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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

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3.3.2

1. Cover page, content page and first page of the selected publication.

3.3. Research Publications and Awards

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 year

Sr. No.	Name of the teacher	Title of the book/chapters published	National / International	Year of publication	ISBN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	**Dr. Vaibhav G. Bhamre**, Mr. Shivraj P. Jadhav	Concepts of Physical Pharmaceutics I	National	2021-2022	9789392867392	K. K. Wagh College of Pharmacy	PharmaCareer Publications
2	**Bhamare V. G., Amrutkar R. D.,** Patil V, Upasani C. D.	Growing impact of herbal bioenhancers in pharmaceutical industries	International	2021-2022	9783110746792	K. K. Wagh College of Pharmacy	De-Gruyter
3	**Shamal. D. Dawange**	A Laboratory Manual for Pharmacognosy	National	2021-2022	9788195407422	K. K. Wagh College of Pharmacy	Briliant Publication
4	**Dr. K. S. Jain, D. K. Kadam**	A Practical of Pharmaceutical Analysis-	National	2020-2021	9789390596898	K. K. Wagh College of Pharmacy	Nirali Prakashan
5	**Dr. K. S. Jain, D. K. Kadam, K. P. Baviskar**	Pharmaceutical Analysis I	National	2019-2020	978-93-90506-60-6	K. K. Wagh College of Pharmacy	Nirali Prakashan
6	**Dr. K. S. Jain**	A Practical book of Pharmaceutical Organic Chemistry	National	2018-2019	978-93-87686-05-2	K. K. Wagh College of Pharmacy	Nirali Prakashan
7.	**Dr. K. S. Jain**	Pharmaceutical Organic Chemistry– I, Simplified	National	2018-2019	978-93-87397-62-0	K. K. Wagh College of Pharmacy	Nirali Prakashan
8	**Dr. K. S. Jain, M.G.Shinde**	Practical Pharmaceutical Inorganic Chemistry simplified	National	2018-2019	978-93-88293-31-0	K. K. Wagh College of Pharmacy	Nirali Prakashan
9	**Dr. K. S. Jain**	A Text Book of Pharmaceutical Organic Chemistry – III	National	2018-2019	978-93-880706-58-2	K. K. Wagh College of Pharmacy	Nirali Prakashan

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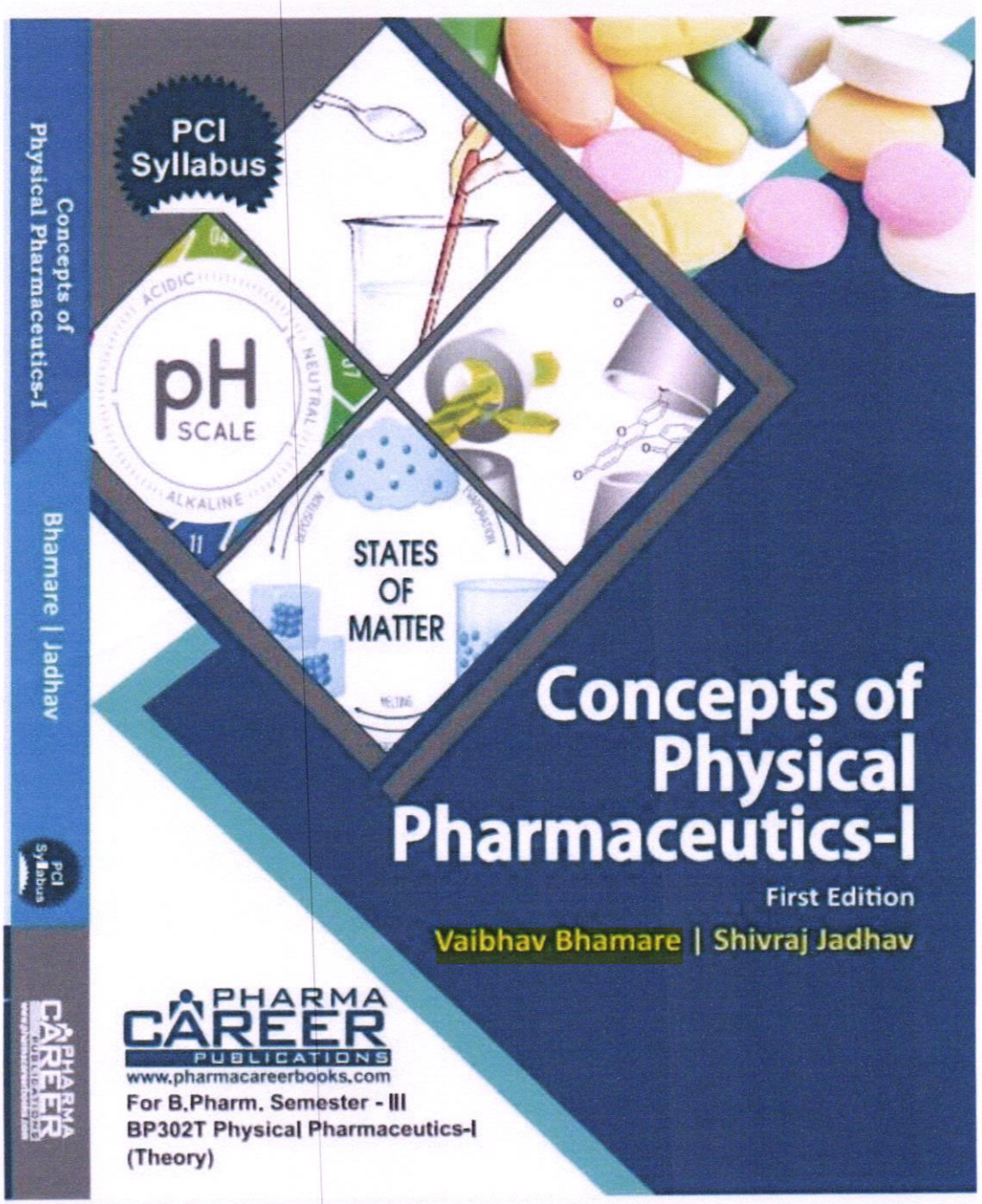
10	**Dr. K. S. Jain**	Pharmaceutical Inorganic Chemistry, Simplified	National	2017-2018	9789388194556	K. K. Wagh College of Pharmacy	Nirali Prakashan
11	**Dr. K. S. Jain**	A textbook of Pharmaceutical Organic Chemistry–II	National	2017-2018	978-93-88194-10-5	K. K. Wagh College of Pharmacy	Nirali Prakashan

