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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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
3	Dr. K. S. Jain	Pharmaceutical Inorganic Chemistry, Simplified	Pharmacy	2021-22	978-93-99194-55-4	K K Wagh College of Pharmacy	Nirali Prakashan
4	Dr. K. S. Jain	A Practical Book of Pharmaceutical Analysis	Pharmacy	2020-21	978-93-90596-89-8	K K Wagh College of Pharmacy	Nirali Prakashan
5	Dr. K. S. Jain	Pharmaceutical Organic Chemistry–II, Simplified	Pharmacy	2020-21	978-93-88194-10-5	K K Wagh College of Pharmacy	Nirali Prakashan
6	Dr. K. S. Jain	Practical Pharmaceutical Inorganic Chemistry	Pharmacy	2019-20	978-93-88293-31-0	K K Wagh College of Pharmacy	Nirali Prakashan
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9	Dr. R.J. Oswal	Pharmaceutical inorganic chemistry	Pharmacy	2018-19	978-93-87093-00-3	RJSPM's College of Pharmacy	Thakur Publication
10	Mr. J. S. Dhumal	Practical handbook of pharmacognosy and phytochemistry - II	Pharmacy	2017-18	978-93-24457-10-0	RJSPM's College of Pharmacy	Success publication
11	Mr. J. S. Dhumal	Practical handbook of pharmacognosy and phytochemistry - I	Pharmacy	2017-18	978-93-24457-09-2	RJSPM's College of Pharmacy	Success publication
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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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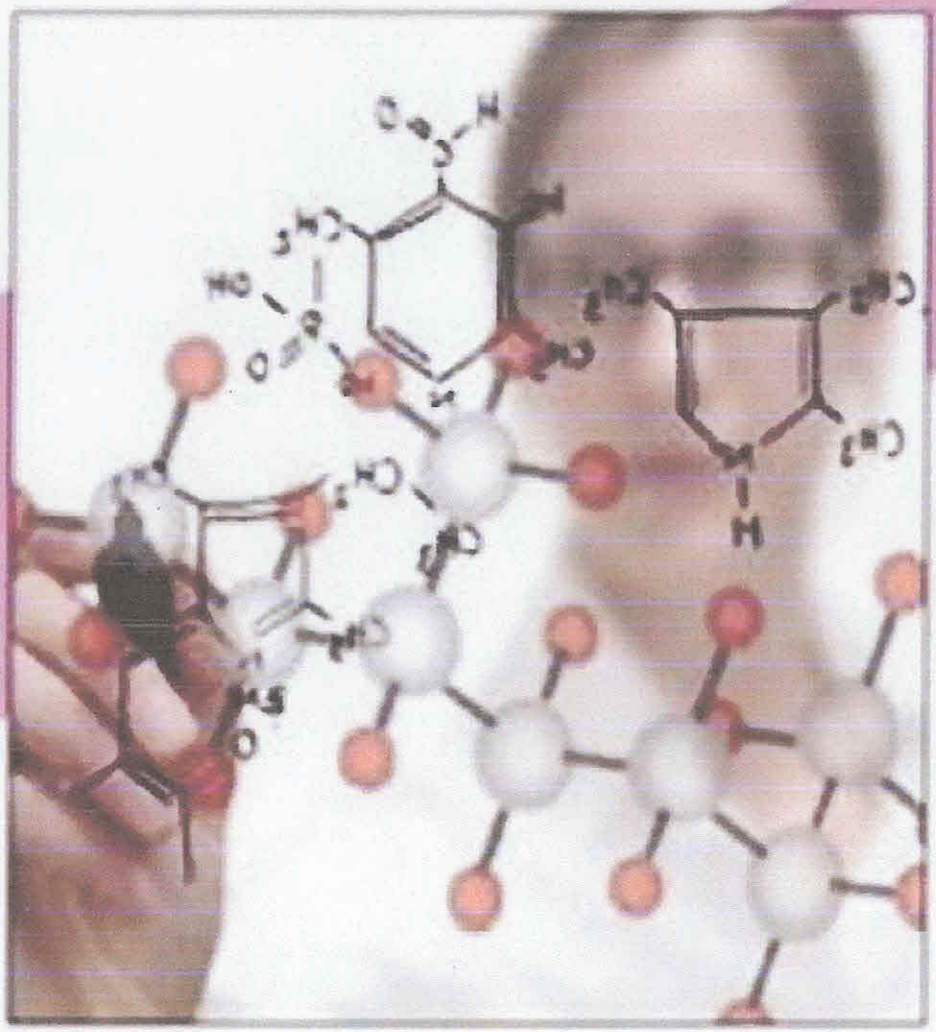

