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COLLEGE OF PHARMACY (B.Pharm.)

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3.3.2 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

Sr. No.	Name of the teacher	Title of the book	Department	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	Dr. K. S. Jain	Pharmaceutical Analysis I	Pharmacy	2021-22	978-93-90506-60-6	K K Wagh College of Pharmacy	Nirali Prakashan
2	Dr. K. S. Jain	Pharmaceutical Organic Chemistry- I	Pharmacy	2021-22	978-93-87397-62-0	K K Wagh College of Pharmacy	Nirali Prakashan
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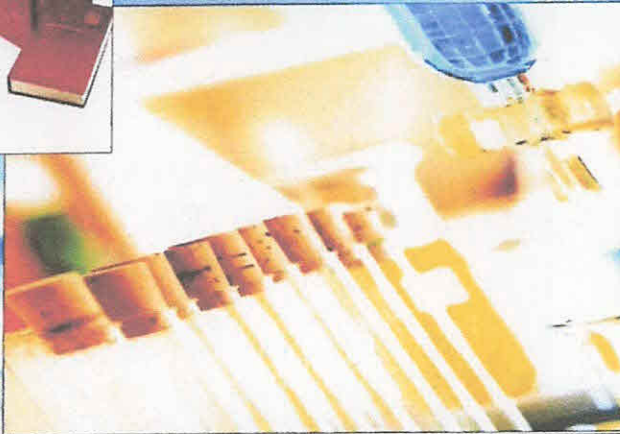
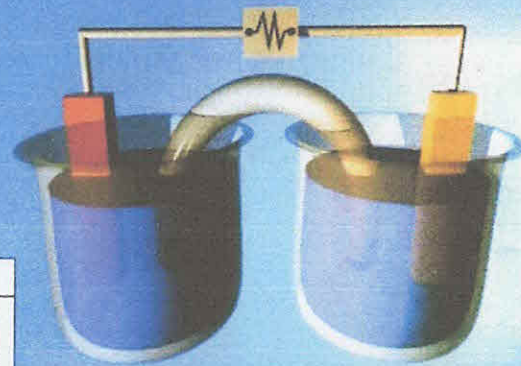
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PHARMACEUTICAL ANALYSIS

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Contents

Unit I : Introduction to Pharmaceutical Analysis

1. Pharmaceutical Analysis

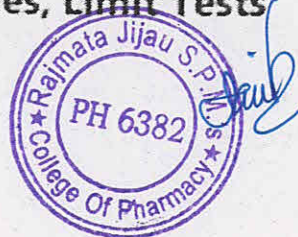
- | | | |
|---------|--|------------|
| 1.1 | Introduction: Definition & Scope of Pharmaceutical Analysis | 1.1 - 1.18 |
| 1.2 | Different Techniques of Analysis | 1.1 |
| 1.3 | Methods of Expressing Concentration | 1.2 |
| 1.4 | Primary and Secondary Standards | 1.4 |
| 1.4.1 | Primary Standards | 1.6 |
| 1.4.2 | Secondary Standards | 1.6 |
| 1.5 | Preparation and Standardization of Various Molar and Normal Solutions: Oxalic Acid, Sodium Hydroxide, Hydrochloric Acid, Sodium Thiosulphate, Sulphuric Acid, Potassium Permanganate and Ceric Ammonium Sulphate | 1.8 |
| 1.5.1 | Preparation of Standard Solutions | 1.9 |
| 1.5.1.1 | Preparation of N/10 H ₂ SO ₄ | 1.9 |
| 1.5.1.2 | Preparation of N/10 Na ₂ CO ₃ Solution | 1.11 |
| 1.5.1.3 | Preparation of N/10 NaOH Solution | 1.11 |
| 1.5.1.4 | Preparation of N/10 Oxalic Acid | 1.12 |
| 1.5.1.5 | Preparation of N/10 KMnO ₄ Solution | 1.12 |
| 1.5.1.6 | Preparation of 0.1 N Hydrochloric Acid | 1.12 |
| 1.5.1.7 | Sodium Thiosulfate, (0.1 N) Na ₂ S ₂ O ₃ · 5H ₂ O (248.19) | 1.13 |
| 1.5.1.8 | Cerric Ammonium Sulfate, (0.1 M) (NH ₄) ₄ Ce(SO ₄) ₄ · 2 H ₂ O | 1.14 |
| | • Question Bank | 1.1 |

2. Errors in Chemical Analysis

- | | | |
|-----|---|-----------|
| | | 2.1 - 2.1 |
| 2.1 | Introduction | 2 |
| 2.2 | Precision | 2 |
| 2.3 | Accuracy | 2 |
| 2.4 | Significant Figures | 2 |
| 2.5 | Sources of Errors in Experimental Chemical Analysis | 2 |
| 2.6 | Types of Errors | 2 |
| 2.7 | Methods of Minimizing Errors | 2 |
| 2.8 | Methods to Minimize and Detect Determinate Errors | 2 |
| | • Question Bank | 2 |

3. Pharmacopoeia, Sources of Impurities, Limit Tests

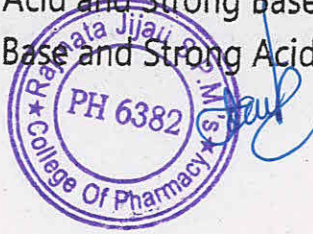
- | | | |
|-------|-----------------------|----------|
| | | 3.1 - 3. |
| 3.1 | Pharmacopoeia | |
| 3.1.1 | Indian Pharmacopoeia | |
| 3.1.2 | British Pharmacopoeia | |



3.1.4	United States Pharmacopoeia (USP)	3.7
3.1.5	Pharmacopoeia International (International Pharmacopoeia)	3.8
3.1.6	Extrapharmacopoeia (Martindale)	3.9
3.2	Sources of Impurities in Pharmaceuticals	3.10
3.2.1	Sources and Effects of Impurities in Pharmacopoeial Substances	3.10
3.2.2	Effects of Impurities on Pharmaceuticals	3.13
3.3	Limit Tests	3.13
3.3.1	Importance of Limit Tests	3.13
3.3.2	Principle and Procedure of Limit Test for Chloride	3.15
3.3.2.1	Principle and Procedure of Modified Limit Test for Chloride	3.16
3.3.2.2	Principle and Procedure of Limit Test for Sulphate	3.17
3.3.2.3	Principle and Procedure of Limit Test for Sulphate	3.19
3.3.2.4	Principle and Procedure of Limit Test for Iron	3.20
3.3.2.5	Principle and Procedure of Limit Test for Lead	3.22
3.3.2.6	Principle and Procedure of Limit Test for Arsenic	3.27
3.3.2.7	Principle and Modified Procedure of Limit Test for Arsenic for Different Compounds	3.30
3.3.2.8	Principle and Procedure of Limit Test for Heavy Metals	3.33
•	Question Bank	3.37

Unit II

4. Acid Base Titrations	4.1 – 4.20
4.1 Concepts of Acid and Base	4.1
4.1.1 Arrhenius Theory	4.1
4.1.2 Lowry and Bronsted's Theory	4.1
4.1.3 Lewis's Theory	4.3
4.1.4 Usanovich Theory	4.3
4.1.5 Lux-Flood Concept	4.4
4.2 Theories of Acid-Base Indicators	4.4
4.2.1 Indicator Range	4.5
4.2.2 Ostwald's Theory	4.5
4.2.3 Quinonoid Theory	4.7
4.3 Theory Involved in Titrations of Strong, Weak and Very Weak Acids and Bases	4.8
4.4 Buffer Equations and Buffer Capacity	4.8
4.5 Neutralization Curves	4.11
4.5.1 Neutralization Curve for Strong Acid and Strong Base Titration	4.11
4.5.2 Neutralization Curve for Weak Acid and Strong Base Titration	4.13
4.5.3 Titration Curve between Weak Base and Strong Acid Titration	4.15



5. Non-Aqueous Titrations

- 5.1 Introduction
- 5.2 Advantages of Non-aqueous Titrations
- 5.3 Solvents used in Non-aqueous Titration
 - 5.3.1 Properties of Non-aqueous Solvent
 - 5.3.2 Different Types of Solvents
- 5.4 Levelling Effect, Leveling and Differentiating Solvents
- 5.5 Methodology for Non-aqueous Titrations
 - 5.5.1 Preparation of 0.1 N Perchloric Acid
 - 5.5.2 Standardization of 0.1 N Perchloric Acid
 - 5.5.3 Choice of Indicators
 - 5.5.4 Effect of Temperature on Assays
- 5.6 Assays by Non-aqueous Titrations
 - 5.6.1 Acidimetry in Non-aqueous Titrations
 - 5.6.1.1 Titration of Primary, Secondary and Tertiary Amines
 - 5.6.1.2 Titration of Halogen Acid Salts of Bases
 - 5.6.1.2.1 Amitriptyline Hydrochloride
 - 5.6.2 Alkalimetry in Non-Aqueous Titrations
 - 5.6.2.1 Preparation of 0.1 N Potassium Methoxide in Toluene-Methanol
 - 5.6.2.2 Preparation of 0.1 N Sodium Methoxide
 - 5.6.2.3 Preparation of 0.1 N Lithium Methoxide
 - 5.6.2.4 Standardization of 0.1 N Methoxide Solution
- 5.7 Estimation of Sodium Benzoate and Ephedrine HCl
- 5.8 Applications of Non-aqueous Titration
 - Question Bank

Unit III

6. Precipitation Titrations

- 6.1 Introduction
- 6.2 Solution Process
- 6.3 Factors Affecting Solubility
- 6.4 Detection of End Point
 - 6.4.1 Mohr's Method
 - 6.4.2 Volhard's Method
 - 6.4.3 Fajan's Method
- 6.5 Estimation of Sodium Chloride
- 6.6 Classification of Methods in Precipitation Titration



6.1 - 6.1

7. Complexometric Titrations	7.1 - 7.16
7.1 Introduction and Definition	7.1
7.2 Ligands (Complexing Agent)	7.2
7.2.1 Classification of Ligands	7.2
7.2.2 Chelating Agents	7.2
7.2.3 EDTA	7.3
7.3 Stability Constant	7.4
7.3.1 Factors Affecting Stability Constant	7.5
7.3.1.1 Effect of pH	7.5
7.3.1.2 Thermodynamic/Chelon Effect	7.6
7.3.1.3 Macrocyclic Effect	7.6
7.3.1.4 Effect of Temperature	7.6
7.3.1.5 Addition of Electrolytes	7.6
7.4 Detection of End Point	7.7
7.4.1 Visual Indicators	7.7
7.4.1.1 Metallochromic Indicators	7.7
7.4.1.2 pH Indicators	7.10
7.4.2 Instrumental Methods	7.10
7.4.2.1 Potentiometric Method	7.10
7.4.2.2 Spectrophotometric Method	7.10
7.4.2.3 Amperometric Method	7.10
7.5 Types of Titration	7.10
7.5.1 Direct Titrations	7.10
7.5.2 Back Titration	7.11
7.5.3 Replacement Titration/ Displacement Titration	7.11
7.5.4 Indirect Titration	7.11
7.5.5 Alkalimetric Titration	7.12
7.6 Titration of Mixtures	7.12
7.7 Applications of Complexometric Titrations	7.13
7.8 Estimation of Magnesium Sulphate	7.14
7.9 Estimation of Calcium Gluconate	7.14
• Question Bank	7.15
8. Gravimetry	8.1 - 8.18
8.1 Introduction	8.1
8.2 Types of Precipitates	8.2
8.2.1 Crystalline Precipitates	8.2
8.2.2 Colloidal Precipitates	8.3
8.2.2.1 Types of Colloidal Precipitates	8.4
8.2.2.2 Pentization of Colloids	8.4



8.3	Precipitation Process and Particle Size	8.5
8.4	Digestion of Precipitates (Ostwald Ripening)	8.6
8.5	Purity of Precipitates	8.6
8.5.1	Co-precipitation	8.6
8.5.1.1	Surface Adsorption	8.7
8.5.1.2	Mixed Crystal Formation	8.7
8.5.1.3	Occlusion and Mechanical Entrapment	8.7
8.5.2	Post Precipitation	8.8
8.6	Precipitation from Homogenous Solution	8.8
8.7	Precipitating Agents	8.9
8.7.1	Inorganic Precipitants	8.9
8.7.2	Reducing Agents	8.9
8.7.3	Organic Precipitants	8.9
8.7.3.1	Advantages of Organic Precipitants	8.11
8.7.3.2	Disadvantages of Organic Precipitants	8.11
8.8	Advantages of Gravimetric Methods	8.11
8.9	Unit Operations in Gravimetric Analysis	8.11
8.10	Estimation of Barium Sulphate	8.15
8.10.1	Principle	8.15
8.10.2	Procedure	8.15
	• Question Bank	8.16
Diazotization Titration (Sodium Nitrite Titration)		9.1 - 9.6
9.1	Introduction	9.1
9.2	Theory	9.1
9.3	Condition for Diazotization	9.2
9.3.1	Rate of Titration	9.2
9.3.2	Temperature	9.2
9.4	Principle	9.2
9.5	Types of Diazotization Titrations	9.3
9.5.1	Direct Titrations	9.3
9.5.2	Reverse Method	9.3
9.5.3	Special Method	9.3
9.6	Preparation and Standardization of 1 M Sodium Nitrate	9.3
9.6.1	Preparation of 1M Sodium Nitrate	9.3
9.6.2	Standardization of 1M Sodium Nitrate with Sulphanilamide	9.3
9.7	Assay of Calcium Aminosalicylate	9.4
9.8	Applications of Diazotization Titration	9.5



Unit IV

10. Redox Titrations	10.1 - 10.16
10.1 Introduction	10.1
10.2 Concepts of Oxidation and Reduction	10.1
10.3 Balancing of Half Reactions	10.2
10.4 Equivalent Weights	10.4
10.5 Redox Potential	10.4
10.6 Detection of End Point in Redox Titrations	10.5
10.6.1 Internal Indicators	10.5
10.6.2 Self Indicators	10.6
10.6.3 External Indicators	10.6
10.6.4 Specific Indicators	10.6
10.6.5 Potentiometric Method	10.6
10.7 Redox Titrations	10.7
10.7.1 Titrations using Potassium Permanganate	10.7
10.7.2 Cerimetry	10.8
10.7.3 Iodine Titrations	10.9
10.7.4 Bromatometry	10.13
10.7.5 Dichrometry	10.14
10.7.6 Titration with Potassium Iodate	10.15
• Question Bank	10.15

Unit V : Electrochemical Methods of Analysis

11. Conductometry	11.1 - 11.13
11.1 Introduction	11.1
11.2 Measurement of Conductivity	11.4
11.3 Conductometric Titrations	11.7
11.3.1 Acid-Base Titrations	11.7
11.3.1.1 Strong Acid with a Strong Base	11.8
11.3.1.2 Strong Acid with Weak Base	11.8
11.3.1.3 Weak Acid with a Strong Base	11.9
11.3.1.4 Weak Acid with Weak Base	11.9
11.3.2 Precipitation Titrations	11.10
11.3.3 Redox Titrations	11.10
11.3.4 Complexometric Titrations	11.11
11.3.5 Non-aqueous Titrations	11.11
11.4 Applications	11.12



12. Potentiometry	
12.1 Introduction	12.1
12.2 Electrode Potential	12.1
12.3 Cell	12.2
12.3.1 Galvanic Cell	12.2
12.4 Electrodes	12.4
12.4.1 Reference Electrodes	12.4
12.4.1.1 The Standard Hydrogen Electrode (SHE)	12.4
12.4.1.2 Calomel Electrode	12.6
12.4.1.3 Silver Chloride Electrode	12.7
12.4.2 Indicator Electrodes	12.8
12.4.2.1 Metal Electrode	12.8
12.4.2.2 Glass Electrode	12.8
12.5 Methods to Determine End Points	12.10
12.6 Types of Potentiometric Titrations	12.11
12.7 Applications of Potentiometric Titrations	12.12
• Question Bank	12.13

13. Polarography	13.1 - 13.14
13.1 Introduction	13.1
13.2 Principle	13.1
13.3 Theory of Polarography	13.2
13.3.1 Polarization of Electrodes	13.2
13.4 Construction and Working of Dropping Mercury Electrode and Rotating Platinum Electrode	13.3
13.4.1 Dropping Mercury Electrode	13.3
13.4.2 Rotating Platinum Electrode	13.8
13.4.3 Polarographic Modes	13.9
13.5 Applications	13.11
• Question Bank	13.13

Index

Bibliography

I.1 - I.2

B.1 - B.1



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Unit I : Introduction to Pharmaceutical Analysis

Chapter 1

PHARMACEUTICAL ANALYSIS

◆ LEARNING OBJECTIVES ◆

After completing this chapter, student should be able to understand:

- Definition and scope of Pharmaceutical analysis.
- Various analytical techniques.
- Methods of expressing concentration.
- Standard solutions used in analysis.
- Preparation of solutions of various concentrations.