Title of the book/chapters published- Concepts of Physical Pharmaceutics I

Name of the faculty- Dr. Vaibhav G. Bhamre, Mr. Shivraj P. Jadhav

Name of the publisher- PharmaCareer Publications



Concepts of Physical Pharmaceutics - I

As per PCI Regulations
For B. Pharm : Semester-III

BP302T PHYSICAL PHARMACEUTICS - I (Theory)

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CONTENTS

UNIT : I

SOLUBILITY OF DRUGS

Solubility expressions, Mechanisms of solute solvent interactions, Ideal solubility parameters, Solvation & Association, Factors influencing solubility of drugs, Diffusion principles in biological systems, Solubility of gas in liquids, Solubility of liquids in liquids, (Binary solutions, ideal solutions), Raoult's law, Ideal and Real solutions, Partially miscible liquids, Critical solution temperature and applications, Distribution law, its limitations and applications.

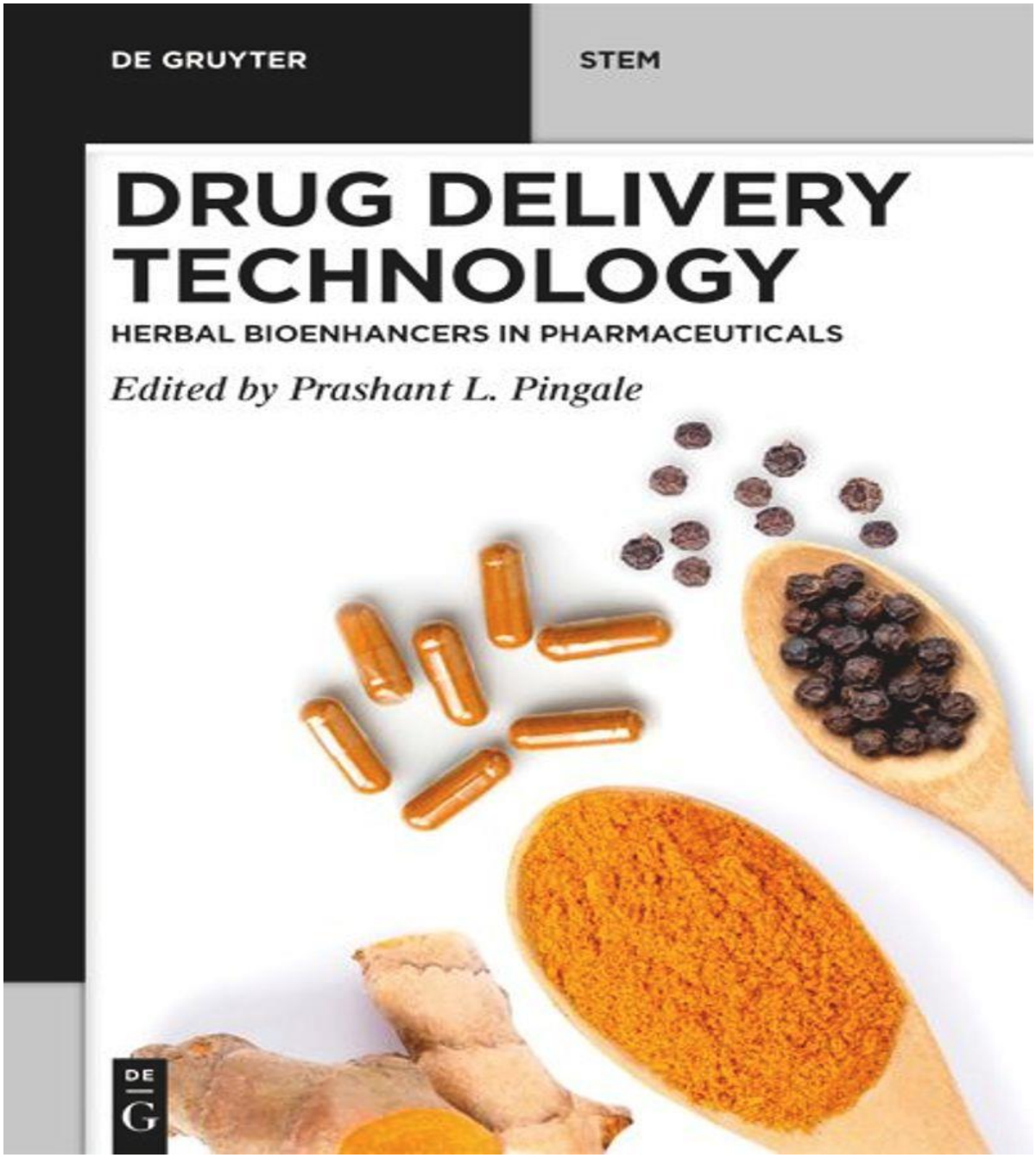
1.1 INTRODUCTION TO SOLUBILITY :