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UNIT I

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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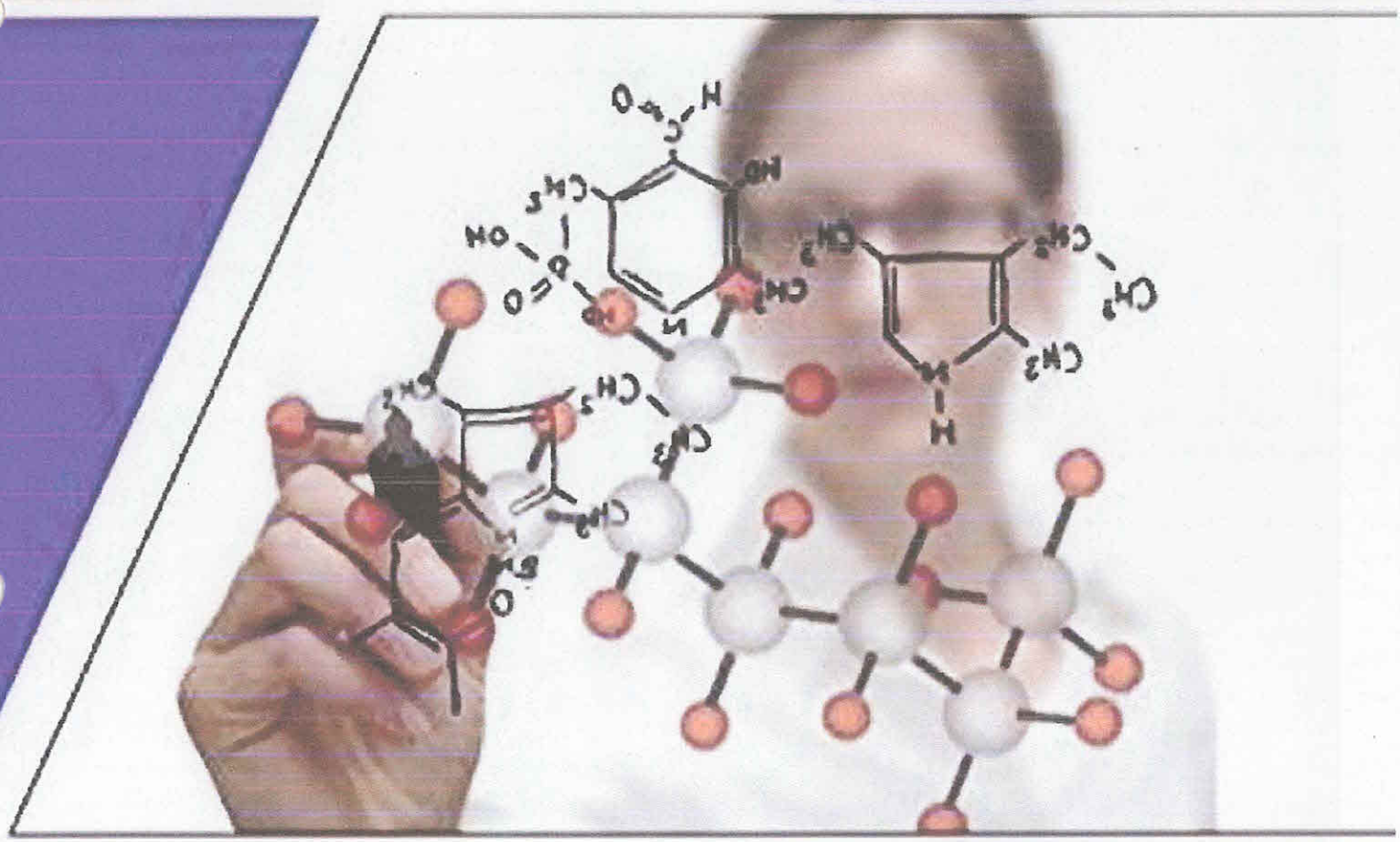

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Chapter 1 ...

