTHESIS OF THE AMINO ACIDS

- i. Significance of the Term, Amino Acid
- ii. Relation of amino acids to proteins
- iii. Classification of the accepted amino acids
- iv. Constitutions of the accepted amino acids
- v. Laboratory Syntheses of the Accepted Amino Acids
- vi. Amino Acid Reported but not verified

## 2. THE ISOLATION OF THE AMINO ACIDS FROM PROTEINS

1. Introduction
2. Hydrolysis
3. Selective Liberation of Amino Acids
4. THE FISCHER ESTERIFICATION METHOD
5. DAKINs BUTYL ALCOHOL METHOD
6. The Electrical Transport Method
7. SPECIAL ACIDS USED FOR THE PREPARATION OF AMINO ACIDS
8. THE RACEMIZATION OF PROTEINS AND AMINO ACIDS
9. THE RESOLUTION OF AMINO ACIDS

## 3. THE PREPARATION OF AMINO ACIDS AND PROTEINS

1. PROTEINS
4. METHODS OF ANALYSIS AND REACTIONS OF THE AMINO ACIDS AND PROTEINS
1. COLOR REACTIONS
2. GENERAL QUANTITATIVE METHODS FOR THE ESTIMATION OF THE AMINO ACIDS AND PROTEINS
3. RETROSPECT
5. THE RELATION OF THE AMINO ACIDS TO PRODUCTS OF BIOCHEMICAL IMPORTANCE

1. DEAMINATION OF AMINO ACIDS
2. FORMATION OF GLUCOSE FROM AMINO ACIDS
3. FORMATION OF ACETONE FROM AMINO ACIDS
4. INTERMEDIATE METABOLISM OF THE AMINO ACIDS
5. SYNTHESIS OF UREA
6. RELATIONSHIP OF AMINO ACID TO OTHER COMPOUND FOUND IN THE BODY
7. THE ROLE OF AMINO ACIDS IN DETOXICATION
8. AMINES DERIVED FROM AMINO ACIDS
9. THE BETAINES
10. ADRENALINE AND EPHEDRINE
11. THYROXINE
12. RELATIONSHIP OF CERTAIN AMINO ACIDS TO THE PURINES

## 6. PEPTIDES, PEPTIDASES, AND DIKETOPIPERAZINES

1. INTRODUCTION
2. THE SYNTHESIS OF PEPTIDES
3. SURVEY OF THE METHODS OF PEPTIDE SYNTHESIS
4. The ISOLATION OF PEPTIDES FROM PROTEINS
5. THE PEPTIDASEs
6. THE SYNTHETIC ACTION OF PROTEASES
7. THE DIKETOPIPER AZINES
8. THE ISOLATION OF DIKETOPIPERAZINES FROM PROTEINS

9. THE ACTION OF PROTEOLYTIC ENZYMES ON DIKETOPIPERAZINES
7. THE CHEMICAL CONSTITUTION OF THE PROTEINS
1. THE CLASSIFICATION OF THE PROTEINS THE PROTEIN
2. METHODS OF ISOLATION
3. THE CHEMICAL CHARACTERISTICS OF SIMPLE AND CONJUGATED PROTEINS
4. INTRODUCTION OF SPECIAL GROUPS INTO THE PROTEIN MOLECULE
5. HYPOTHESES OF THE STRUCTURE OF PROTEINS
6. SUMMARY
7. CONCLUSION
8. PRODUCTION OF PROTEIN ISOLATE FROM GROUNDNUT (PEANUT)
1. STUDY OF SOME OF THE OPERATIONS IN THE INTEGRATED PROCESS FOR ROUNDNUTS
2. TECHNOLOGY OF PROTEIN-RICH NUTRO FOODS
9. STUDIES ON THE NUTRITIVE VALUE OF PROCESSED PROTEIN FOOD BASED ON OIL SEED MEALS FORTIFIED WITH VITAMINS AND MINERALS
- DEVELOPMENT OF PRECOOKED BALANCED PROTEIN FOOD SUITABLE FOR WEANED THE NUTRITIONAL VALUE OF FISH FLOUR
- THE GROUP OF VITAMINS A
10. THE GROUP OF VITAMINS A
- PROVITAMINS A
- CONVERSION OF PROVITAMINS A INTO VITAMINS A
- OTHER VITAMIN A FACTORS VITAMIN A3
- VITAMIN A2
- VITAMINS A
- DETERMINATION
11. VITAMIN B1 THIAMIN
1. Nomenclature and Survey
4. Isolation
5. Properties
6. Chemical Constitution and Synthesis
7. Industrial Methods of Preparation
8. Biogenesis
9. Thiochrome
10. Vitamin B1 Pyrophosphate
11. Specificity of the Vitamin B1 Action
12. Determination
13. Standards
14. Physiology of Plants and Microorganisms
15. Animal Physiology
16. Avitaminosis and Hypovitaminosis
17. Hypervitaminosis
18. Requirements
12. VITAMIN B2 RIBOFLAVIN
1. Nomenclature and Survey
2. Chronology
3. Occurrence
4. Isolation
5. Properties
6. Chemical Constitution of Vitamin B2: Degradation Reactions
7. Synthesis of Vitamin. B2 and Other Flavins
8. Industrial Methods of Preparation
9. Flavin-Enzymes