- Solubility is the important parameter to achieve desired concentration of drugs in the systemic circulation that could exert desired physiological response. Any drug to be absorbed must be present in the form of an aqueous solution at the site of absorption. Since, water remains the solvent of choice for liquid pharmaceutical formulations; poor water soluble drugs have slow absorption leading to inadequate bioavailability.
- Solubility can be defined in two ways, in quantitative way and qualitative way.
- Quantitatively solubility is defined as the maximum amount of a substance that will dissolve in a given amount of solvent at a specified temperature.
- Qualitatively solubility can be defined as spontaneous interaction between solute and solvent to form homogeneous solution.
- Generally, the solubility of a compound depends on the physical and chemical properties of the components (solute and the solvent) and several factors that have impact over process of solublization such as temperature, pressure, pH, particle size of solute etc.
- Solubility is usually expressed as grams of solute per liter of solvent.
- A solute is any substance which can be either solid or liquid or gas dissolved in a solvent. Generally, in solution, the amount of solute is always less than solvent. For ex. Sodium Chloride, Sugar.
- A solvent is a substance that dissolves a solute. The solvent is the component of a solution that is present in higher concentration. Solvents which are generally in liquid form but can also be a solid or gas that are used to dissolve, suspend or extract other materials, usually without chemically changing either the solvents or the other materials. For ex. Water, Ethanol.

Title of the book/chapters published- Growing impact of herbal bioenhancers in pharmaceutical industries

Name of the faculty- Dr. Vaibhav Bhamre, Dr. Rakesh Amrutkar, Mr. Vinod Patil, Dr. Chandrashekhar Upasani

Name of the publisher- De-Gruyter, Garmany



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Contents

Vaibhav Bhamare, Rakesh Amrutkar, Vinod Patil,
Chandrashekhar Upasani

Chapter 7
Growing impact of herbal bioenhancers in pharmaceutical industries

Abstract: Ayurvedic expertise has made a significant contribution to drug research in the world, with new methods of identifying active compounds. In comparison to modern medicines, herbal medicines have succeeded to emphasize the world for their use, with advantageous therapeutic effects and fewer adverse effects. However, in vitro/in vivo findings for these herbal drugs or extracts are not so impressively correlative. Poor lipid solubility, improper molecular size, and prolonged therapy of phytoconstituents leads to poor absorption, followed by poor bioavailability and treatment expenses. Herbal bioenhancers are nontherapeutic active phytomolecules that, when co–administered at low doses, improve the bioavailability, bioefficacy, and biological activity of different drugs without having a synergistic impact with medication. Since herbal bioenhancers are healthy, nontoxic, inexpensive, easy to obtain, nonaddictive, pharmacologically inert, and nonallergenic, they are enticing pharmaceutical industries as a valuable and most effective means of bioavailability enhancement. Nowadays, industries are focusing on improvement in pharmacokinetic parameters of potent active pharmaceutical ingredients using various bioenhancing mechanisms that can help through alteration in enzyme activity, phytosomal formulation system, escape protein modifications, effects of cholagogic or choleretic agent, and heat production in the organism. An emphasis is made to tackle multidrug resistance in the treatment of infectious diseases. Bioenhancers significantly contribute to the drug development process, with innovative methods for identifying active compounds, using natural drugs and products. Herbal bioenhancers are becoming increasingly popular as a paradigm-shifting technology for improving the bioavailability and bioefficacy of various classes of drugs, nutraceuticals, and veterinary medicines, thanks to recent advances in drug delivery.

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Name of the faculty- Shamal. D. Dawange