1.1 INTRODUCTION: DEFINITION & SCOPE OF PHARMACEUTICAL ANALYSIS

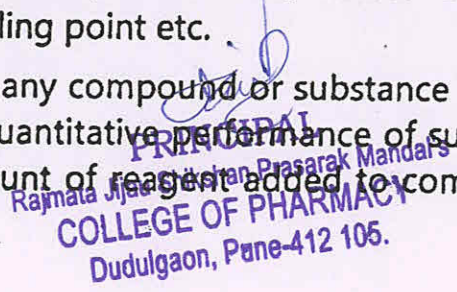
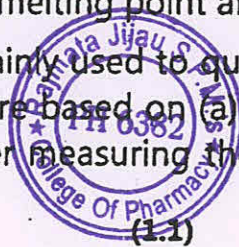
Definition:

Pharmaceutical analysis is a branch of practical chemistry that involves a series of processes for identification, determination, quantification and purification of a substance, separation of the components of a solution or mixture, or determination of structure of chemical compounds. The substance may be a single compound or a mixture of compounds and it may be isolated or in any of the dosage forms. The substances used as pharmaceuticals are from various synthetic or natural (animal, plant, marine, microbial or mineral) sources.

Scope:

The process of analysis can be broadly categorized as; a) qualitative (identification) and b) quantitative (estimation). The sample to be analysed is called as **analyte** and on the basis of size of analyte, quantitative analysis can be termed as; macro (0.1 gm or more), semi-micro (0.01 gm to 0.1 gm), micro (0.001 gm to 0.01 gm), sub-micro (0.0001 gm to 0.001 gm), ultra-micro (below 10^{-4} gm) and trace analysis (100 to 10000 ppm).

1. **Qualitative analysis** is performed to establish composition of natural/synthetic substances. These tests are performed to indicate whether the substance or compound is present in the sample or not. Various qualitative tests involve; detection of evolved gas, formation of precipitates, limit tests, colour change reactions, determination of melting point and boiling point etc.
2. **Quantitative analysis** is mainly used to quantify any compound or substance in the sample. These techniques are based on (a) the quantitative performance of suitable chemical reaction and either measuring the amount of reagent added to complete



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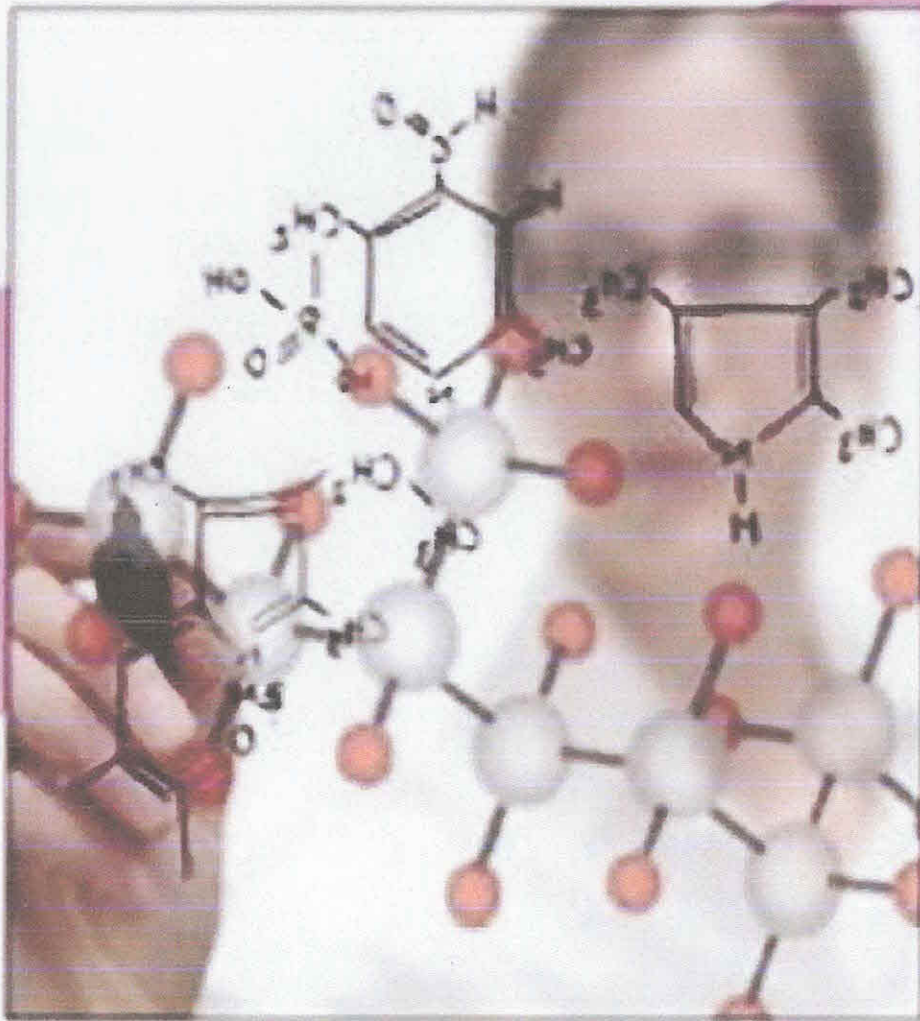
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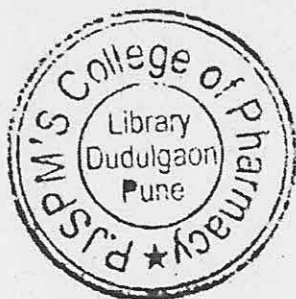
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Contents

Unit I

1. Classification, Nomenclature and Isomerism	1.1 - 1.37
1.1 Classification of Organic Compounds	1.1
1.2 Common names of Organic Compounds	1.1
1.2.1 Compounds containing Carbon and Hydrogen Only	1.1
1.2.2 Compounds containing Carbon, Hydrogen and Oxygen	1.1
1.2.3 Compounds containing Carbon, Hydrogen and Nitrogen only	1.1
1.2.4 Compounds containing Carbon, Hydrogen, Oxygen and Halogens only	1.1
1.2.5 Compounds containing Carbon, Hydrogen, Oxygen, Nitrogen and Halogens only	1.1
1.2.6 Compounds containing Carbon, Hydrogen, Oxygen, Nitrogen, Sulphur and/or Halogens	1.1
1.3 IUPAC Nomenclature System for Organic Compounds: General Rules	1.1
1.4 Isomerism	1.2
1.4.1 Constitutional or Structural Isomerism	1.2
1.4.2 Stereoisomerism	1.3
• Questions	1.3

Unit II

2. Alkanes	2.1 - 2.1
2.1 Introduction	2.1
2.2 Hybridization of Atomic Orbitals	2.1
2.3 Halogenation of Alkanes	2.1
2.4 Uses of Paraffins (alkanes)	2.1
• Questions	2.1
3. Alkenes	3.1 - 3.11
3.1 Introduction: Properties of Alkenes	3.1
3.2 Elimination Reactions Type	3.1
3.2.1 The Mechanisms of Elimination Reaction (β -Elimination)	3.1
3.2.2 Orientation of Elimination	3.1
3.2.3 Comparison of E_1 , E_2 and E_{1cB} Reactions	3.1
3.2.4 Ozonolysis	3.1
3.3 Addition Reactions of Alkenes: Electrophilic Additions	3.1
3.4 The Markovnikoff's Orientation in Electrophilic Addition	3.1
• Questions	3.1
4. Conjugated Dienes	4.1 - 4.1
4.1 Introduction	4.1
4.2 Stability of Conjugated Dienes	4.1
4.3 Diel's-Alder Reaction	4.1
4.4 Electrophilic Addition Reaction	4.1
4.5 Free Radical Addition Reactions	4.1
4.6 Allylic Rearrangement	4.1
• Questions	4.1



Unit III

5. Alkyl Halides	5.1 – 5.24
5.1 Introduction	5.1
5.2 General Reactions of Alkyl Halides	5.4
5.3 Factors affecting SN_1 and SN_2 Reaction Mechanisms	5.11
5.4 Substitution Vs Elimination	5.14
5.5 Structures and Uses of Some Alkyl halide derivatives	5.17
• Questions	5.23
6. Alcohols	6.1 – 6.10
6.1 Introduction	6.1
6.2 Nomenclature	6.2
6.3 Physical Properties	6.3
6.4 Qualitative Tests	6.4
6.5 Structure and Uses of some Alcohols	6.6
• Questions	6.10

Unit IV


7. Carbonyl Compounds	7.1 – 7.28
7.1 Nucleophilic Addition	7.1
7.1.1 Mechanism of Nucleophilic Addition and Condensation Reactions	7.1
7.1.2 Examples of Nucleophilic Addition to Carbonyl Groups	7.2
7.1.3 Acetal-Preparation and Uses / Addition of Alcohols to $C=O$	7.4
7.1.4 Additions of Derivatives of Ammonia	7.6
7.2 Electromeric Effect	7.12
7.3 Some Reactions of Carbonyl Compounds	7.13
7.3.1 Aldol Condensation	7.13
7.3.2 Crossed Aldol Condensation	7.14
7.3.3 Cannizaro Reaction	7.14
7.3.4 Crossed Cannizaro Reaction	7.15
7.3.5 Benzoin Condensation	7.15
7.3.6 Perkin Reaction	7.16
7.4 Qualitative tests for Aldehydes and Ketones	7.17
7.4.1 2, 4-DNP Test for Aldehydes and Ketones	7.17
7.4.2 Tollen's Test for Aldehydes	7.17
7.4.3 Jones (Chromic Acid) Oxidation Test for Aldehydes	7.18
7.4.4 Iodoform Test for Methyl Ketones	7.19
7.5 Structures and Uses of some Carbonyl Compounds	7.19
• Questions	7.28



Unit V

8. Carboxylic Acids (Aromatic and Aliphatic)	8.1 – 8.7
8.1 Introduction	{
8.2 Acidity of Carboxylic Acids	{
8.3 Effect of Substituents on Acidity	{
8.4 Inductive Effect	{
8.5 Qualitative Test for Carboxylic Acid (R-/Ar-COOH)	{
8.6 Structures and Uses of some Carboxylic Acids and Derivatives	8.
• Questions	8.
9. Aliphatic Amines	9.1 – 9.1
9.1 Introduction	{
9.2 Basicity of Amines	{
9.3 Effects of Substituents on Basicity of Amines	{
9.4 Qualitative Tests for Amines	{
9.5 Structure and Uses of some Amines	{
• Questions	9.
Index	I.1 – I.




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UNIT I

Chapter ... 1

CLASSIFICATION, NOMENCLATURE AND ISOMERISM

◆ LEARNING OBJECTIVES ◆

- To know different types of Classes and Organic Compounds.
- To understand the IUPAC Rules for Nomenclature of Organic Compounds.
- To draw the Structure from given name.
- To give the name for given Structure.
- To understand types of Isomerism of the Organic Compound.

1.1 CLASSIFICATION OF ORGANIC COMPOUNDS

Classification of organic compounds on the basis of functional group and elemental composition:

1. Compounds containing carbon and hydrogen atoms only: Hydrocarbons (Alkanes, Alkenes, Alkynes, Aromatic Hydrocarbons, Arylalkyl Hydrocarbons, Alicyclic Hydrocarbons).
2. Compounds containing carbon, hydrogen and oxygen atoms only: Alcohols, Phenols, Ethers, Epoxides, Carbonyl compounds, Aldehydes and Ketones, Carboxylic acids, Esters, Anhydrides.
3. Compounds containing Carbon, Hydrogen and Nitrogen atoms only: Amines and Imines, Nitriles, Hydrazines.
4. Compounds containing Carbon, Hydrogen, Halogens with or without Oxygen: Alkyl Halides, Aryl Halides, Acyl Halides.
5. Compounds containing Carbon, Hydrogen, Oxygen and Nitrogen atoms only: Amides, Imides, Aldoximes, Ketoximes, Nitro compounds.
6. Compounds containing Carbon, Hydrogen and Sulphur with/without Nitrogen, Oxygen and Halogen: Sulphonic acids, Sulphonylhalides, Sulphonamides.
7. IUPAC nomenclature of all classes of compounds; Nomenclature of Mono-substituted and Poly-substituted compounds. (Recent rules of IUPAC referred).