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):

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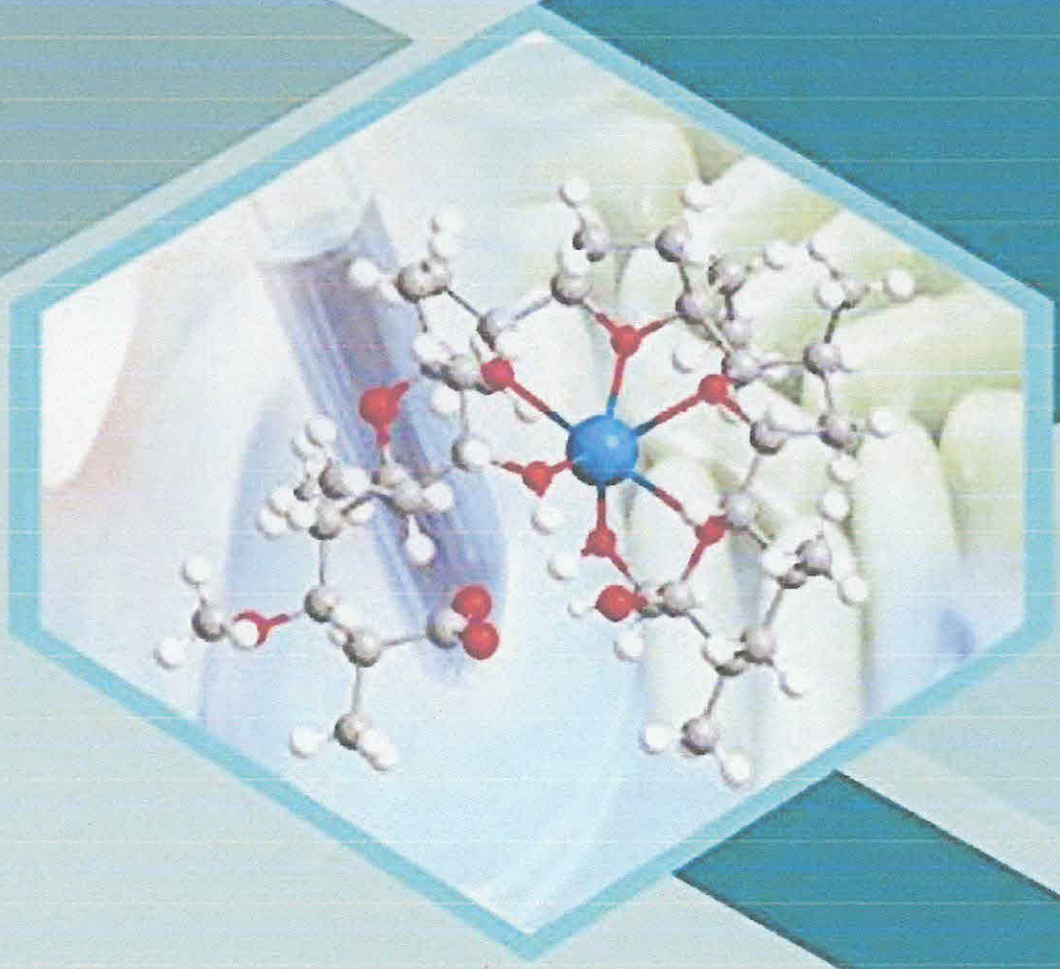

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Unit I

Chapter ... 1

BENZENE AND ITS DERIVATIVES

♦ LEARNING OBJECTIVES ♦

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

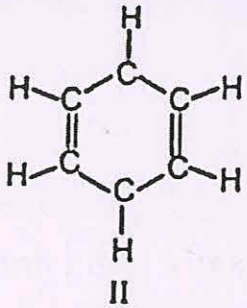
- Introduction to benzene.
- Analytical, Synthetic and other evidences in the derivation of structure of benzene.
- Orbital picture of benzene.
- Resonance in benzene, aromatic characters, Huckel's rules.
- Reactions of benzene - nitration, sulphonation, halogenation-reactivity, Friedel-Crafts alkylation - 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 c...ll 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 ...rious substitution products as compared with other four proposed structures II-V (Fig. 1.1.).