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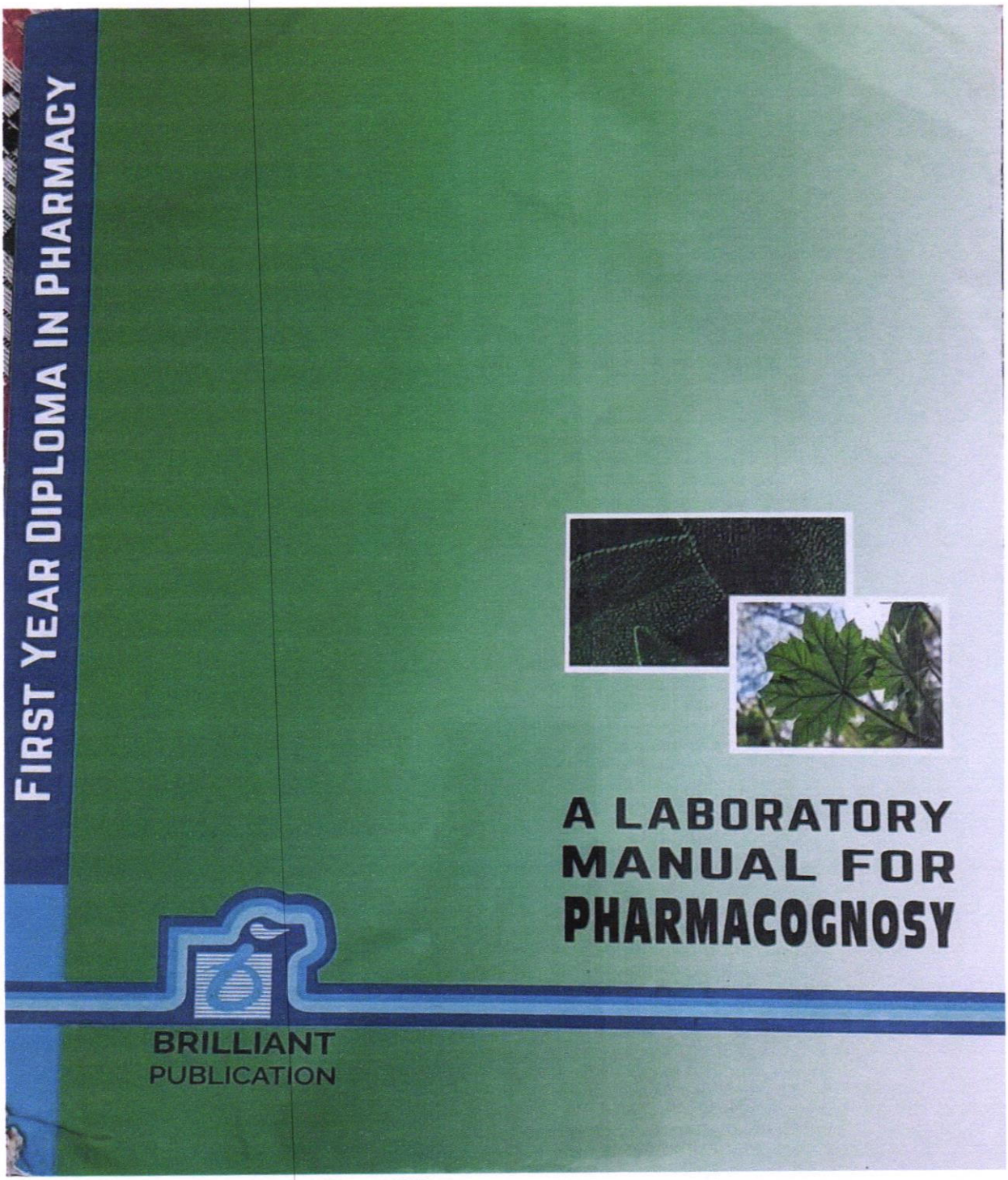

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A Laboratory Manual is designed as per New Syllabus prescribed by PCI Accordance of E.R 2020

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A LABORATORY MANUAL

Salient Features :

- All experiments covered as ER 2020 syllabus.
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- Learning objectives to aid in understanding the expected set of skills.
- Easy to use format for writing the experiments.
- Concise and Lucid language
- Well labeled diagram of Morphological and microscopically characteristics of crude drug.
- To lend a hand to professionals with scientific interest in herbalism.

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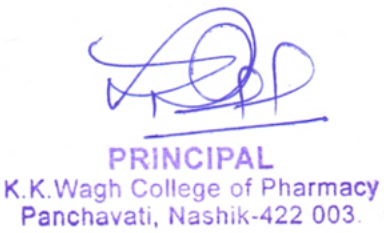
SYLLABUS

As per ER 2020, Pharmacognosy Practical Syllabus is as given below:	
Sr. No.	Title
1.	**Morphological Identification of drug :** Ispaghula, Senna, Coriander, Fennel, Cardamom, Ginger, Nutmeg, Black Pepper, Cinnamon, Clove, Ephedra, Rauwolfia, Gokhru, Punarnava, Cinchona, Agar.
2.	**Gross anatomical studies (Transverse Section) of the following drugs:** Ajwain, Datura, Cinnamon, Cinchona, Coriander, Ashwagandha, Liquorice, Clove, Curcuma, Nuxvomica, Vasaka.
3.	**Physical and chemical tests for evaluation of drugs:** Asafoetida, Benzoin, Pale catechu, Black catechu, Castor oil, Acacia, Tragacanth, Agar, Guar gum, Gelatin.



EXPERIMENT NO - 01

◆ **Aim – To study morphological characteristics of Ispaghula**

- **Synonyms -** Ispaghula, Ispagol, Ishabgula, Spongel seeds.

- **Botanical Source -** Ispaghula consists of dried seeds of *Plantago ovata*, belonging to family Plantaginaece.