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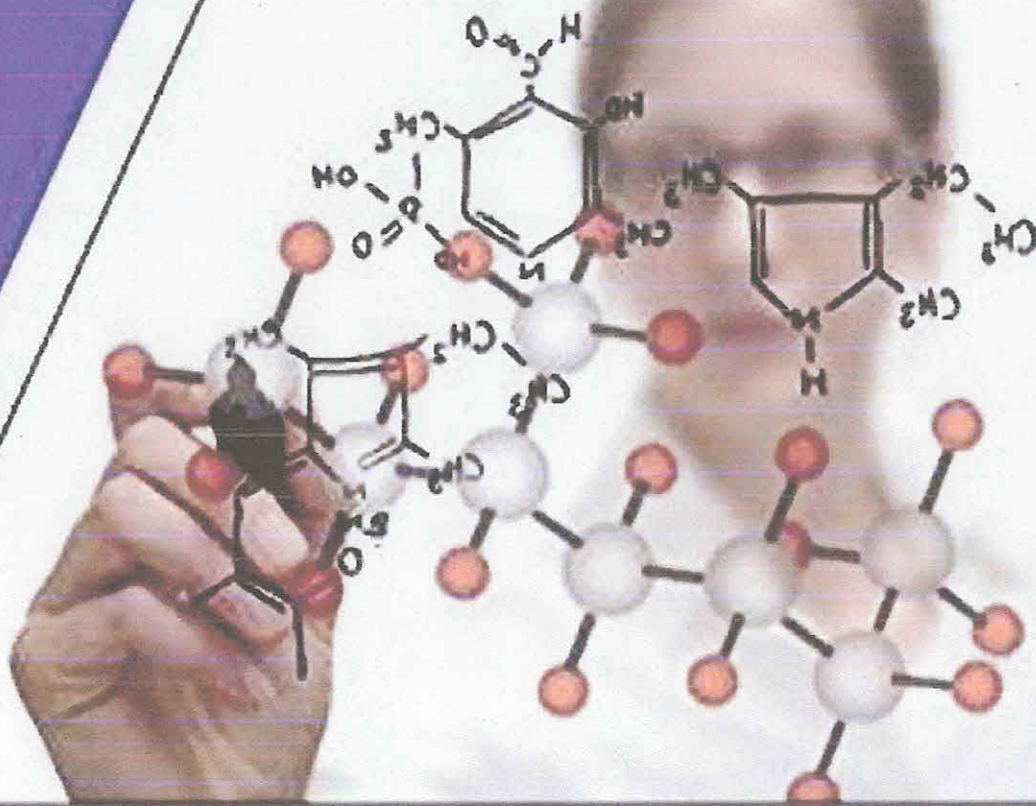
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Contents ...

1. Impurities in Pharmaceutical Substances	1.1 - 1.1
2. Acids Bases and Buffers	2.1 - 2.1
3. Major Extra and Intracellular Electrolytes	3.1 - 3.2
4. Dental Products	4.1 - 4.1
5. Gastrointestinal Agents	5.1 - 5.1
6. Antacids	6.1 - 6.1
7. Cathartics	7.1 - 7.1
8. Antimicrobials	8.1 - 8.1
9. Miscellaneous Agents	9.1 - 9.1
10. Radiopharmaceuticals	10.1 - 10.1




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Unit - I

Chapter 1...

Impurities in Pharmaceutical Substances

Contents ...

- 1.1 Inorganic Chemistry
 - 1.1.1 Importance of Inorganic Pharmaceuticals
- 1.2 Pharmacopoeia
 - 1.2.1 History of Pharmacopoeia
 - 1.2.2 Indian Pharmacopoeia
 - 1.2.3 Indian Pharmacopoeia 2010
 - 1.2.4 Indian Pharmacopoeia 2014
 - 1.2.5 Indian Pharmacopoeia 2018
 - 1.2.6 British Pharmacopoeia
 - 1.2.7 European Pharmacopoeia
 - 1.2.8 Pharmacopoeia International (International Pharmacopoeia)
 - 1.2.9 United States Pharmacopoeia (USP)
- 1.3 Official Monograph
- 1.4 New Inclusion / Exclusion of Monograph
- 1.5 Sources of Impurities
- 1.6 Limit Tests
 - 1.6.1 Limit Test for Chlorides
 - 1.6.2 Limit Test for Sulphates
 - 1.6.3 Limit Test for Iron
 - 1.6.4 Limit Test for Lead
 - 1.6.5 Limit Test for Heavy Metals
 - 1.6.6 Limit Test for Arsenic
 - 1.6.7 Limits of Insoluble and Soluble Matter
- 1.7 Qualitative Tests for Alkali and Alkaline Earth Metals
- 1.8 Modified Limit Tests for Chlorides and Sulfates
- Question Bank



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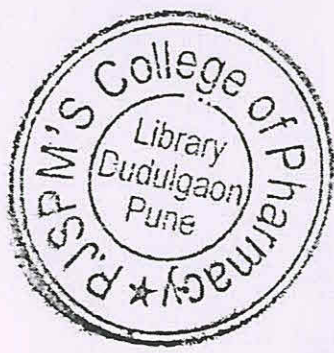
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CONTENTS

Unit 1 : General Introduction

1.1 Volumetric Glassware

1.1.1 Pipettes

1.1.2 Burettes

1.1.3 Measuring Cylinders

1.1.4 Volumetric Flasks

1.1.5 Erlenmeyer Flasks

1.1.6 Weighing Bottles and Specific Gravity Bottles

1.1.7 Beakers

1.2 Cleaning of Glassware

1.3 Some Basic Concepts

1.3.1 Preparation of Aqueous Solutions

1.3.2 Per cent Solutions

1.4 Volumetric Methods

1.4.1 Definitions of Terms

1.4.2 Requirements for Volumetric Methods

1.4.3 Classification of Volumetric Methods

1.4.4 Steps Involved in Quantitative Analysis

1.4.5 End Point Detection

1.4.6 Calibration of Volumetric Glasswares

- Question Bank for Viva-Voce

Unit 2 : Limits Tests

Experiment 1: To Perform Limit Test for Chlorides

Experiment 2 : To Perform Limit Test for Sulphate

Experiment 3 : To Perform Limit Test for Iron

Experiment 4 : To Perform Limit Test for Arsenic

- Question Bank for Viva-Voce

Unit 3 Preparation and Standardization of Some Volumetric Reagent Solutions

Experiment 1 : To Prepare and Standardize 0.1 N Sodium Hydroxide

Experiment 2 : To Prepare and Standardize 0.5 M Sulphuric Acid

Experiment 3 : To Prepare and Standardize 0.1 N Sodium Thiosulfate

Experiment 4 : To Prepare and Standardize 0.1 N Potassium Permanganate

Experiment 5 : To Prepare and Standardize 0.1 M Ceric Ammonium Sulphate

- Question Bank for Viva-Voce



Unit 4 : Assay of the Compounds Along with Standardization of Titrant	4.1 - 4.14
Experiment 1 : Assay of Ammonium Chloride by Acid-Base Titration	4.1
Experiment 2 : Assay of Ferrous Sulphate by Cerimetry	4.2
Experiment 3 : Assay of Copper Sulphate by Iodometry	4.3
Experiment 4 : Assay of Calcium Gluconate by Complexometry	4.5
Experiment 5 : Assay of Hydrogen Peroxide by Permanganometry	4.7
Experiment 6 : Assay of Sodium Benzoate by Non-Aqueous Titration	4.9
Experiment 7 : Assay of Sodium Chloride by Precipitation Titration	4.10
• Question Bank for Viva-Voce	4.12

Unit 5 : Determination of Normality by Electro-Analytical Methods **5.1 - 5.10**

1. Conductometric Titrations **5.1**

Experiment 1 : Determination of the Strength of a Solution of Strong Acid (Hydrochloric Acid) by A Standard Solution of Strong Base (Sodium Hydroxide) **5.1**

Experiment 2 : To Carry Out the Conductometric Titration of Mixture of Acids [0.1N HCl + 0.1N CH₃COOH] vs. Strong Base (1 N NaOH) **5.5**

2. Potentiometric Titrations **5.7**

Experiment 3 : Determination of Strength of Strong Acid Against Strong Base by Potentiometric Titration **5.7**

• Question Bank for Viva-Voce **5.9**

Bibliography

B.1 - B.1



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Limit Tests

Limit Tests are quantitative or semi-quantitative tests designed to identify or control small quantities of impurities. These tests should be specific and sensitive.

Limit = A value or amount that is likely to be present in a substance.

Test = To examine or to investigate

Impurity = A foreign matter present in a compound

Definition:

Limit test is defined as a quantitative or semi-quantitative test designed to identify and control small quantities of impurities which are likely to be present in the substance.

Importance of Limit Tests:

1. To find out the harmful amount of impurities
2. To find out avoidable / unavoidable amount of impurities.

Types of Limit Tests:

1. Comparison method
2. Quantitative determination
3. Test in which there is no visible reaction

General Principles:

1. If the sample is lighter (in colour/turbidity/opalescence) than the standard solution then it is within the pharmacopoeial limit (accepted).
2. If the sample is darker/heavier than the standard solution then it is above the pharmacopoeial limit (rejected).
3. **Specificity of a Limit Test:** A given limit test for a trace impurity should involve some selective reaction of the reagent with the trace impurity under consideration/detection specifically characteristic only to it.
4. **Sensitivity of a Limit Test:** As most of the limit tests involve dilute solutions and results are based on concentration of the trace impurity, the results may take longer duration to become observable or appreciable. Thus, consideration of duration of test needs to be of prime consideration in designing the limit test.

Nessler's Cylinder (IP appendix VII A127):

It is a clear glass cylinder with normal capacity of 50 ml. However, some Nessler's cylinders are of 100 ml capacity. The overall height is about 15 cm, the external height to the 50 ml mark is 11.0 to 12.4 cm and the thickness of the wall is around 1.0 to 1.5 mm, while, the thickness of the base is about 1.0 to 3.0 mm. The external height to the 50 mark of cylinders used for the test must not differ by more than 1 mm in the given pair.

(1.1)



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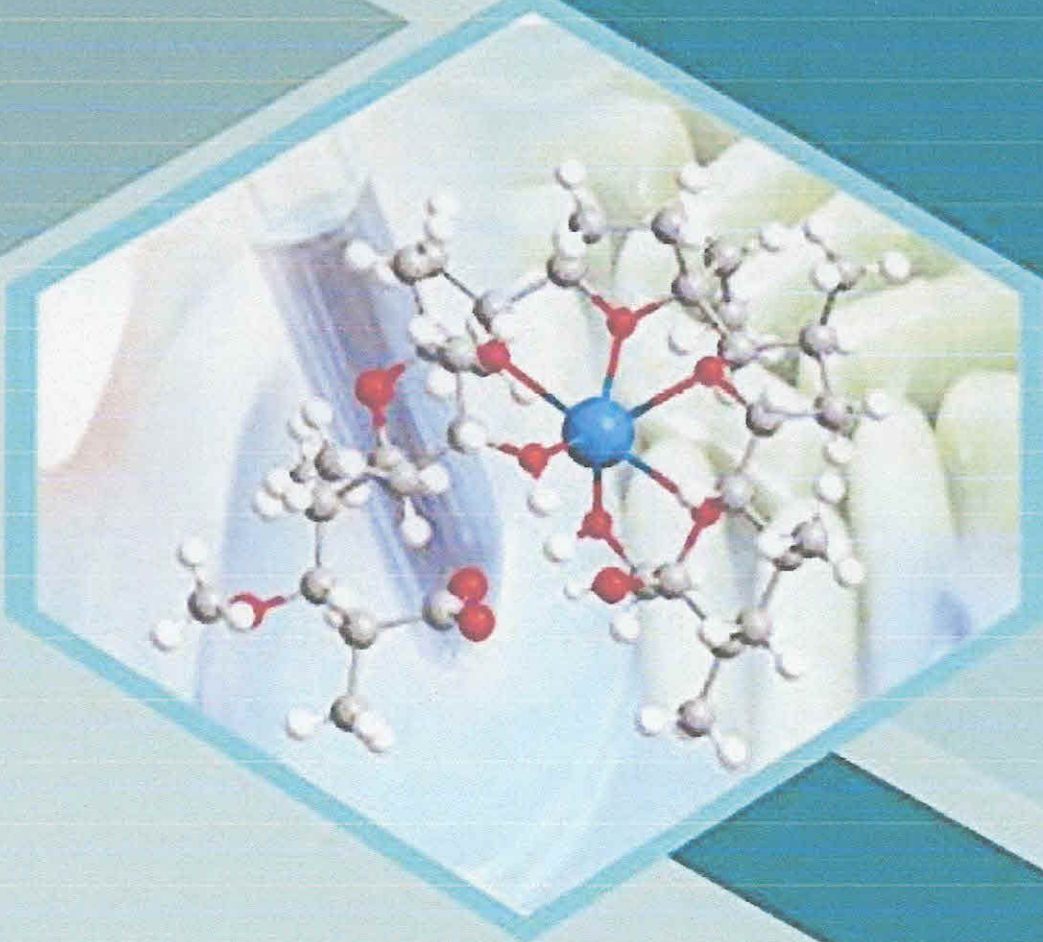
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Contents

Unit I

1. Benzene and Its Derivatives

- 1.1 Structure of Benzene
- 1.2 Analytical Evidences
- 1.3 Synthetic/Chemical Evidences
- 1.4 Orbital Picture of Benzene
- 1.5 Resonance and Aromaticity in Benzene
- 1.6 Reactions of Benzene
- 1.7 Electrophilic Aromatic Substitution
- 1.8 Nucleophilic Aromatic Substitution
- 1.9 Structure and Uses of some selected Benzene Derivatives, viz., DDT, Saccharin, BHC and Chloramine
 - Questions

1.1 - 1.2

Unit II

2. Phenols

- 2.1 Introduction
- 2.2 Acidity of Phenols
- 2.3 Methods of Preparation
- 2.4 Reactions of Phenols
 - Questions

2.1 - 2.1

3. Aromatic Amines

- 3.1 Introduction
- 3.2 Methods of Preparation
 - 3.2.1 Reduction of Nitriles
 - 3.2.2 Reduction of Nitrocompounds
 - 3.2.3 Selective Reduction by Ammonium Sulphide
 - 3.2.4 Reductive Amination of Ketone
 - 3.2.5 Hoffmann Rearrangement
 - 3.2.6 Ammonolysis of Aryl Chloride
- 3.3 Chemical Reactions of Aromatic Amines
 - 3.3.1 Formation of Amide from Acyl Chloride
 - 3.3.2 Salt Formation
 - 3.3.3 Reaction with Nitrous Acid
 - 3.3.4 Carbylamine Reaction
 - 3.3.5 Acetylation

3.1 - 3.14



3.4	Basicity of Amines	3.5
3.5	Effects of Substituents on Basicity of Amines	3.7
3.6	Factors affecting on Basicity	3.7
3.6.1	Resonance Effect	3.8
3.6.2	Inductive Effect	3.8
3.6.3	Hydrogen Bonding	3.9
3.6.4	Orbital Nature of Electron Pair	3.9
3.6.5	Steric Effect	3.9
3.6.6	Solvation Effect	3.9
3.6.7	Electronegativity of Bonded Atoms	3.10
3.7	Aryl Diazonium Salts	3.10
3.7.1	History of Aryl Diazonium Salts	3.10
3.7.2	Aryl Diazonium Salts	3.10
3.7.3	Preparation of Benzenediazonium Chloride	3.11
3.7.4	Synthetic Applications of Aryl Diazonium Salts	3.12
3.7.5	Importance of Diazonium Salts	3.13
•	Questions	3.14

Aromatic Acids

4.1 – 4.8

4.1	Introduction	4.1
4.2	Acidity: Salt Formation	4.2
4.3	Important Reactions of Benzoic Acid	4.3
4.4	Methods of Preparation of Aryl Carboxylic Acids	4.6
•	Questions	4.8

Unit III

Fats and Oils

5.1 – 5.6

5.1	Introduction	5.1
5.2	Reactions of Fatty Acids	5.2
5.2.1	Hydrolysis	5.2
5.2.2	Hydrogenation	5.2
5.3	Rancidity of Oil (Rancidification)	5.2
5.3.4	Drying Oils	5.3
5.3	Principles and Significance of various Analytical Constants	5.3
5.3.1	Acid Value	5.4
5.3.2	Saponification Value	5.4
5.3.3	Ester Value	5.5
5.3.4	Iodine Value	5.5
5.3.5	Acetyl Value	5.6
5.3.6	Reichert-Meisler (RM) Value	5.6
•	Questions	5.6