10. Specificity
11. Determination
12. Standards
13. Physiology of Plants and Microorganisms
14. Animal Physiology
15. Avitaminosis and Hypovitaminosis
16. Hypervitaminosis
17. Requirements

### 13. VITAMIN B6 - PYRIDOXIN

1. Nomenclature and Survey
2. Chronology
3. Occurrence
4. Isolation
5. Properties  
Constitution
7. Synthesis
8. Industrial Methods of Preparation
9. Biogenesis
10. Specificity
11. Determination
12. Standard
13. Physiology of Plants and Microorganisms
14. Animal Physiology
15. Avitaminosis and Hypovitaminosis
16. Hyper vitaminosis
17. Requirements

### 14. VITAMIN C - ASCORBIC ACID

- Nomenclature and Survey
- Occurrence
- Isolation
- Constitution
- Synthesis
- Industrial Methods of Preparation
- Biogenesis
- Specificity
- Determination
- Standards
- Physiology of Plants and Microorganisms
- Animal Physiology
- Avitaminosis and Hypovitaminosis
- Hypervitaminosis
- Requirements

### 15. EFFECT OF DIFFERENT TREATMENTS ON VITAMIN C AND MICROBIAL STERILITY OF CANNED DRUMSTIC (MORINGA OLEIFERA)

### 16. THE GROUP OF VITAMINS D

- Nomenclature and Survey
- THE CONCEPT OF PROVITAMINS D AND OF VITAMINS  
PROVITAMINS D
- Occurrence
- Isolation
- Properties
- Chemical Constitution
- Synthesis

Industrial Methods of Preparation

Biogenesis

Determination

(a) Physical Methods

(b) Chemical Methods

CONVERSION OF PROVITAMINS D TO VITAMINS D

Process of Activation

Mechanism of Activation

Chemistry of Activation Products

Vitamins D

Occurrence

Isolation

Properties

Chemical Constitution

Synthesis

Industrial Methods of Preparation

Biogenesis

Specificity

Compound Specificity

Compound And Species Specificity of Known Vitamins D

Species Specificity

Determination

Standards

Metabolism

Physiological Action

Relation to Other Vitamins and Hormones

Hypovitaminosis and Avitaminosis

Hypovitaminosis

Requirements

17. THE GROUP OF VITAMINS E

Nomenclature and Survey

Occurrence

Isolation

Properties

Chemical Constitution

Synthesis

Industrial Methods of Preparation

Biogenesis

Specificity

Determination

Standards

Physiology of Plants and Microorganisms

Animal Physiology

Avitaminosis and Hypovitaminosis

Hypervitaminosis

Requirements

18. VITAMIN H -BIOTIN

Nomenclature

Occurrence

Isolation

Properties

Chemistry<sup>9</sup>

Industrial Methods of Preparation

Specificity  
Determination  
Standards  
Physiology of Plants and Microorganisms  
Animal Physiology  
Avitaminosis  
Requirements  
19. THE GROUP OF VITAMINS K  
Nomenclature and Survey  
The Group of Vitamins K  
Occurrence  
Isolation  
Properties  
Chemical Constitution  
Synthesis  
Industrial Methods of Preparation  
Biogenesis  
Specificity  
Determination  
Standards  
Physiology of Plants and Microorganisms  
Animal Physiology  
Hypovitaminosis and Avitaminosis  
Hypervitaminosis  
Requirements

20. VITAMIN P  
Nomenclature and Survey  
Occurrence  
Isolation  
Properties  
Constitution  
Biogenesis  
Specificity  
Determination  
Standards  
Physiology of Plants  
Animal Physiology  
Avitaminosis  
Requirements

## **About NIIR**

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Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

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