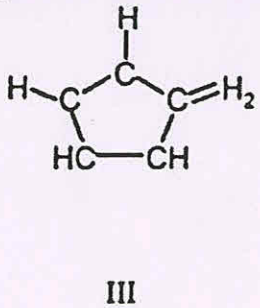
I

Kekule formula



II

Dewar formula



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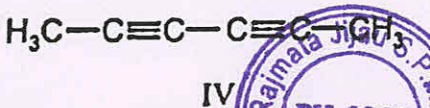

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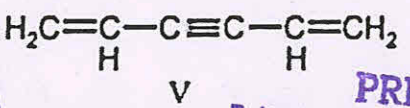

V

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

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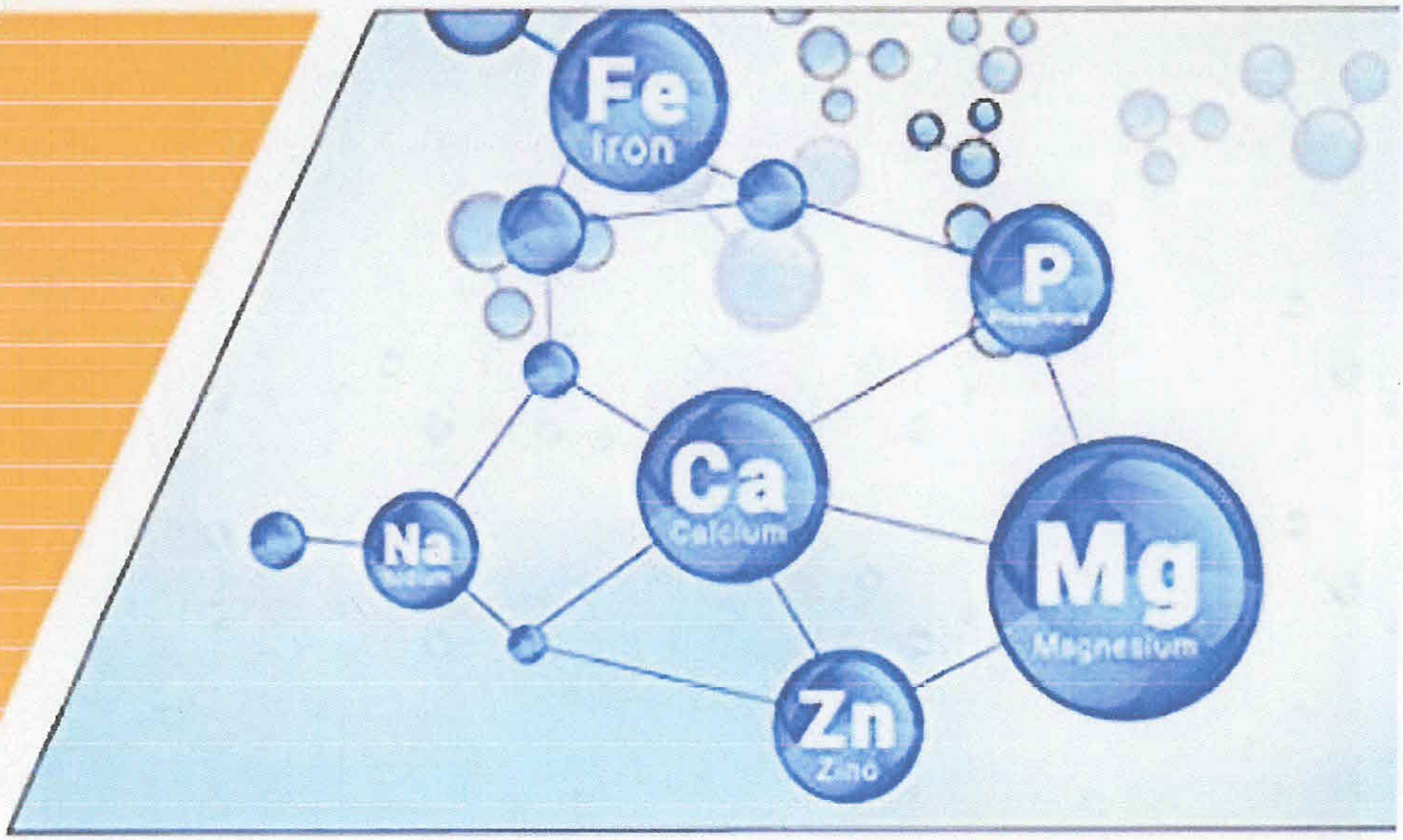