Unit IV

6. Polynuclear Hydrocarbons

		6.1 - 6.24
6.1	Introduction	6.1
6.2	Naphthalene	6.1
6.2.1	Synthesis of Naphthalene	6.3
6.2.2	Properties	6.4
6.2.3	Chemical Reactions	6.6
6.2.4	Uses of Naphthalene and its Derivatives	6.9
6.2.5	Structures of Naphthalene Derivatives	6.10
6.3	Anthracene	6.10
6.3.1	Synthesis	6.11
6.3.2	Chemical Reactions	6.12
6.3.3	Uses of Anthracene and its Derivatives	6.14
6.3.4	Structures of Anthracene Derivatives	6.15
6.4	Phenanthrene	6.16
6.4.1	Syntheses	6.16
6.4.2	Chemical Reactions	6.19
6.4.3	Uses of Phenanthrene and its Derivatives	6.20
6.5	Diphenylmethane (Benzylbenzene)	6.21
6.6	Triphenylmethane	6.21
	• Questions	6.24

Unit V

Cycloalkanes

		7.1 - 7.7
7.1	Introduction	7.1
7.2	Classification of Saturated Cycloalkanes	7.1
7.3	Methods of Preparation of Cycloalkanes	7.3
7.3.1	From Dihalides	7.3
7.3.2	Dieckmann Reaction	7.3
7.3.3	Simmons-Smith Reaction	7.3
7.3.4	From Aromatic Hydrocarbon	7.3
7.4	Stability of Cycloalkanes	7.4
7.4.1	Baeyer Strain Theory	7.4
7.4.2	Sache-Mohr's Theory of Strainless Rings	7.5
7.5	Reactions of Cyclopropane and Cyclobutane	7.6
7.5.1	Substitution Reactions	7.6
7.5.2	Addition of Cl ₂ and Br ₂	7.6
7.5.3	Addition of HBr and HI	7.6
7.5.4	Addition of Hydrogen	7.6
	• Questions	7.7



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Chapter ... 1

BENZENE AND ITS DERIVATIVES

◆ LEARNING OBJECTIVES ◆

After completing this chapter, reader should be able to understand:

- ▶ Introduction to benzene.
- ▶ Analytical, Synthetic and other evidences in the derivation of structure of benzene.
- ▶ Orbital picture of benzene.
- ▶ Resonance in benzene, aromatic characters, Huckel's rules.
- ▶ Reactions of benzene - nitration, sulphonation, halogenation-reactivity, Friedel-Crafts alkylation - reactivity, limitations, Friedel-Crafts acylation.
- ▶ Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction.
- ▶ Structure and uses of DDT, Saccharin, BHC and Chloramine.

1.1 STRUCTURE OF BENZENE

Benzene on which the study of aromatics began was discovered in 1825. However, it was only in 1866 that the Kekule's formula or structure I of benzene was known, till he proposed this structure of benzene is most accepted because the satisfactory answers it offers to various substitution products as compared with other four proposed structures II-V (Fig. 1.1).

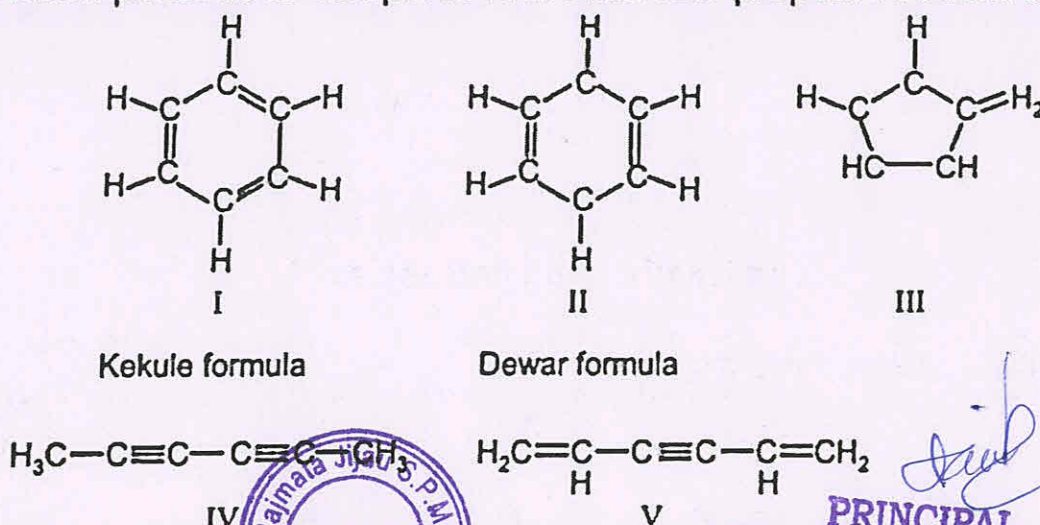


Fig. 1.1: Various structures proposed for benzene in earlier days



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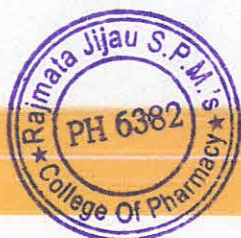
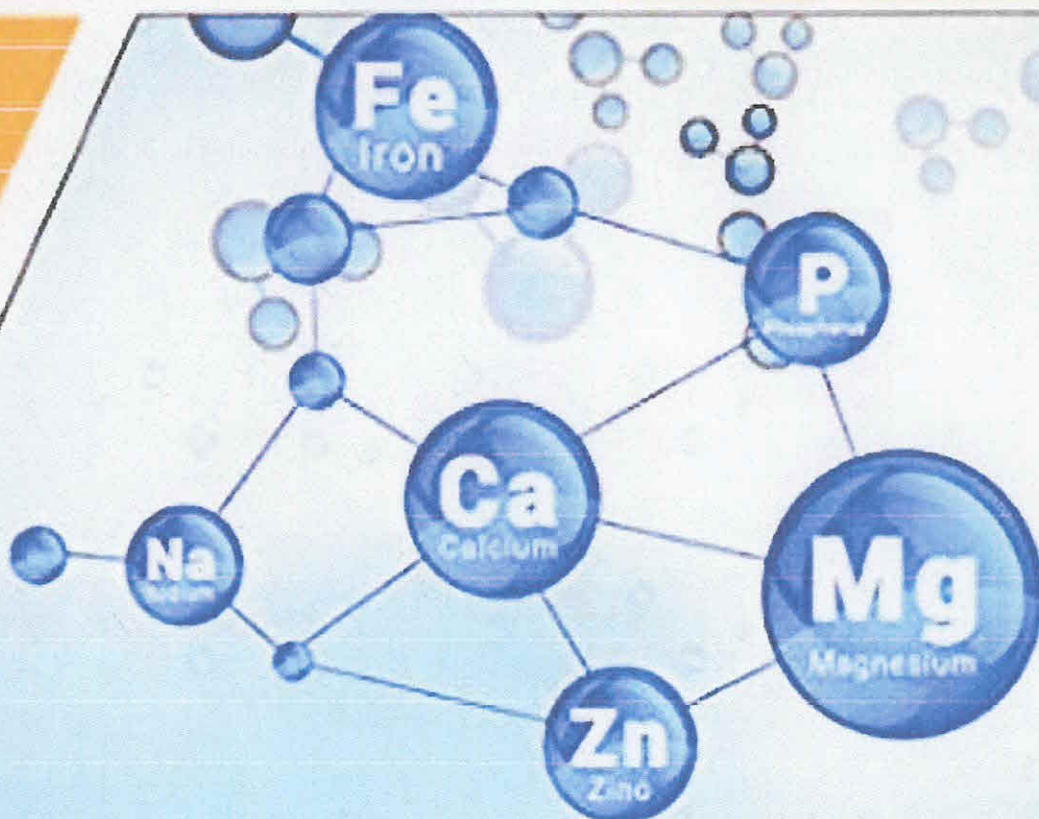
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Contents

1. Limit Tests for Various Ions - Introduction	1.1 - 1.26
1. To perform Limit Test for Chloride	1.2
2. To perform modified Limit Test for Chloride.	1.4
3. To perform Limit Test for Sulphate	1.5
4. To perform modified Limit Test for Sulphate	1.7
5. To perform Limit Test for Iron	1.8
6. To perform Limit Test for Lead	1.11
7. To perform Limit Test for Arsenic	1.15
8. To perform modified Limit Test for Arsenic	1.17
9. To perform Limit Test for Heavy metals	1.21
2. Qualitative Analysis of Inorganic Substances	2.1 - 2.41
10. Magnesium Hydroxide	2.22
11. Ferrous Sulphate	2.25
12. Sodium Bicarbonate	2.29
13. Calcium Gluconate	2.33
14. Copper Sulphate	2.36
3. Tests for Purity	3.1 - 3.6
15. To determine the neutralizing capacity of Aluminium Hydroxide Gel	3.1
16. To determine the Swelling Power of Bentonite	3.2
17. To determine Potassium Iodate and Iodine in Potassium Iodide	3.2
Preparation of Inorganic Pharmaceuticals	4.1 - 4.4
18. To prepare Boric Acid	4.1
19. To prepare Ferrous Sulphate	4.2
20. To prepare Potash Alum	4.3




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Limit Tests

Limit Tests are quantitative or semi-quantitative tests designed to identify or control small quantities of impurities. These tests should be specific and sensitive.

Limit = A value or amount that is likely to be present in a substance.

Test = To examine or to investigate

Impurity = A foreign matter present in a compound

Definition:

Limit test is defined as a quantitative or semi-quantitative test designed to identify and control small quantities of impurities which are likely to be present in the substance.

Importance of Limit Tests:

1. To find out the harmful amount of impurities
2. To find out avoidable / unavoidable amount of impurities.

Types of Limit Tests:

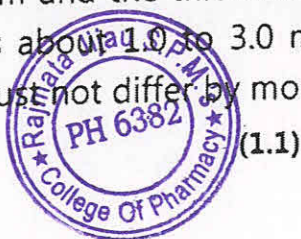
1. Comparison method
2. Quantitative determination
3. Test in which there is no visible reaction

General Principles:

1. If the sample is lighter (in colour/turbidity/opalescence) than the standard solution then it is within the pharmacopoeial limit (accepted).
2. If the sample is darker/heavier than the standard solution then it is above the pharmacopoeial limit (rejected).
3. **Specificity of a Limit Test:** A given limit test for a trace impurity should involve some selective reaction of the reagent with the trace impurity under consideration/detection specifically characteristic only to it.
4. **Sensitivity of a Limit Test:** As most of the limit tests involve dilute solutions and results are based on concentration of the trace impurity, the results may take longer duration to become observable or appreciable. Thus, consideration of duration of test needs to be of prime consideration in designing the limit test.

Nessler's Cylinder (IP appendix VII A127):

It is a clear glass cylinder with normal capacity of 50 ml. However, some Nessler's cylinders are of 100 ml capacity. The overall height is about 15 cm, the external height to the 50 ml mark is 11.0 to 12.4 cm and the thickness of the wall is around 1.0 to 1.5 mm, while, the thickness of the base is about 1.0 to 3.0 mm. The external height to the 50 mark of cylinders used for the test must not differ by more than 1 mm in the given pair.

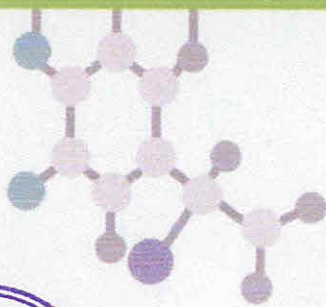


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Experimental Pharmaceutical Organic Chemistry

a benchtop manual



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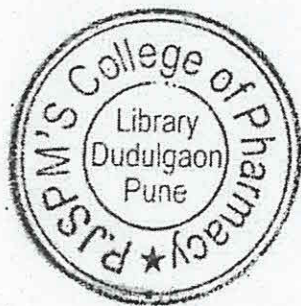
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CONTENTS

1)	Safety in Laboratory	9
2)	Treatment Procedures For Various Types of Injuries	12
3)	Laboratory Techniques	....	15
4)	Qualitative Organic Analysis	....	28
	A) Preliminary Examination/Preliminary Test	....	32
	B) Detection of Elements/Elemental Analysis	....	43
	C) Detection of Functional Group	....	49
	D) Derivative Preparation	....	87
	E) Determination of Physical constants	....	104
	F) Separation of Binary Mixture	....	124
5)	Estimation of Functional Groups	....	130
6)	Analysis of Oils	....	148
7)	Organic Syntheses	....	155
8)	Viva Voce Questions and Answers	....	177
9)	Common Laboratory Regents	....	185
10)	Index	....	187



1.

Safety in Laboratory

Safety is of prime importance while working in laboratories, especially chemistry laboratories. Any disregard to safety can lead to serious accidents and injuries. Following safety precautions in the form of Do's and Don'ts should be exercised while working in the laboratory, handling of chemicals, solvents, glasswares, labware and equipments. Systematic, methodical and organised work will give good results, while haphazard and casual approach may lead to failures and accidents.


Do's

1. Always familiarise yourself with laboratory safety procedures.
2. Always wear safety goggles for eye protection.
3. Always dress sensibly and wear a laboratory apron (girl candidates should not allow *dupatta* to come out of the apron).
4. Wash your hands thoroughly before leaving the laboratory.
5. Read the instructions before starting.
6. Check whether apparatus is assembled correctly.
7. Handle all chemicals with great care.
8. Keep your working area tidy.
9. Attend to any spills immediately.
10. Ask your instructor in case of doubts.
11. Be careful while using pipette to suck corrosive solutions.
12. Use only matchsticks for lighting burners and not papers.
13. Keep your burner off, when it is not in use.
14. Switch off lights, gas and water taps before leaving laboratory.
15. Use fire extinguisher to put off fire. Do not pour water or blow air on fires caused by organic compounds. Instead put sand on it.

Don'ts

1. Never eat or drink in the laboratory.
2. Never inhale or taste or sniff chemicals.
3. Never fool around or distract your neighbour.
4. Never run around in the laboratory.