- **Morphology Ispaghula seed –**

Colour	Pinkish gray to brown
Odour	None
Taste	Mucilaginous
Shape	Ovate, boat shaped, cymbiform
Size	1.5–3.5 mm long, 1–1.8 mm wide.
Weight of 100 seeds	0.15–0.19 g
Surface	Smooth
Nature	Seeds are hard, translucent
External Features	The dorsal (convex surface) consist of a small elongated reddish brown spot at the center while the ventral (concave surface) has a cavity which is covered with a thin whitish membrane.

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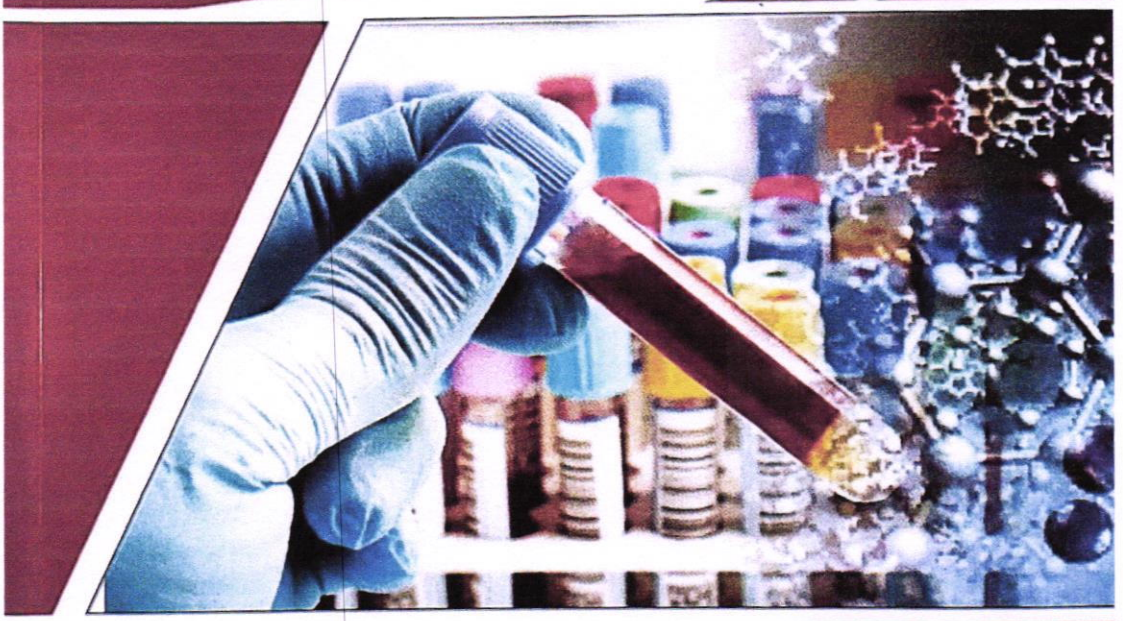

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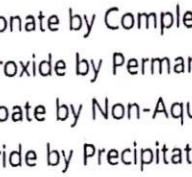

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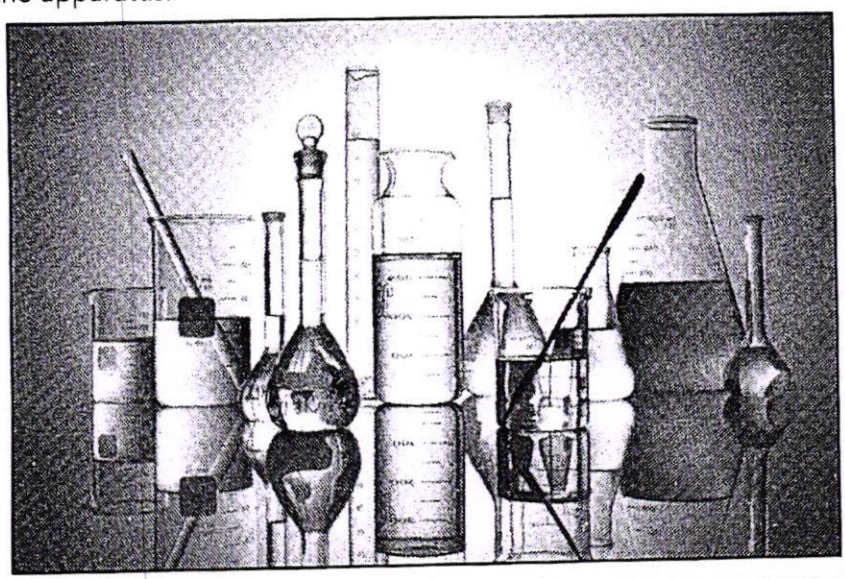
Unit...1

GENERAL INTRODCUTION

All laboratory work involves some form of measurement. Various types of volumetric glassware are available for measuring lab reagents. Before starting any analytical experiment, one must familiarize him/herself with the types of volumetric glassware and should learn to use the apparatus accurately to eliminate the errors resulting from careless handling of the apparatus.



1.1 VOLUMETRIC GLASSWARE

1.1.1 Pipettes

These are used to transfer a known volume of liquid from one container to another. They are designed either to contain (TC) a specific volume of liquid or to deliver (TD) a specified volume. [**To contain and To deliver (TC & TD):** Manufacturer stamp TC or TD near the top of the pipette. TC pipette holds or contains a particular volume but does not dispense that exact volume, whereas TD pipette will dispense the exact volume indicated].