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Contents

■■■

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.

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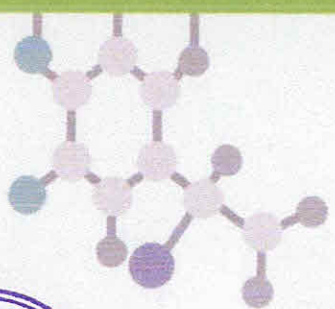
a benchtop manual



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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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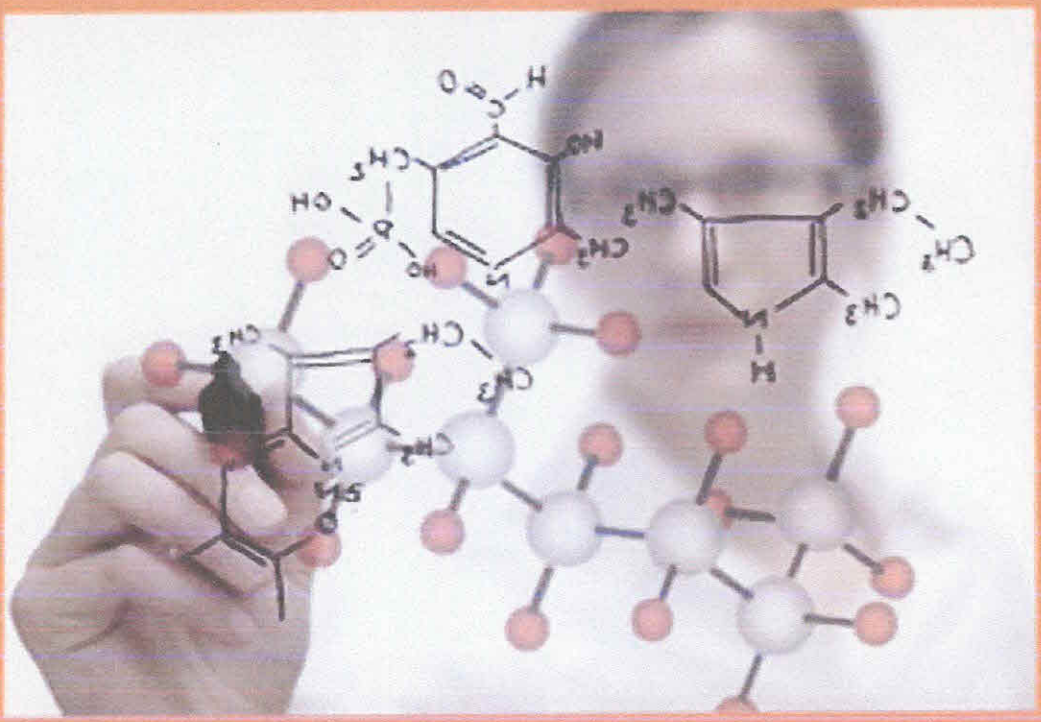