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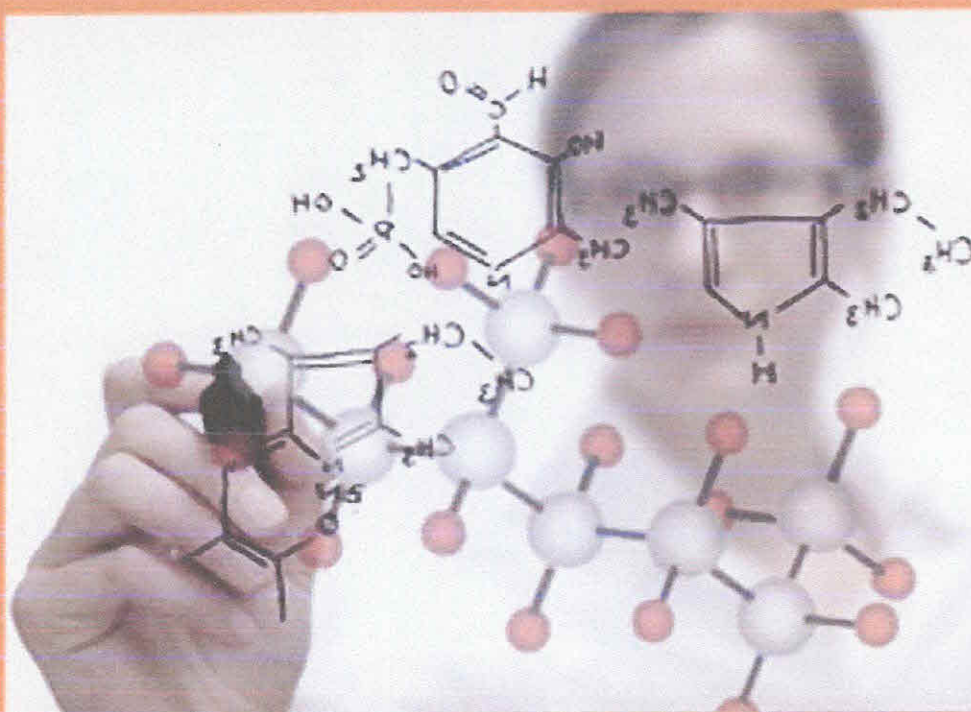
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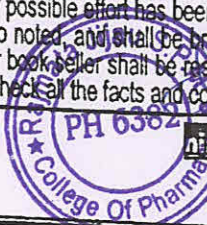
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Contents ...

Stereoisomerism	1.1 – 1.34
1.1 Introduction	1.1
1.2 Stereoisomerism	1.3
1.2.1 Configurational Isomerism	1.3
1.2.2 Conformational Isomerism	1.4
1.3 Optical Isomerism	1.4
1.4 Optical Activity	1.5
1.5 Molecular Symmetry and Chirality	1.7
1.6 Optical Isomers	1.9
1.6.1 Enantiomers and Diastereomers	1.9
1.7 DL System of Nomenclature of Optical Isomers	1.13
1.8 RS System of Nomenclature of Optical Isomers	1.15
1.9 Reactions of Chiral Molecules	1.23
1.9.1 The Stereochemistry of SN2 and SN1 Reactions	1.23
1.9.2 The Stereochemistry of E1 and E2 Reactions	1.24
1.10 Racemic Modification and Resolution of Racemic Mixture	1.27
1.11 Asymmetric Synthesis (Stereoselective Synthesis or the Synthesis of Chiral Molecules)	1.30
• Questions	1.32
Geometrical Isomerism	2.1 – 2.30
2.1 Introduction	2.1
2.2 Nomenclature of Geometrical Isomers	2.2
2.3 Methods of Determination of Configuration of Geometrical Isomers	2.6
2.3.1 Chemical Methods	2.6
2.3.2 Physical Methods	2.7
2.4 Conformational Isomerism	2.9
2.4.1 Newmann Projections	2.9
2.4.2 Sawhorse Projections	2.10
2.4.3 Conformational Isomerism and Conformational Analysis	2.10
2.4.4 Conformations of Ethane	2.11
2.4.5 Conformations of Butane	2.12
2.4.6 Conformations of Cyclohexane	2.14
2.4.7 Equatorial and Axial Bonds in Chair form of Cyclohexane	2.14
2.4.8 Conformation of Cyclohexane - Conformational Analysis	2.20
5 Stereo Isomerism in Biphenyl Compounds (Atropisomerism) and Conditions for Optical Activity	2.22
6 Stereoselective and Stereospecific Reactions	2.24
• Questions	2.28



3. Heterocyclic Compounds - I

- 3.1 Introduction
- 3.2 Nomenclature of Heterocyclic Compounds
- 3.3 Classification of Heterocyclic Compounds
- 3.4 Pyrrole
- 3.4.1 Structure
- 3.4.2 Physical Properties
- 3.4.3 Synthesis of Pyrroles
- 3.4.4 Chemical Reactions
- 3.4.5 Medicinal uses of Pyrrole
- 3.5 Furan
- 3.5.1 Structure
- 3.5.2 Physical Properties
- 3.5.3 Synthesis of Furan
- 3.5.4 Chemical Reactions
- 3.5.5 Medicinal uses of Furan
- 3.6 Thiophene
- 3.6.1 Structure
- 3.6.2 Physical Properties
- 3.6.3 Synthesis of Thiophene
- 3.6.4 Chemical Reactions
- 3.6.5 Medicinal uses of Thiophene
- 3.7 Relative Aromaticity and Reactivity of Pyrrole, Furan and Thiophene
- Questions

4. Heterocyclic Compounds - II

- 4.1 Pyrazole
- 4.1.1 Structure
- 4.1.2 Physical Properties
- 4.1.3 Synthesis of Pyrazole
- 4.1.4 Chemical Reactions
- 4.1.5 Medicinal uses of Pyrazole
- 4.2 Imidazole
- 4.2.1 Structure
- 4.2.2 Physical Properties
- 4.2.3 Synthesis of Imidazole
- 4.2.4 Chemical Reactions
- 4.2.5 Medicinal uses of Imidazole
- 4.3 Oxazole
- 4.3.1 Structure
- 4.3.2 Physical Properties



4.4	Thiazole	4.15
4.4.1	Structure	4.15
4.4.2	Physical Properties	4.16
4.4.3	Synthesis of Thiazole	4.16
4.4.4	Chemical Reactions	4.16
4.4.5	Medicinal uses of Thiazoles	4.17
4.5	Pyridine	4.18
4.5.1	Structure and Physical Properties	4.18
4.5.2	Electrophilic Attack at Positions 3 and 5	4.18
4.5.3	Synthesis of Pyridine	4.19
4.5.4	Chemical Properties	4.20
4.5.5	Medicinal uses of Pyridine	4.23
4.6	Quinoline	4.24
4.6.1	Structure, Reactivity and Orientation	4.24
4.6.2	Synthesis of Quinoline	4.25
4.6.3	Chemical Properties	4.28
4.6.4	Medicinal uses of Quinoline	4.31
4.7	Isoquinoline	4.31
4.7.1	Structure	4.31
4.7.2	Physical Properties	4.31
4.7.3	Synthesis of Isoquinoline	4.32
4.7.4	Chemical Reactions	4.32
4.7.5	Medicinal uses of Isoquinoline	4.34
4.8	Acridine	4.35
4.8.1	Structure	4.35
4.8.2	Physical Properties	4.35
4.8.3	Synthesis of Acridine	4.35
4.8.4	Chemical Reactions	4.35
4.8.5	Medicinal uses of Acridine	4.36
4.9	Indole	4.36
4.9.1	Structure	4.36
4.9.2	Physical Properties	4.36
4.9.3	Synthesis of Indole	4.37
4.9.4	Chemical Reactions of Indole	4.39
4.9.5	Medicinal uses of Indole	4.41
4.10	Basicity of Pyridine	4.42
4.11	Pyrimidine	4.43
4.11.1	Synthesis of Pyrimidine	4.43
4.11.2	Pyrimidine: Biological Activity	4.44
4.12	Purine	4.44
	• Questions	4.45



5. Reactions of Synthetic Importance

- 5.1 Metal Hydride reduction by Sodium Borohydride (NaBH_4) and Lithium Aluminium Hydride (LiAlH_4)
 - 5.2 Clemmensen Reduction
 - 5.3 Wolf Kishner Reduction
 - 5.4 Birch Reduction
 - 5.5 Oppenauer-Oxidation
 - 5.6 Dakin Reaction
 - 5.7 Claisen-Schmidt Condensation
 - 5.8 Schmidt Rearrangement
 - 5.9 Beckmann Rearrangement
- Questions

5.1 - 5.1



A handwritten signature in blue ink, appearing to be "Sant".

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STEREOISOMERISM

◆ LEARNING OBJECTIVES ◆

After completing this chapter, reader should be able to understand:

- Optical isomerism – Optical Activity
- Enantiomerism
- Diastereoisomerism
- Meso Compounds
- Elements of Symmetry
- Chiral and Achiral Molecules
- DL System of Nomenclature of Optical Isomers, Sequence Rules
- RS System of Nomenclature of Optical Isomers
- Reactions of Chiral Molecules
- Racemic Modification and Resolution of Racemic Mixture
- Asymmetric Synthesis: Partial and Absolute

1.1 INTRODUCTION

Stereochemistry is a branch of organic chemistry which deals with structure of compounds in three dimensions and hence can be termed as chemistry or study of compounds with respect to the arrangements and movements of different atoms or group of atoms in space. The word is derived from Greek word (Stereos = "three"-dimensionality).

Stereochemistry also deals with stereo-isomerism and stereo-chemical reactions of organic compounds.

Founders of Stereochemistry:




		
<p>Biot realized in 1815 that the solutions of many naturally occurring compounds rotate the plane of polarization of plane polarized light.</p>	<p>Pasteur recognized in 1850 that the optical activity was caused by an asymmetric arrangement of atoms in a molecule.</p>	<p>van't Hoff with Le Bel described in 1874 how the atoms of a molecule are actually arranged in space.</p>

Fig. 1.1: Founders of Stereochemistry



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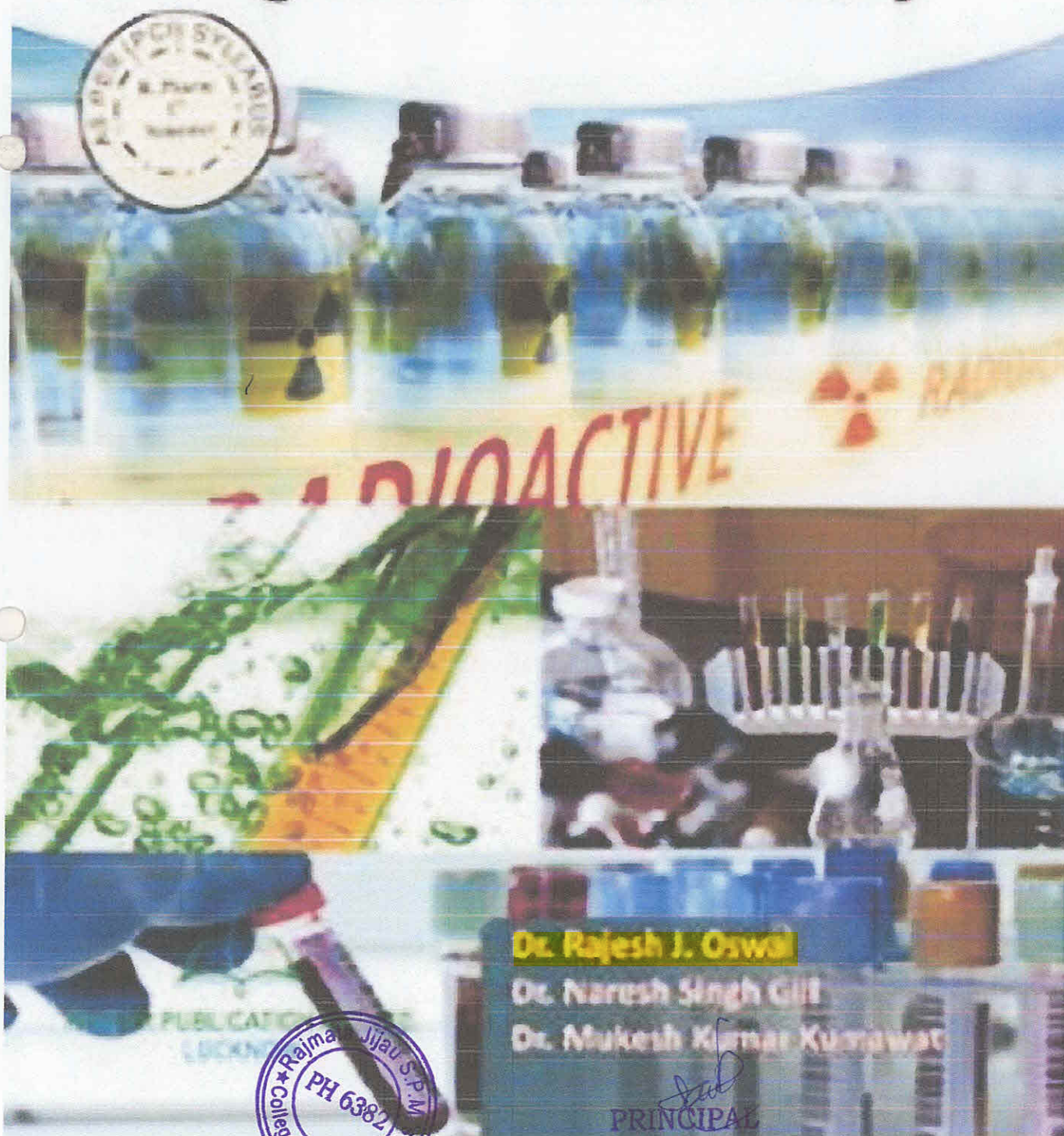
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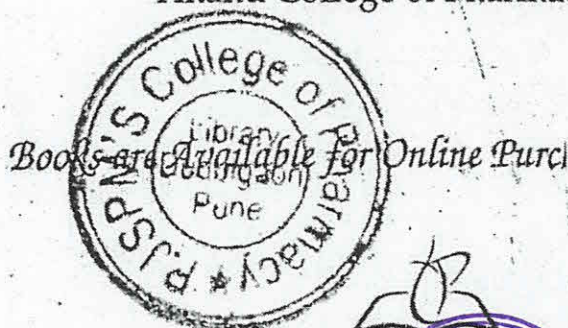
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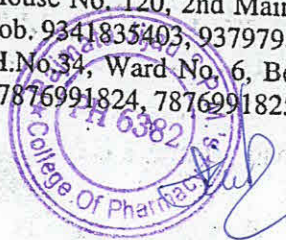
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Contents

Chapter 1: Impurities in Pharmaceutical Substances

1.1.	Pharmacopoeia	
1.1.1.	Introduction	11
1.1.2.	Indian Pharmacopoeia (I.P.)	11
1.2.	Impurities in Pharmaceutical Substances	16
1.2.1.	Introduction	16
1.2.2.	Types of Impurities	16
1.2.3.	Pharmaceutical Impurities	17
1.2.4.	Quality Control of Impurities	24
1.3.	Summary	25
1.4.	Exercise	25

Chapter 2: Limit Tests

2.1.	Limit Tests	
2.1.1.	Introduction	27
2.1.2.	Factors Affecting Limit Tests	27
2.1.3.	Limit Test for Chloride (I.P. 1995)	28
2.1.4.	Limit Test for Sulphate (I.P. 1996)	29
2.1.5.	Limit Test of Iron (I.P. 1996)	31
2.1.6.	Limit Test for Arsenic (I.P. 1996)	32
2.1.7.	Limit Test for Lead (I.P. 1996)	34
2.1.8.	Limit Test for Heavy Metals (I.P. 1996)	35
2.2.	Summary	37
2.3.	Exercise	38

Chapter 3: Acid, Bases and Buffers

3.1.	Acids and Bases	
3.1.1.	Introduction	40
3.1.2.	Theories	40
3.1.3.	Pharmaceutical Importance of Acids and Bases	45
3.2.	Buffers	45
3.2.1.	Introduction	45
3.2.2.	Buffer Capacity	46
3.2.3.	Buffer Equation (Henderson-Hasselbalch Equation)	46
3.2.4.	Characteristics of Buffer Solution	48
3.2.5.	Types of Buffer Solution	48
3.2.6.	Buffers in Pharmaceutical Systems	48
3.2.7.	Buffered Isotonic Solutions	51
3.2.8.	Pharmaceutical Importance of Buffers	57
3.3.	Summary	58
3.4.	Exercise	60