Table 1.1 : Pipette Classification

I.	Design
	A. To contain (TC)
	B. To deliver (TD)

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Unit II

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Unit III

Unit IV

Unit V : Electrochemical Methods of Analysis

■■■

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 anlaysis.*
- *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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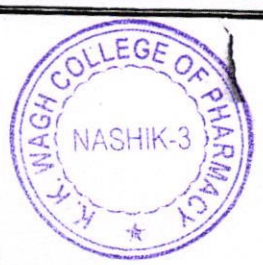

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Contents

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Chapter 1...

Systematic Qualitative Analysis of Unknown Organic Compounds

Qualitative organic analysis is the systematic identification and confirmation of an unknown organic compound.

Qualitative organic analysis forms an important part of the practical training of the budding organic chemist. It gives a balance between structured systemic approach and the intuition, which the student acquires with experience.

Proper application of knowledge of organic chemistry and significant observations can help draw meaningful conclusions leading to pinpoint identification.

The systematic steps of qualitative analysis:

Following essential and integral steps for the systematic identification of an unknown organic compound, should be followed meticulously and religiously, skipping none of it.

1. **Preliminary tests:** It can tell the state, nature and type in a broad manner.
2. **Detection of elements/elemental analysis (Lassaigne's test):** It can throw light on which of the elements N, [O], S, halogens are present.
3. **Detection of functional group:** Which is the main organic functional group in the compound.
4. **Derivative preparation:** This is preparable and can help to confirm the unknown compound.
5. **Determination of physical constants:** B.P. or M.P. are an important characteristic physical property.
6. **Separation of binary mixture:** In case of mixture of two unknown compounds, which need to be separated prior to their analysis.

This helps in error free identification of an unknown organic compound. The tests are given in sequence one after the other, to reach the end results and to confirm the identity of the given, unknown organic compound, correctly and student is required to follow the same sequence.

Main class of organic compounds encountered in the systematic qualitative analysis:

(a) Carbohydrates: (e.g., glucose, fructose, sucrose, lactose, maltose, starch, dextrin, etc.)

Tests:

1. **Molisch test:** General test for carbohydrates.
2. **Barfoed's test:** For distinction between mono and disaccharides.
3. **Fehling's and Benedict's tests:** For differentiating between a reducing and a non-reducing saccharides.
4. **Selvinoff's test:** Test for ketoses.

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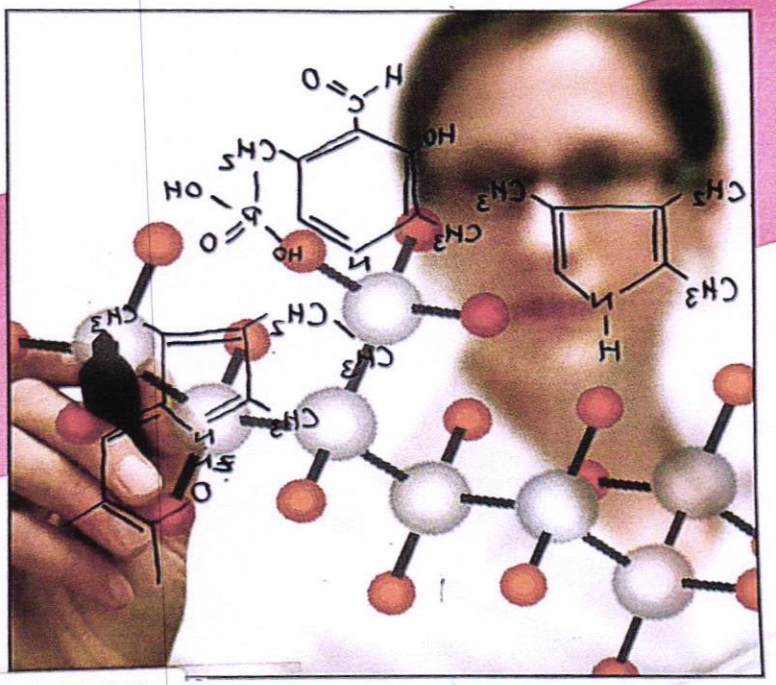