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5.5 Oppenauer-Oxidation

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5.9 Beckmann Rearrangement

- Questions

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

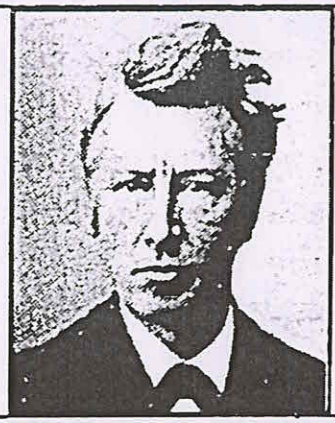
Stereochemistry is a branch of organic chemistry which deals with structure of compounds in three dimensions and hence can be termed as chemistry or study of compounds with respect to the arrangements and movements of different atoms or group of atoms in space. The word is derived from Greek word (Stereos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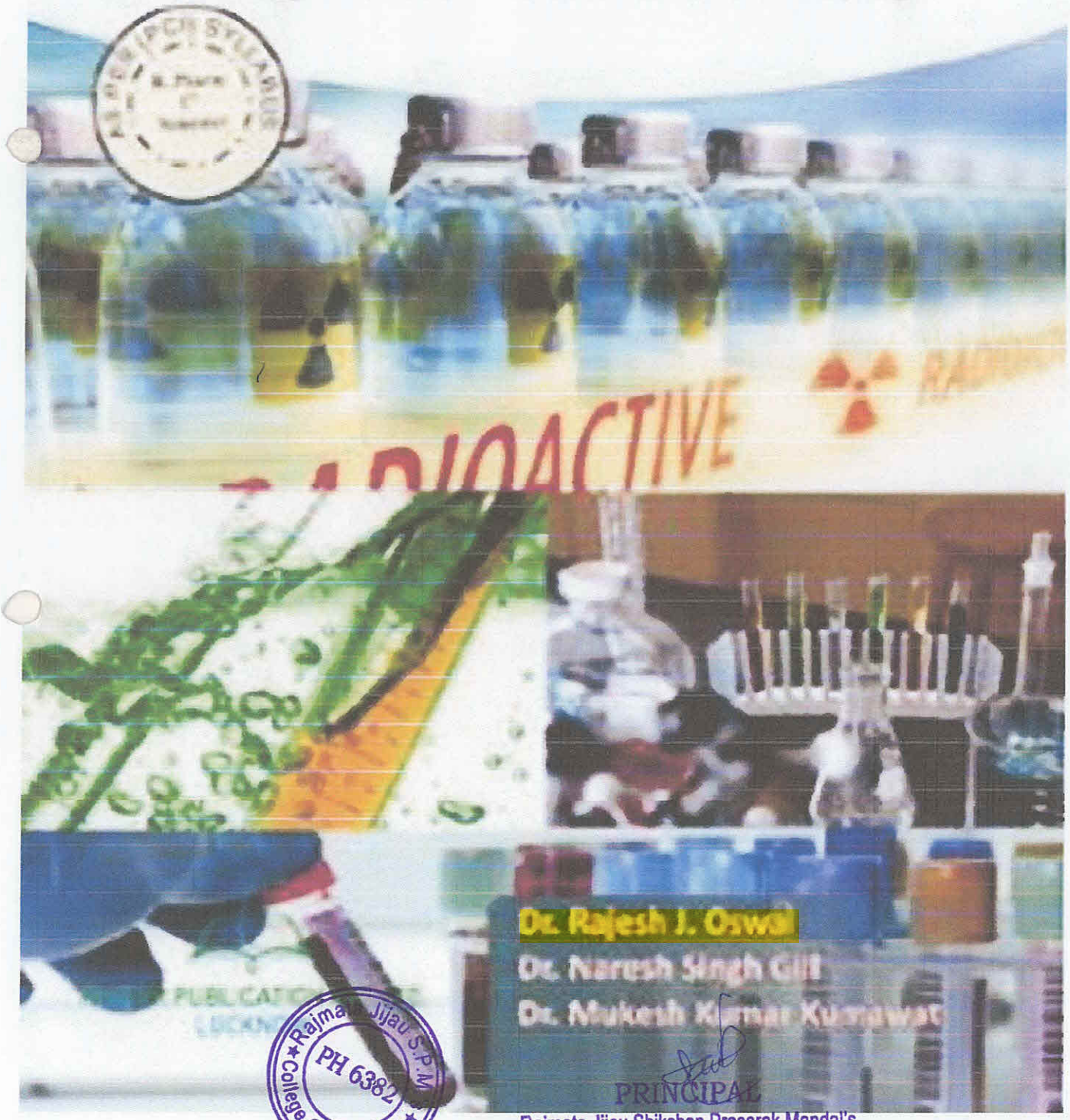