Chapter 4: Major Extracellular and Intracellular Electrolytes

4.1.	Major Extra & Intracellular Electrolytes	
4.1.1.	Introduction	61
4.1.2.	Electrolytes	62
4.1.2.1.	Physiological Importance of Electrolytes	63
4.1.2.2.	Classification of Electrolytes	64
4.1.2.3.	Intracellular Compartment	64



4.1.2.4.	Extracellular Compartment	64
4.1.2.5.	Transcellular Compartment	65
4.1.3.	Functions of Major Physiological Ions	66
4.1.3.1.	Chloride	67
4.1.3.2.	Phosphate	67
4.1.3.3.	Bicarbonate	68
4.1.3.4.	Sodium	68
4.1.3.5.	Potassium	69
4.1.3.6.	Calcium	70
4.1.3.7.	Magnesium	71
4.1.3.8.	Role of Physiological Ions	72
4.1.4.	Electrolytes Used for Replacement Therapy	72
4.1.4.1.	Sodium and Potassium Replacement	72
4.1.4.2.	Sodium Chloride (NaCl)	73
4.1.4.3.	Potassium Chloride (KCl)	75
4.1.4.4.	Parenteral Magnesium Administration	76
4.1.4.5.	Calcium Replacement	76
4.1.4.6.	Calcium Gluconate (C ₁₂ H ₂₂ CaO ₁₄)	77
4.1.5.	Dialysis Fluids	78
4.1.6.	Physiological Acid Base Balance	79
4.1.7.	Electrolyte Combination Therapy	82
4.2.	Summary	85
4.3.	Exercise	86

Chapter 5: Dental Products

5.1.	Dental Products	88
5.1.1.	Introduction	88
5.1.2.	Cleaning Agents	88
5.1.3.	Dentifrices	89
5.1.4.	Anticaries Agents/Fluorides	92
5.1.5.	Desensitising Agents	96
5.1.6.	Cement and Fillers	97
5.1.7.	Oral Antiseptics and Astringents	98
5.1.8.	Polishing Agents/Abrasive Agents	98
5.2.	Summary	98
5.3.	Exercise	99

Chapter 6: Gastrointestinal Agents

6.1.	Gastrointestinal Agents	101
6.1.1.	Introduction	101
6.1.2.	Acidifiers	101
6.1.3.	Antacids	105
6.1.3.1.	Ideal Properties	105
6.1.3.2.	Classification	106
6.1.3.3.	Limitations	106
6.1.3.4.	Examples	106
6.1.3.5.	Sodium Bicarbonate (Baking Soda, NaHCO ₃)	106
6.1.3.6.	Aluminium Hydroxide Gel (Amphojel, Al(OH) ₃)	107
6.1.3.7.	Magnesium Hydroxide Mixture (Milk of Magnesia, Mg(OH) ₂)	108
6.1.3.8.	Combinations of Antacids	109
6.1.4.	Cathartics	110
6.1.4.1.	Classification	111



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Chapter 1

Impurities in Pharmaceutical Substances

1.1. PHARMACOPOEIA

1.1.1. Introduction

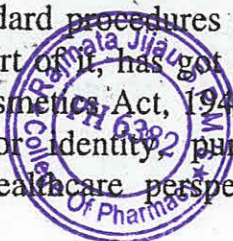
For preparation of medicines there is a requirement of specific directions, which are written in a book known as **Pharmacopoeia**. Usually a pharmacopoeia is published by a concerned authority, and is established by the government. Therefore, pharmacopoeia is a legislation of a country responsible for setting standards as well as parameters related to quality and quantity of drugs, and raw materials required for the preparation of several pharmaceutical formulations.

Pharmacopoeia is a collection of drugs and therapeutic substances with directions and methods for preparation. Pharmacopoeia means a **book of standards applicable to drugs and their common dosage forms and pharmaceutical aids published in a country under the authority of its own government.**

Most of the advanced countries have their own Pharmacopoeias. For example, Indian Pharmacopoeia (I.P.) and British Pharmacopoeia (B.P.) are published under the authority of respective governments. The first British Pharmacopoeia was published in the year 1864 and many editions of this book have published since then. United States Pharmacopoeia (U.S.P.) published in U.S.A. is another important book in this regard.

1.1.2. Indian Pharmacopoeia (I.P.)

Indian Pharmacopoeia (I.P.) is an official document meant for overall quality control and assurance of pharmaceutical products marketed in India by way of contributing on their safety, efficacy, and affordability. I.P. contains a collection of standard procedures of analysis and specifications for drugs. The I.P. or any part of it, has got legal status under the Second Schedule of the Drugs & Cosmetics Act, 1940 and Rules 1945 thereunder. I.P. prescribes standards for identity, purity, and strength of drugs essentially required from healthcare perspective of human beings and



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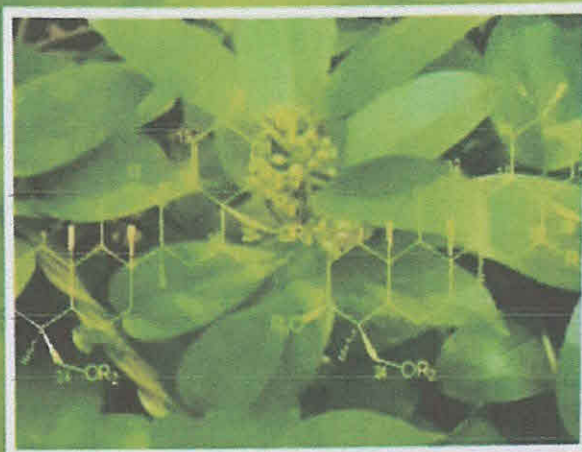
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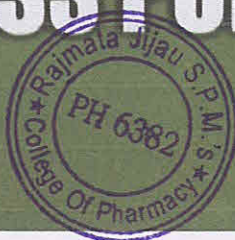
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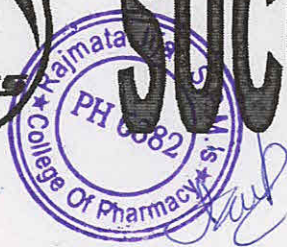
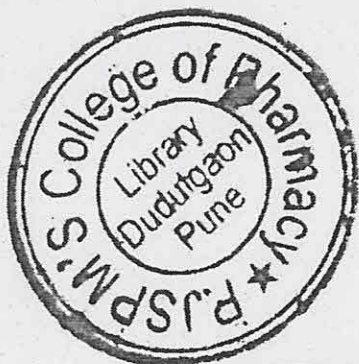
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Index

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Practical Handbook of Pharmacognosy and Phytochemistry-II

Sr. No.	Name of Experiment	Page No.
-	To identify the following crude drugs by -	-
	1) Morphology,	-
	2) Microscopy and	-
	3) Powdered Characteristics Study	-
1	Rauwolfia	1
2.	Datura	7
3.	Cinchona	13
4.	Clove	19
5.	Comparative study of Cassia and Cinnamon barks	24
6.	To determine Specific Gravity of given sample	32
7.	To determine Refractive Index of given sample	33
8.	To determine specific rotation of given sample	34
9.	To determine total alkaloidal content of Nux vomica seeds	37
10.	To determine Reserpine content of Rauwolfia roots by photometric method	38
11.	To isolate Caffeine from the given sample of tea powder	39
12.	To determine total Tropane alkaloids by UV-visible Spectrophotometer	40
13.	To extract the Clove oil from Clove flower bud powder	41
14.	To isolate Eugenol from Clove oil	44
15.	To identify the given unorganized drug (Guggul) by-	45
	1) Organoleptic characteristic	-
	2) Chemical reactions	-



Experiment No. 1**PART A:****OBJECTIVE:**

To identify the given crude drug by

- 1) Morphology
- 2) Microscopy and
- 3) Microchemical reactions

REQUIREMENTS:**Apparatus:**

Simple and compound microscope, watch glass, test tubes, test tube stand, sharp blade, cover slips, micro slides, beaker, filter paper, scale, forceps, needle, etc.

Chemicals:

Dr. sample, phloroglucinol reagent, dil. acetic acid, sulphuric acid (60% w/w), iodine solution, strong KOH solution, sudan red III, conc. HCl, alcoholic picric acid and ruthenium red.

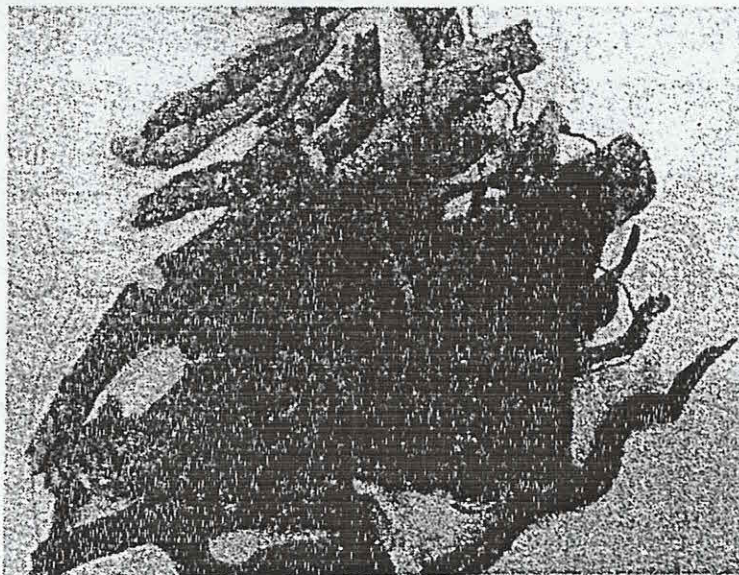
MORPHOLOGY AND MICROSCOPY:

Fig. *Rauwolfia serpentina*



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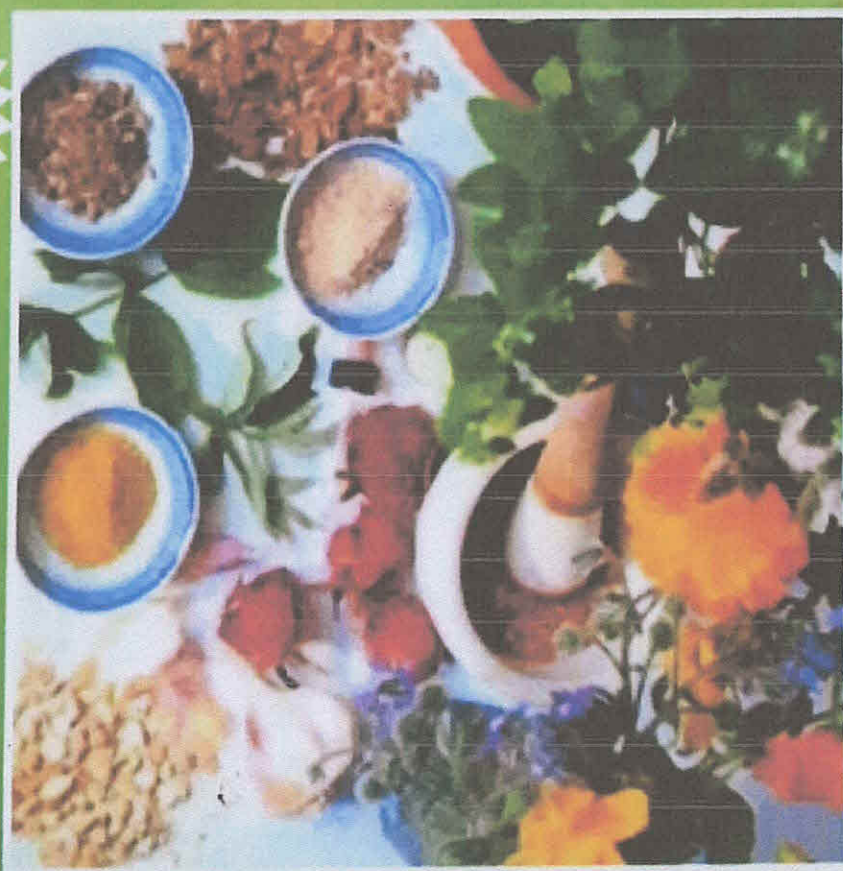
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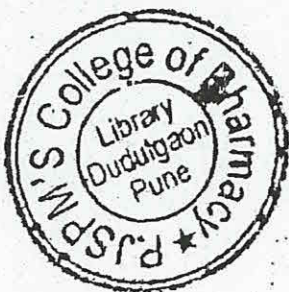
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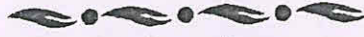
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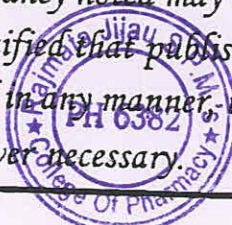
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Index


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Sr. No.	Name of Experiment	Page No.
1.	To Prepare Permanent Slides.	1
	To identify the given crude drug by 1. Morphology 2. Histology and 3. Histochemical reactions	
2.	Senna	2
3.	Kalmegh	8
4.	Liquorice	13
	To identify the given unorganized drug by 1. Organoleptic characteristic 2. Chemical reactions	
5.	Agar	19
6.	Acacia	22
7.	Tragacanth	25
8.	To identify the fibres.	27
9.	To determine swelling index of mucilage containing crude drugs.	32
10.	To extract and isolate Mucilage from Isabgol	33
11.	To extract and isolate Pectin from Citrus peels	34
12.	To perform characterization of starches by microscopic technique	35
13.	To determine Acid value of a fat.	37
14.	To determine Specific Gravity of given sample.	38
15.	To determine Refractive Index of given sample	39
16.	To determine melting point of Fat.	41
17.	To estimate Tannin content of given sample by Spectrophotometer.	43

~ iv ~




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Experiment No. 1**OBJECTIVE :**

To Prepare Permanent Slides.

REQUIREMENTS:**Apparatus:**

Simple and compound microscope, watch glass, test tubes, test tube stand, sharp blade, cover slips, micro slides, beaker, filter paper, scale, forceps, needle, etc.

Chemicals: Drug sample, staining solution, glycerin water etc.

PROCEDURE:**Staining Process :**

1. Take a clean watch glass. Add safranin to it and transfer a thin uniform section . Treat it for 10 mins
2. Take a watch glass containing 50% alcohol. Transfer the section from safranin to 50 % alcohol and keep for 05 mins
3. Transfer the section in watch glass containing water and keep it for 05 mins. This washing removes stain from the cellulose part.
4. Transfer the Safranin stained section to a watch glass containing dilute haematoxylin and treat it for 02 mins
5. Transfer to a watch glass containing water for washing
6. For dehydration treat the stained sections with increasing strengths of alcohol for one minute in each strength, starting with 30 % alcohol till 100 %.
7. Place the dehydrated section on a glass slide and add a few drops of. Canada balsam dissolved in xylol
8. Slightly warm the slide or keep for drying in sun in a dust free place.
9. As the solvent evaporates the balsam fixes the section on the glass slide
10. Label the slide properly and submit

Questions:

1. Give the staining reagents used for Permanent slide preparation.
2. Explain the detail staining process.
3. Give the applications of Permanent slides in microscopical examination.