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UNIT I

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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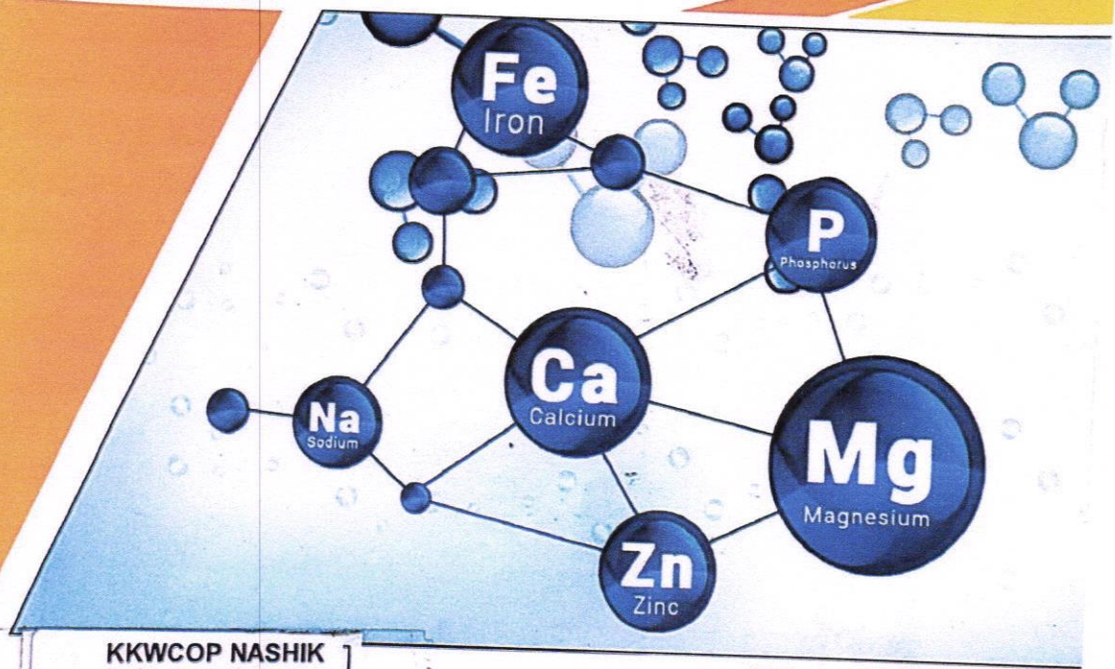

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Chapter 1 ...

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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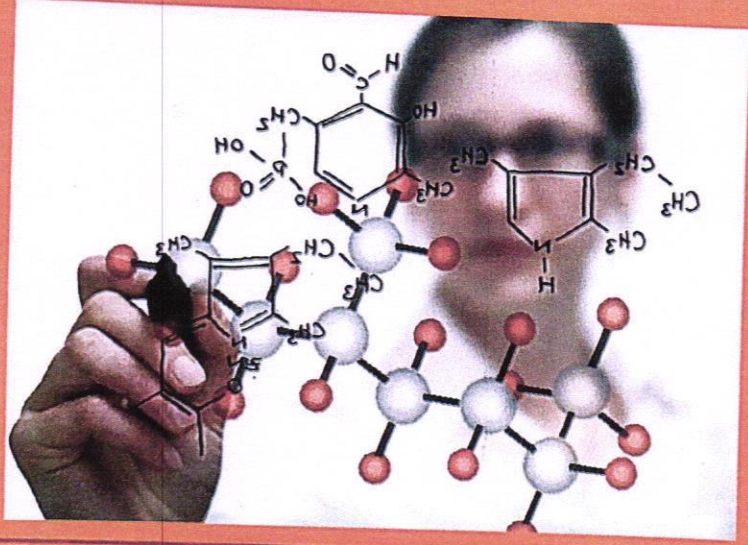

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5. Reactions of Synthetic Importance

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Unit ... 1

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:

		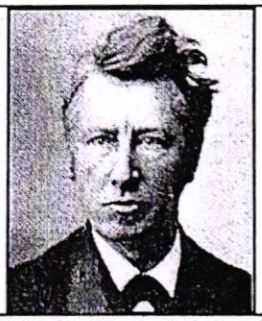
Biot realized in 1815 that the solutions of many naturally occurring compounds rotate the plane of polarization of plane polarized light.	**Pasteur** recognized in 1850 that the optical activity was caused by an asymmetric arrangement of atoms in a molecule.	**van't Hoff** with **Le Bel** described in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

Fig. 1.1: Founders of Stereochemistry

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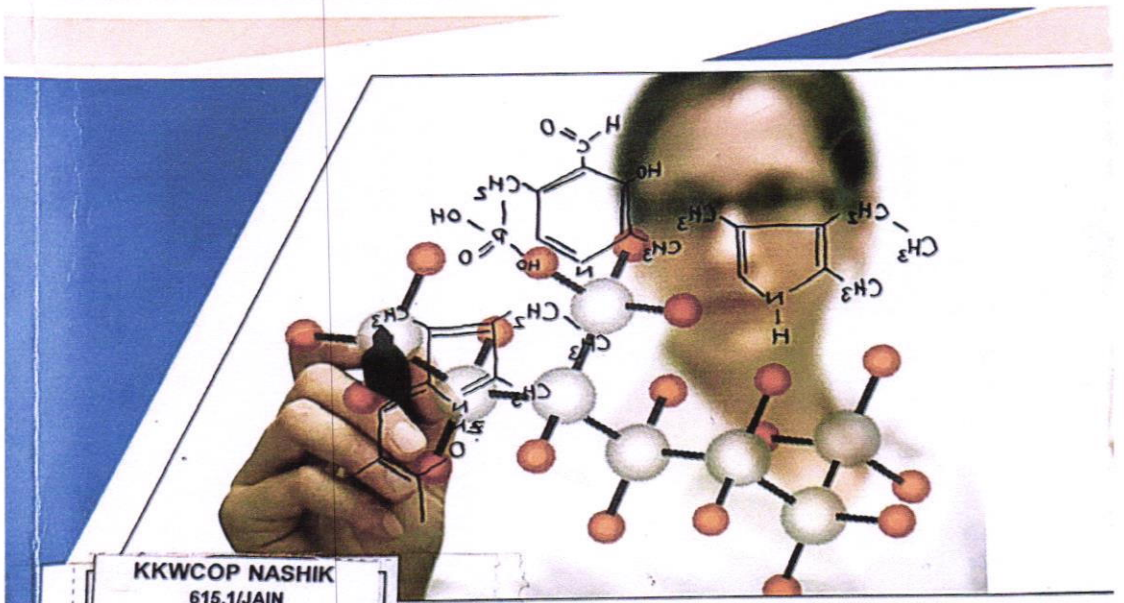