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B.Pharm., First Semester

According to the syllabus based on 'Pharmacy Council of India'

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Chapter 5: Dental Products

Chapter 6: Gastroinestinal Agents

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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S. Y. B. Pharm. (Sem. - IV)

Practical Handbook of Pharmacognosy and Phytochemistry-II

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[illegible] 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:

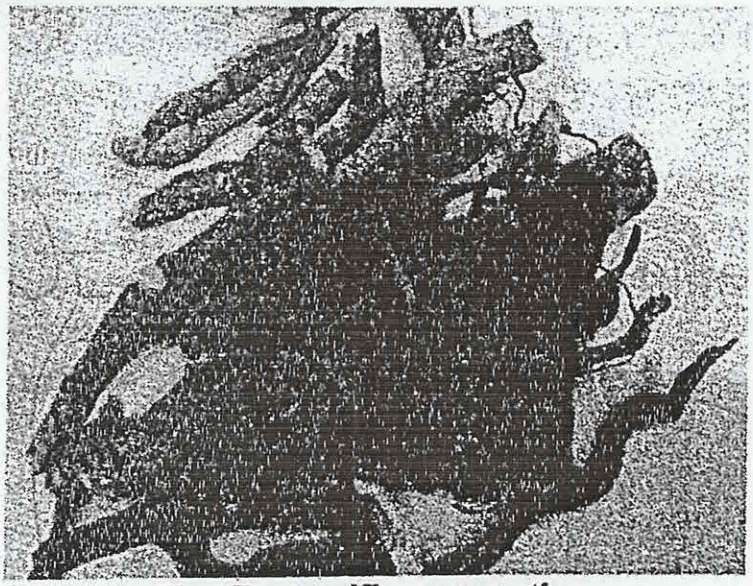

Fig. ***Rauwolfia serpentina***

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S. Y. B. Pharm. (Sem. - III)

Practical Handbook of Pharmacognosy and Phytochemistry-I

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 dying 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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UNIT-I