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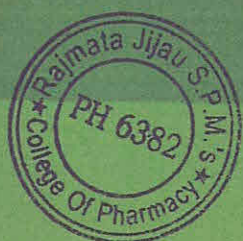
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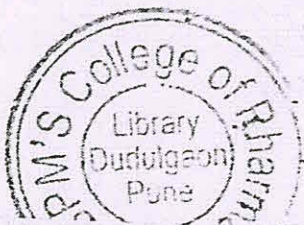
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INDEX

UNIT - I		
1	Biology & Pharmaceutical Sciences	1 to 6
	1.1 Biology 1.2 Important Branches of Biology 1.3 Under-disciplinary Subjects of Biology 1.4 Applied Biology 1.5 Applied Botany (Economic Botany) 1.6 Relevance of Biology to Pharmaceutical Sciences	
2	Principles of Genetics	7 to 16
	2.1 History of DNA 2.2 DNA Structure 2.3 Replication in DNA 2.4 DNA Transcription : 2.5 Genetic Code 2.6 Translation 2.7 Mendelian Genetics	
3	Plant Cell and Cell Division	17 to 27
	3.1 Plant Cell 3.2 Ergastic Cell Contents: (Non Living Cells) 3.3 Cell Division - Mitosis and Meiosis	
UNIT - II		
1	Cell Differentiation & Plant Tissues	28 to 42
	1.1 Plant Tissues 1.2 Meristematic Tissues 1.3 Permanent Tissues 1.4 Primary Growth 1.5 Secondary Growth	



2	Plant Description, Morphology and Anatomy	43 to 60
	2.1 Barks 2.2 Woods 2.3 Leaf 2.4 Root 2.5 Seed 2.6 Fruits 2.7 Flowers 2.8 Inflorescences	
UNIT - III		
1	Plant Physiology	61 to 75
	1.1 Mode of nutrition 1.2 Photosynthesis 1.3 Chemosynthesis 1.4 Plant growth regulators (phytohormones)	
2	Plant Taxonomy	76 to 84
	2.1 Need of Classification 2.2 Historical Account of Contribution to Botanical Systems of Classification 2.3 Artificial and Natural Methods of Classification 2.4 Divisions of Plant Kingdom 2.5 Binomial Nomenclature	
UNIT - IV		
1	Ecology and Environment	85 to 111
	1.1 Ecosystems 1.2 Components of Ecosystem 1.3 Types of Ecosystems 1.4 Ecological Succession 1.5 Energy Flow 1.6 Food Chain 1.7 Food Web 1.8 Vegetation Types of the World	



	1.9 Pollution 1.10 Speciation and Extinction 1.11 Conservation Strategies 1.12 Phytoremediation 1.13 Western Ghat Biodiversity	
2	Application of Genetics to Crop Improvements	112 to 116
	2.1 Hybridization 2.2 Mutation 2.3 Polyploidy	
3	Introduction to Pharmacognosy	117 to 122
	3.1 Defination 3.2 History 3.3 Scope of Pharmacognosy 3.4 Classification of Crude Drug	



Biology & Pharmaceutical Sciences

- 1.1 Biology
- 1.2 Important Branches of Biology
- 1.3 Under-disciplinary Subjects of Biology
- 1.4 Applied Biology
- 1.5 Applied Botany (Economic Botany)
- 1.6 Relevance of Biology to Pharmaceutical Sciences

1.1 Biology:

It is the branch of science deals with the study of living things. It is derived from two Greek words i.e. *bios* means life and *logos* means branch of study.

Defining a living thing is a difficult proposition, as is defining "life"—that property possessed by living things. However, a living thing possesses certain properties that help define what life is.

Living things possesses properties like Responsiveness, Metabolism, Growth, Respiration, Reproduction, etc

Biology also includes the study of evolutionary relationships among organisms and the diversity of life on Earth.

It considers the biology of microorganisms, plants, and animals, for example, and it brings together the structural and functional relationships that underlie their day-to-day activities.

Biology draws on the sciences of chemistry and physics for its foundations and applies the laws of these disciplines to living things.

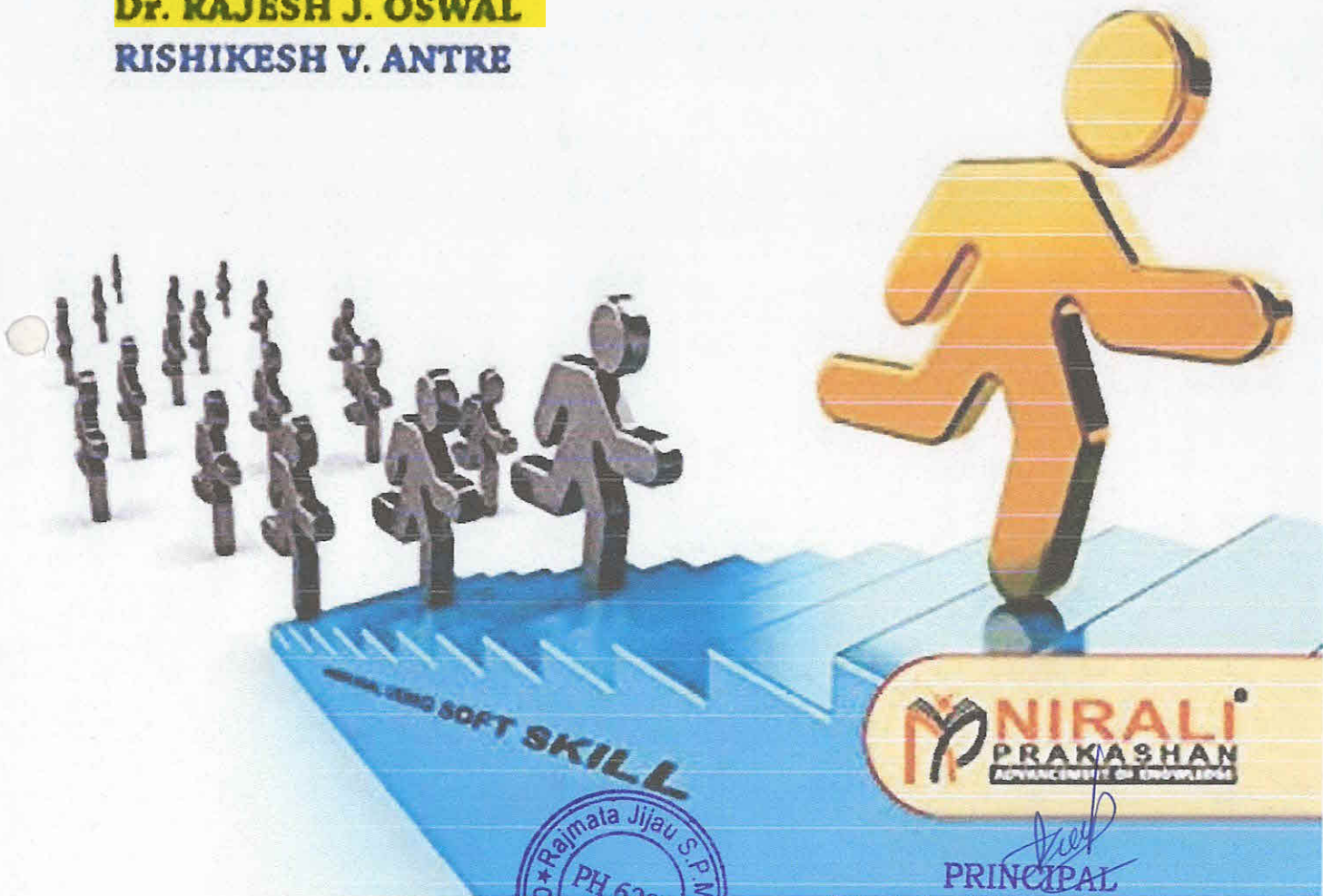
Biology is subdivided into separate branches for convenience of study:

- a) **Botany:** Study of plants (*botane* means herbs)



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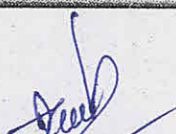
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Contents ...

1. Introduction to Language and Communication	1.1 - 1.48
2. Channels of Communication	2.1 - 2.18
3. Writing	3.1 - 3.42
4. Technical Communication	4.1 - 4.10
5. Business Communication	5.1 - 5.14
6. Career Skills	6.1 - 6.22
7. Formal Written Skills	7.1 - 7.12
8. Introduction to Phonetics	8.1 - 8.6
9. Soft Skills	9.1 - 9.10
10. Modern Technology and Communication	10.1 - 10.24




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3.3.2 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

Sr. No.	Name of the teacher	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	Dr J. S. Dhumal	Comparative HPTLC Study on Isolated Fractions From Seeds of Vigna Mungo and Vigna Radiata	Ethnopharmacology & Medicinal Plants – Approach Towards Product Development	8th SFEC2021	International Conference	2021-22	-	RJSPM's College of Pharmacy	Society For Ethnopharmacology
2	Mr. A. B. Kumbhar	Nanopposite for Periodontal Disease	Ethnopharmacology & Medicinal Plants – Approach Towards Product Development	8th SFEC2021	International Conference	2021-22	-	RJSPM's College of Pharmacy	Society For Ethnopharmacology



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3	Dr J. S. Dhumal	Effect of Different Treatments on Extraction of Bioactive Compounds From Seeds of Vigna Mungo L Hepper	Multidisciplinary Healthcare Research: Challenges, Opportunities and Newer Directions	Savitribai Phule Pune University Sponsored	International Conference	2018-19	2249-1023	RJSPM's College of Pharmacy	Progressive Education Society's Modern College of Pharmacy
4	Mr. A. B. Kumbhar	Antibiotic Loaded NC Scaffolds	Multidisciplinary Healthcare Research: Challenges, Opportunities and Newer Directions	International Conference	Savitribai Phule Pune University Sponsored International Conference	2018-19	2249-1023	RJSPM's College of Pharmacy	Progressive Education Society's Modern College of Pharmacy




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ideal drug delivery system for the posterior segment of the eye. Due to the various advantages of nanomedicines over conventional dosage forms, and the ability to effectively surpass the ocular barriers, we have developed Poly (lactic-co-glycolic acid) (PLGA) nanoparticles for the delivery of hydrophobic immunosuppressant drug at the back of the eye. Nevertheless, the benefits (small size/large surface area) offered by the nanoparticles may also turn into potential toxic effects if the preparation stage is not focused upon. This is where Quality by Design (QbD) approach comes into play. We have therefore, optimized our nanoformulation via Box–Behnken design, Design Expert Software (Statease, version 9.0.1, Minneapolis, MN), keeping concentration of polymer/ stabilizer and sonication time as independent variables and size/polydispersity index and entrapment efficiency as dependent variables. The hydrodynamic diameter of the nanoparticles analysed using Zetasizer Nano ZS (Malvern Instruments, UK) was found in the range of 200-500nm. The same was characterized in terms of zeta potential, morphology, Differential Scanning Calorimetry, Fourier Transform Infrared spectroscopy and X-ray Diffraction analysis. Owing to its tailor-made properties, we believe that the developed nanoformulation would deliver the loaded cargo at the target site in a sustained manner with no potential side-effects and hence, can be efficiently utilized in the management of AMD.

P-93

Comparative HPTLC study on isolated fractions from seeds of *Vigna mungo* and *Vigna radiata*

Priyanka Bagade¹, Dr Jeevan Dhumal¹, Prof. Dr R.G.Katedeshmukh², Amol Kumbhar²

¹Department of pharmaceuticals, RJSPMCO, Dudulgaon Pune, ²Department of Pharmacognosy RJSPMCO, Dudulgaon Pune.

Two species of vigna were selected for the study. Seeds of both plants *Vigna mungo* and *Vigna radiata* were taken for the study. Seeds were extracted by using ethanol water as a solvent in Soxhlet apparatus. Total Phenolic content, total flavonoid content and total alkaloid contents were determined. These extracts were further subjected to the Column chromatography for separation of constituents using n-hexane, chloroform and methanol as a solvent. Isolated fractions were collected and subjected to the HPTLC analysis. HPTLC analysis was performed to determine the presence of phenolic compounds, and saponins compounds. *Vigna radiata* and *Vigna mungo* extracts showing presence of phenolic content. The total phenolic content of the EE *Vigna mungo* was 20.0 ± 5.28 Gallic acid equivalents/g. While phenolic content of EE *Vigna radiata* was found to be 20.51 ± 5 . The total flavonoid content of EE *Vigna mungo* extracts was 166.7 ± 3.66 Flavonoid content of EE *Vigna radiata* was showing 175.0 ± 3.64 quercetin equivalents/g. The total alkaloid content of *Vigna mungo* EE 121.9 ± 3.77 Atropine equivalents/g. Total alkaloid content of EE and EEH of *Vigna radiata* was found to be 98.2 ± 4.0 . In column chromatography total two fractions VMF1 and VMF2 from *Vigna mungo* and VMR1 and VMR2 from *Vigna radiata* were isolated. HPTLC analysis showing presence of phenolic compounds and saponins in isolated fractions.

P-94

Managing stressful conditions due to covid pandemic using herbal medicine

Momin Armash Zakir¹, Subhash Bondhankar¹, Urmila Aswar¹, Rashmi Patil¹

¹Department of Pharmacology, Bharti Vidyapeeth (deemed to be University) Poona College of Pharmacy, Pune

COVID-19 is a contagious disease caused SARS-C-oV-2. The pandemic caused negative social economic consequences and traumatic experiences which aggravated mental health illnesses like stress. CNS and play an important role in behavior and cognition and stress disrupts it by altering the morphology and function of the hippocampus. It leads to activation of the sympathetic nervous system and hypothalamic pituitary adrenal (HPA) axis. It causes an increase in levels of IL-6 and plasma cortisol, norepinephrine (NE), Acetylcholine (Ach) and 5-Hydroxytryptamine (5HT) release. Alongside decreased amounts of cAMP, responsive element binding protein and brain-derived neurotrophic factor (BDNF) are observed. It also impairs the immune system leading to frequent illness. No specific family of medicines is classified under the antistress category, but sedative medication and beta-blockers are given for symptomatic relief. Due to their soporific effect, they are not advisable for long term use. In past years herbal medicine has gained exponential growth in the field of medicine and proved to be effective in stress. The present review will discuss in detail the plants *Withania somnifera*, *Ocimum sanctum*, *Rosa moschata*, *Piper Methysticum*, *Centella asiatica* and *Ginko biloba*, their stress relieving action, that can be beneficial in post covid stress conditions due to their potent antioxidant, anti-inflammatory and neuroprotection actions.





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pneumonia, as well as stomach ulcer. In India, this plant is popularly used as healthy vegetable and sold in markets especially in North-eastern Region. However, many adulterants are marketed due to their lower costs or misidentification of species with similar morphological features. Therefore, correct identification of planting material is crucial for safety of herbal products. In present study, we have performed DNA barcoding of *Houttuynia cordata* collected from Meghalaya and Manipur States of NER. Genomic DNA was isolated from leaf samples collected from different locations from Meghalaya and Manipur. DNA barcodes were amplified using Maturase K (matK), chloroplast intergenic spacer (trnH-psbA), Internal transcribed spacer (ITS), and ribulosebiphosphate carboxylase (rbcl) regions. Phylogenetic trees were also constructed following the neighbour joining (NJ) method, based on ITS, rbcl, matK and trnH-PsbA which clearly distinguish this species. The availability of these DNA barcodes for this medicinal and edible plant species will be helpful for correct identification of its raw material and control market adulteration.