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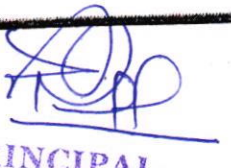

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Unit I

Chapter ... 1

BENZENE AND ITS DERIVATIVES

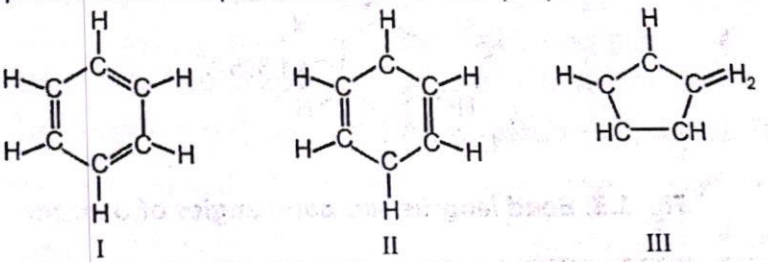
♦ LEARNING OBJECTIVES ♦

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

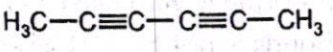
Benzene on which the study of aromatics began was discovered in 1825. However, it was not till 1866 that the Kekule's formula or structure I of benzene was known, till he proposed it. This structure of benzene is most accepted because the satisfactory answers it offers to various substitution products as compared with other four proposed structures II-V (Fig. 1.1.).



I — Kekule formula

II — Dewar formula

III



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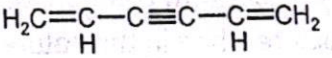

V

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

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3.3.2

2. Web links of Books/Chapter

3.3. Research Publications and Awards

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 year

2. Web-link of books.

Sr. No.	Name of the teacher	Title of the book/chapters published	National / International	Year of publication	ISBN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher	Link of chapter/book
1	**Dr. Vaibhav G. Bhamre**, Mr. Shivraj P. Jadhav	Concepts of Physical Pharmaceutics I	National	2021-2022	9789392867392	K. K. Wagh College of Pharmacy	PharmaCareer Publications	Not Available
2	**Bhamare V. G., Amrutkar R. D.,** Patil V, Upasani C. D.	Growing impact of herbal bioenhancers in pharmaceutical industries	International	2021-2022	9783110746792	K. K. Wagh College of Pharmacy	De-Gruyter	https://www.google.co.in/books/edition/Drug_Delivery_Technology/CyJlEAAAQBAJ?hl=en&gbpv=1&dq=Drug+Delivery+Technology:+Herbal+Bioenhancers+in+Pharmaceuticals+ISBN&printsec=frontcover
3	**Shamal. D. Dawange**	A Laboratory Manual For Pharmacognosy	National	2021-2022	9788195407422	K. K. Wagh College of Pharmacy	Briliant Publication	https://pragationline.com/join-structure-and-function-pamela-k-levangie-cynthia-c-norkin-michael-d-lewek-jaypee/
4	**Dr. K. S. Jain, D. K. Kadam**	A Practical of Pharmaceutical Analysis-	National	2020-2021	9789390596898	K. K. Wagh College of Pharmacy	Nirali Prakashan	https://pragationline.com/a-practical-book-of-pharmaceutical-analysis-first-year-bpharm-semester-1-pci/

Sr. No.	Name of the teacher	Title of the book/chapters published	National / International	Year of publication	ISBN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher	Link of chapter/book
5	**Dr. K. S. Jain, D. K. Kadam, K. P. Baviskar**	Pharmaceutical Analysis I	National	2019-2020	978-93-90506-60-6	K. K. Wagh College of Pharmacy	Nirali Prakashan	https://pragationline.com/pharmaceutical-analysis-jain-kadam-baviskar-first-year-bpharm-semester-1-as-per-pci/
6	**Dr. K. S. Jain**	A Practical book of Pharmaceutical Organic Chemistry	National	2018-2019	978-93-87686-05-2	K. K. Wagh College of Pharmacy	Nirali Prakashan	https://pragationline.com/a-practical-book-of-pharmaceutical-organic-chemistry-miniyar-nargund-jain/
7.	**Dr. K. S. Jain**	Pharmaceutical Organic Chemistry–I, Simplified	National	2018-2019	978-93-87397-62-0	K. K. Wagh College of Pharmacy	Nirali Prakashan	https://pragationline.com/pharmaceutical-organic-chemistry-1-simplified-jain-miniyar-nargund/
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		Organic Chemistry – III						
10	**Dr. K. S. Jain**	Pharmaceutical Inorganic Chemistry, Simplified	National	2017-2018	9789388194556	K. K. Wagh College of Pharmacy	Nirali Prakashan	https://pragationline.com/pharmaceutical-inorganic-chemistry-simplified-jain-miniyar-ilango/
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