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Biology & 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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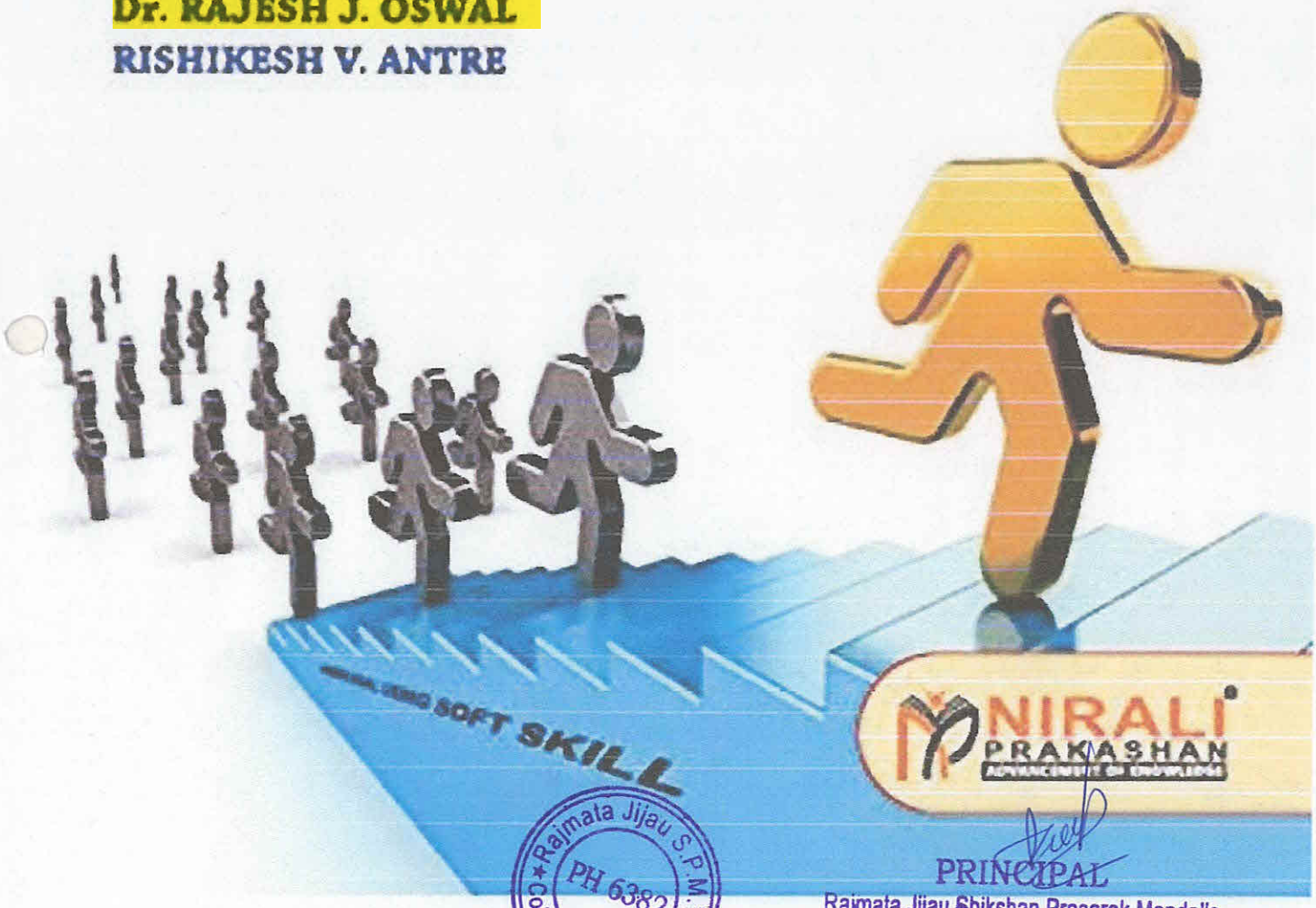

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3.3.2 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

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	Nanocoposite for Periodontal Disease	Ethnopharmacology & Medicinal Plants – Approach Towards Product Development	8th SFEC2021	International Conference	2021-22	-	RJSPM's College of Pharmacy	Society For Ethnopharmacology

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 Scafolds	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 Bagade[1],Dr Jeevan Dhumal[1], Prof. Dr R.G.Katedeshmukh[2], Amol Kumbhar[2]
[1]Department of pharmaceutics,RJSPMCO,Dudulgaon Pune, [2]Department of Pharmacognosy RJSPMCOP 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 Zakir[1*],Subhash Bondhankar[1], Urmila Aswar[1],Rashmi Patil[1]
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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 moschataa*, *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.

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 ribulosebisphosphate 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.

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

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In present study effort has made to ndout 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 analyse 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-(4α,6)-gallocatechin and (3) Quercetin4'- O- α- L- rhamnopyranosyl- 3- O- α- D-allopyranoside.However,Quercetin4'- 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-lipaseactivity with IC50 value 46.07 μg/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

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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 microbiotaor 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

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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

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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 transcutol 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

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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

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Abstract:

Purpose: To study microscopic characteristics and preliminary phytochemical investigations of Callicarpa tomentosa leaf belongings 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.choloroform and ethyl acetate extracts are subjected to qualitative chemical analysis and TLC was performed to determine Rf 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 HEPPER

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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 spectrophometrically by using Bromocresol green using Atropine as a standard. Total phenolic content was estimated spectrophometrically by using Gallic acid as a standard. Quercitin 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± 3.95quercetin 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-biotaor 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.

Scientific Poster Presentation Code: P-PH28

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

Ajay Dongare*, Amir A. Shaikh, Yogesh D. Pawar, Harshada Gawade, Shriniwas P. Patil
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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.