P-213

Beneficial effect of Phospholipase A2 group IIA inhibitors from *Acacia suma* in obesity: an in silico and in vitro study

Nikita Kanbarkar¹, Dr. Sanjay Mishra¹

¹KAHER's Dr. Prabhakar Kore Basic Science Research Center, KLE Academy of Higher Education & Research (KLE University), Nehru Nagar, Belagavi, 590010, Karnataka, India.

In present study effort has made to find a possible novel therapeutic solution for the management of obesity disorders by non-animal model. *Acacia suma* Roxb. (Fabaceae) is an Ayurvedic medicinal plant distributed in Karnataka, Bengal and Bihar region. Phytoconstituents of *Acacia suma* were retrieved from ChEBI databases and queried for phospholipase A2 group IIA inhibitors. Out of 29 reported compounds three were identified in modulating phospholipase A2 group IIA inhibitor their drug likeness score and probable gene expression was identified. Docking study was performed using Autodock 4.0 to predict binding affinity of phytoconstituents with phospholipase A2 group IIA inhibitor and compared with clinically proven drug 'Orlistat' as lipase inhibitor. The respected pathway to show networking between phytochemicals and target were analysed by Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway analysis for regulated genes. Further, in silico findings were validated for hydroalcoholic extract of *Acacia suma* by In vitro lipase inhibition assay. Molecular docking result revealed the presence of three flavonoid compounds for lipase inhibition activity (1) (5S,7R,8R,9R,10S)-(-)-7,8-seco-7,8-oxacassa-13,15-diene-7,17-diol (2) Fisetinidol-(4 α ,6)-gallocatechin and (3) Quercetin 4'-O- α -L-rhamnopyranosyl-3-O- α -D-allopyranoside. However, Quercetin 4'-O- α -L-rhamnopyranosyl-3-O- α -D-allopyranoside was predicted to possess the highest docking score i.e. -7.6 Kcal/mol with phospholipase A2 group IIA. The in vitro study findings revealed significant anti-lipase activity with IC₅₀ value 46.07 μ g/ml. The in silico and in vitro approaches has presented strong binding affinity and significant lipase inhibition activity respectively which supports anti-obesity potential of heart wood hydroalcoholic extract of *Acacia suma*. This non-animal model approach may light the future scope of study findings to design effective and safe medicine to control and prevent obesity.

P-214

Antibiotic Loaded Nanocomposites for Periodontal Disease

Amol Kumbhar¹, Dr. Chaudhari P. D.¹, Dr. Shaikh Karimunnisa¹.
PES'S, Modern College of Pharmacy, Pune¹

Periodontal disease involves the destruction of alveolar bone around the teeth leading to defects or rather loss of the tooth if left untreated. In most cases, tissue regeneration does not happen spontaneously which calls for interventional therapy with bone substitutes. Bone grafts and guided tissue regeneration (GTR) and are the most common approaches. However, the success rate is variable because of the high susceptibility to infection and immunologic response which limits the clinical improvement. Realizing the vital role of synthetic biomaterials with limited immune response and good biological activity, we developed a nanocomposite scaffold by using polymers. Development of nanocomposites having the ability to suppress or eliminate the pathogenic microbiota or modulate the inflammatory response has attracted great interest in order repair periodontal tissue destruction. The prepared nanocomposite scaffolds were characterized using FT-IR, XRD, DLS, TGA, AFM, and SEM. Further, the





porosity, swelling, invitro degradation and biomineralization, cytotoxicity, cell attachment, and cell proliferation were also evaluated. The nanocomposite scaffolds were found to have enhanced porosity, swelling, bioactivity, and degradation in comparison to the control scaffolds. The Nanocomposites scaffolds were non-toxic to human cells and supported cell attachment, spreading, and proliferation. The Nanocomposites scaffolds were found to be satisfactory in all aspects, and these nanocomposite encapsulated antibiotic scaffolds could be promising candidates for the treatment of periodontal disease.

P-215

Comparative extraction and quantification of Scutellarein from leaves of *Triumfetta rhomboidea* by using RP-HPLC

Nutan Kendre¹ Dr. Wakte Pravin¹

¹Department of Chemical Technology, Dr BAM University, Aurangabad

For effective medicine it is important to know exact amount of bioactive in natural products. It is very crucial to develop effective extraction, isolation and quantification methodology for natural products. Here is one attempt, to develop a sensitive, reproducible Reverse Phase High Performance Liquid Chromatography (RP-HPLC) for extraction and quantitative estimation of Scutellarein, major flavone glycoside from leaves of *Triumfetta rhomboidea*. To optimize best solvent system and ideal extraction methodology, various leaves extract was prepared by using different solvent systems such as ethanol, methanol, chloroform and acetone through different extraction methodologies includes, maceration, Soxhlet assisted extraction (SAE), Ultrasound Assisted Extraction (UAE) and Accelerated Solvent Extraction (ASE). Ethanol Solvent systems were found to be most yielded system, showed 9.547 % of extraction which was found to be maximum extraction yield using ASE methodology. In ASE, temperature was set on 75°C at pressure of 75 psi. Two static cycles were completed during the overall extraction process. Scutellarein was quantified by using RP-HPLC, Chromatographic separation of Scutellarein was performed on C18 column, with mobile phase composition, acetonitrile: water (25:75, v/v), adjusted to pH 2.4 with 1M phosphoric acid. The highest concentration of Scutellarein was found to be 1.547 ng in ethanolic extract of leaves of *Triumfetta rhomboidea*. This study states about, existence of flavone glucocidic content in leaves extract of *Triumfetta rhomboidea* which can be extracted using ethanol as best solvent system and ASE as optimized extraction methodology.

P-216

Amlodipine self nano emulsifying drug delivery systems

Mohammed Parveen¹ Dr.Sk.Wajid¹

¹Department of Pharmaceutics, Max Institute of pharmaceutical sciences, khammam, Telangana.

The present study involves the development of SNEDDS employing essential oils for enhancing biopharmaceutical performance. Preliminary investigations suggested the selection of cinnamon oil as an essential oil, tween 60 as a surfactant, while transcutool HP as a co-solvent for formulating SNEDDS. Formulations evaluated for stability, robustness to dilution, and emulsification time, droplet size, zeta potential (ζ), cloud point, in vitro drug release, drug excipients compatibility, TEM, stability assessment, and in vivo pharmacokinetic performance in rats. All formulations were robust, stable, and revealed excellent emulsification time <40s, with fine droplet size (11.41 ± 2.41 nm), lower PDI (0.028-0.277). Formulation F (AML)6 exhibited a release of 97.7% within 4h, and the TEM photograph confirmed spherical droplets. The bioavailability results revealed a higher rate and extent of absorption, AUC, and Cmax for the formulations found to be 1212.4 and 355.40 ± 13.67 ($p < 0.05$). The results recommend that the developed formulation approach offers bioavailability enhancement of AML. The study concluded that SNEDDS would be an effective formulation system in increasing the aqueous solubility and potentially bioavailability. Furthermore, it can be applied for other therapeutic categories of drugs belonging to BCS class II and IV that show comparable biopharmaceutical challenges.

P-217

Ameliorative Effect of *Curcuma longa* against Arsenic Induced Reproductive Toxicity in Charles Foster Rats

Shazia Akhter¹ Dr. Rekha Kumari¹

¹Department of zoology, A. N. College, Patliputra University, Patna, Bihar.

An estimated 70 million population are exposed to arsenic poisoning in India in the recent times. Arsenic contamination in the ground water has caused serious health hazards among the exposed population. In Bihar, the first district was Bhojpur, where



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Scientific Poster Presentation Code: P-PCOG01

Title: MICROSCOPIC AND PRELIMINARY PHYTOCHEMICAL INVESTIGATIONS OF CALLICARPA TOMENTOSA LEAF

Anil N.Tankar*, Rakesh Kumar Jat, K.R.Khandelwal

Institute of Pharmacy, Shri Jagdish Prasad Jhabarmal Tibrewala University, Jhunjhunu, Rajasthan

Abstract:

Purpose: To study microscopic characteristics and preliminary phytochemical investigations of Callicarpa tomentosa leaf belonging to family Lamiaceae. Method: Plant material is collected from Dapoli Kokan region of Maharashtra state. Thin sections of the leaf specimen were taken by using rotary microtome. Physical parameters are determined as per the standard procedure mentioned in Indian Pharmacopoeia. Fluorescence analysis of the leaf sample was carried out under the UV light. The methanol, ethanol, chloroform and ethyl acetate extracts are subjected to qualitative chemical analysis and TLC was performed to determine R_f values. Result: Microscopic study shows thick midrib and thin lamina. Epidermis with few layers of collenchyma cells, large shrunken parenchyma, compact lines of xylem elements and thick layers of phloem elements. Large masses of Calcium Oxalate druses and horse shoe shaped vascular strands are seen. Evaluation of physical constants shows moisture content (3.35 %) Total ash (6.2%). Extractive values determined are water soluble (1.6 %) ethanol soluble (16.2 %), methanol soluble (14.92 %). The components in the extracts detected by quantitative chemical analysis are flavanoids alkaloids, saponins, carbohydrate, tannins and coumarins. Conclusion: The present study reveals information about microscopic characteristics, physical constants and physicochemical screening which will be helpful in pharmacognostic identification of this species.



Scientific Poster Presentation Code: P-PCOG02

Title: EFFECT OF DIFFERENT TREATMENTS ON EXTRACTION OF BIOACTIVE COMPOUNDS FROM SEEDS OF VIGNA MUNGO L HEPPEL

J. S. Dhumal*¹, S. R. Chaudhari², M. J. Chavan¹

1. Amrutvahini Sheti and Shikshan Sanstha's, Amrutvahini College of Pharmacy, Sangamner, Tal- Sangamner, Dist. Ahmednagar, Maharashtra, India 422608

2. Shri Jain Vidya Prasarak Mandal, Rasiklal M. Dhariwal Institute of Pharmaceutical Education and Research, Acharya Anand Rushiji Marg, Telco Road D-2 60-61 Chinchwad Station Pune, Maharashtra, India 411019

Abstract:

Purpose: To determine the content of bioactive compounds present in the Vigna mungo seeds and to study effect of sample pretreatment, fractionation on total alkaloid, total phenolic and total flavonoids content. Materials and methods: Three types of extracts were prepared by using ethanol as a solvent by using Soxhlet extractor. First Ethanolic extract (EE), second extract prepared from pretreated seeds with an acid (EEH) and third fraction from ethanolic extract (EF) were prepared. Total alkaloid content were determined spectrophotometrically by using Bromocresol green using Atropine as a standard. Total phenolic content was estimated spectrophotometrically by using Gallic acid as a standard. Quercetin was used as a standard for estimation of total flavonoids content. Results: The total phenolic content of the EE, EF and EEH extract, was 20.0 ± 5.28 , 21.03 ± 5.04 and 17.8 ± 5.77 Gallic acid equivalents/g respectively. The total flavonoid content of EE, EF and EEH extract was 166.7 ± 3.66 , 304.2 ± 3.48 and 112.5 ± 3.95 quercetin equivalents/g. The total alkaloid content of EE, EF and EEH extract, was 121.9 ± 3.77 , 154.8 ± 3.60 and 202.1 ± 3.49 Atropine equivalents/g. Conclusion: Various treatments have effect on extraction of bioactive compounds. Extract from pretreated seeds with acid improved extraction of alkaloids. Fractionation of extract yield higher content of flavonoids and phenolic content than normal ethanolic extract. Hydrolysis of extract results in decreased concentration of flavonoids and phenolic.



Scientific Poster Presentation Code: P-PH27

Title: ANTIBIOTIC LOADED NANOCOMPOSITE SCAFFOLDS FOR PERIODONTAL DISEASE

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Abstract:

Introduction: Periodontal disease involves destruction of alveolar bone around the teeth leading to defects or rather loss of the tooth if left untreated. In most cases, tissue regeneration does not happen spontaneously which calls for interventional therapy with bone substitutes. Bone grafts and guided tissue regeneration (GTR) and are the most common approaches. However, the success rate is variable because of high susceptibility to infection and immunologic response which limits the clinical improvement. **Purpose/need:** Therapy is needed to eliminate or control these pathogens and restore the periodontium to a normal functional state in periodontal therapy and regeneration of the affected tissues with natural architecture and function. To overcome the limitations of conventional therapy with systemic antimicrobials, locally delivered & anti-infective pharmacological agents most recently employing nanocomposites with control release Local delivery of drug which increase patient compliance & efficacy of drug. **Method:** Realizing the vital role of synthetic biomaterials with limited immune response and good biological activity, we developed a nanocomposite scaffold using hydrogel with bioactive glass ceramic nanoparticles. Development of nanocomposites having the ability to suppress or eliminate the pathogenic micro-biota or modulate the inflammatory response has attracted great interest in order repair periodontal tissue destruction. The prepared nanocomposite scaffolds were characterized using FT-IR, XRD, DLS, TGA, AFM and SEM. Further, the porosity, swelling, invitro degradation and biomineralization, cyto-toxicity, cell attachment and cell proliferation were also evaluated. The nanocomposite scaffolds were found to have enhanced porosity, swelling, bioactivity and degradation in comparison to the control scaffolds. **Result:** The Nanocomposites scaffolds were non-toxic to human cells and supported cell attachment, spreading and proliferation. The Nanocomposites scaffolds were found to be satisfactory in all aspects, and these nanocomposite encapsulated antibiotic scaffolds could be promising candidates for the treatment of periodontal disease.



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Title: OPTIMIZATION OF TOPICAL EMULGEL OF ETODOLAC BY USING CENTRAL COMPOSITE DESIGN AND ITS EVALUATION

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Abstract:

Introduction: Emulgel is emerging field for the topical drug delivery, exhibits several advantages like incorporation of hydrophobic drugs, sufficient loading capacity, better stability, controlled release, production feasibility and low preparation cost. Etodolac is BCS Class II Drug which selectively inhibits COX-2. When administered orally, Etodolac causes gastric irritation, constipation, diarrhea, vomiting, headache, dizziness, sore throat. Hence, present work was aimed towards development of formulation of Emulgel containing etodolac. **Materials and Methods:** Etodolac and other excipients were procured and their pre-formulation study was carried out. Then, emulgel was prepared by central composite design in few steps, formulation of emulsion (O/W), formulation of gel base and finally incorporation of emulsion into gel base with continuous stirring. Emulgel so prepared was then evaluated for different pharmaceutical parameters. **Results and Discussion:** Due to addition of turmeric, yellow and thick emulgel was obtained having pH around 6.5. Incorporation of gelling agent, imparted viscosity. Spreadability was found inversely related to viscosity. Drug content of emulgel indicated high entrapment in the internal phase. **Conclusion:** Etodolac could be effectively formulated in emulgel having better patient acceptability overcoming unwanted effects when taken orally.