ADITYA
PHARMACY COLLEGE
Approved by AICTE & PCI – NEW DELHI, Affiliated to JNTU KAKINADA
(Formerly known as Aditya Institute of Pharmaceutical Sciences & Research)

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B. PHARMACY		
S.No	**Name of the course that include experiential learning through Project work/ Internship/Field work**	**Page No**
1	B132102-Pharmacognosy-I	4
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5	B132204-Medicinal Chemistry-I	27
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14	B134203-Controlled Released and Novel Drug Delivery Systems	83
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16	B13203-Computer Applications & Biostatistics	93
17	B132104-Pharmaceutical Microbiology	96
18	B132202-Pharmaceutical Analysis-1	99

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ADITYA PHARMACY COLLEGE SURAMPALEM

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II Year – I SEMESTER

T	P	C
3+1	0	3

PHARMACOGNOSY – I(50 Hrs)

UNIT- I

Definition, history, scope and development of Pharmacognosy. General introduction to alternative systems of medicine like Ayurveda, Siddha, Unani and Homeopathy. 02

Brief introduction to natural sources of drugs with examples: Plant Source, Animal Source, Mineral Source, Marine Source and microorganisms. 04

LO : To make the students understand that drugs are obtained from different sources and crude drugs, are used in the indigenous systems of medicine.

UNIT-II

Classification of Crude Drugs: Alphabetical, morphological, pharmacological, chemical, taxonomical and chemotaxonomical methods of classification with suitable examples. 06

LO : To make the students understand that crude drugs can be classified based on several criteria.

UNIT-III

Cultivation, collection, processing, drying and storage of medicinal plants: 08

- Factors influencing cultivation of medicinal plants.
- Plant hormones and their applications.
- Definitions and examples for polyploidy, mutation and hybridization with reference to medicinal plants.

Good Agriculture Practices: Strategies of obtaining improved cultivation of medicinal plants.

LO : To understand improve agricultural conditions provide high yield and the methods be standardized to get consistent yields.

UNIT-IV

Adulteration &Evaluation of crude drugs: 06

Adulteration of crude drugs: Different methods of adulteration of crude drugs and general methods for detection of adulterants. For example

i) Organoleptic ii) Microscopic iii) Physical iv) Chemical and Biological methods of evaluation.

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LO : To provide enough knowledge to identify adulterants from genuine products and to provide quality products.

UNIT-V 06

Systematic pharmacognostic study of the following carbohydrates and derived products: Acacia, tragacanth, agar, starch, guargum, pectin, isabgol and honey.

LO : To provide quality products of the above as exceipients.

UNIT-VI

Systematic Pharmacognostic study of the following Lipids: Castor oil, cod liver oil, shark liver oil, linseedoil, cocoa butter, kokum butter, bees wax, wool fat, hydrocarpus oil, spremaceti, lard and olive oil.

08

Systematic Pharmacognostic study of the following volatile oils: Mentha, coriander, cinnamon, lemon oil,nutmeg, eucalyptus, ginger, cardamom, tulsi, lemon grass, caraway, cumin, dill, clove, fennel and black pepper.

06

LO : To maintain quality in fixed and volatile oils.

TEXT BOOKS

1. Kokate C.K, Purohit AP &GokhalePharmacognosy S.B (Nirali)
2. Trease and Evans Pharmacognosy, Latest Edition.
3. Tyler, Brady & Robert, Pharmacognosy.
4. T.E.Wallis, Textbook of Pharmacognosy, Pub by CBS Publishers and distributors, New Delhi.

REFERENCES

1. Atal C.R & Kapur B.M, Cultivation & Utilization of Medicinal Plants.
2. Ayurvedic Pharmacopoeia of India, Pub by Govt. of India.
3. A.A. Farooqi& B.S. SreeRamu, Cultivation of Medicinal and Aromatic Crops, University Press.
4. CSIR Publications, Wealth of India.
5. Handa and Kapoor, Text Book of Pharmacognosy.
6. Gokhale, Pharmacognosy.
7. Heinrich, Fundamentals of Pharmacognosy and Phytotherapy.
8. Taylor and Evans, Text Book of Pharmacognosy.
9. Iyengar, Pharmacognosy of Powdered Crude Drugs.
10. R.N Chopra, S.L Nair and I.C Chopra, Glossary of Indian Medicinal Plants, CSIR, New Delhi.

PRELIMINARY PHYTOCHEMICAL SCREENING, *INVITRO* ANTIBACTERIAL AND ANTHELMINTIC ACTIVITIES OF ETHANOLIC EXTRACT OF LEAVES OF *ALPINIA GALANGA* (L) Willd.

Thesis submitted to

Jawaharlal Nehru Technological University, Kakinada, A.P.,

For the award of the degree of

Bachelor of Pharmacy

K.SITAMAHALAKSHMI (143G1R0043)

K.SUDHEEP (143G1R0044) **M.MOUNICA (143G1R0045)**

M.HEMALATHA (143G1R0046)

Under the guidance of

M.VINAY KUMAR, M.PHARM, (Ph.D)

Assistant Professor in Pharmacognosy & Phytochemistry

Aditya Pharmacy College

Surampalem -533437

2014-2018

CERTIFICATE

This is to certify that K.Sita mahalakshmi, K.Sudheep, M.Mounica, M.Hemalatha has carried out the dissertation work on "PRELIMINARY PHYTOCHEMICAL SCREENING, *IN-VITRO* ANTIBACTERIAL AND ANTHELMINTIC ACTIVITIES OF ETHANOLIC EXTRACT OF LEAVES OF *ALPINIA GALANGA*(L) Willd" in the partial fulfilment of the requirements for the award of B.Pharm in Pharmacognosy & Phytochemistry and this dissertation work is a bonafide research work done by them under the supervision of M. Vinay kumar and guidance at the department of Pharmacognosy& Phytochemistry, Aditya Pharmacy college, Surampalem, affiliated to Jawaharlal Nehru Technological University, Kakinada.

Dr. K. DIVAKAR, M. Pharm, Ph.D

PRINCIPAL,

Professor in Pharmaceutical Technology,

Aditya Pharmacy College,

Surampalem.

Place: Surampalem

Date:

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

CERTIFICATE

This is to certify that K.Sita mahalakshmi, K.Sudheep, M.Mounica, M.Hemalatha has carried out the dissertation work on "PRELIMINARY PHYTOCHEMICAL SCREENING, *IN-VITRO* ANTIBACTERIAL AND ANTHELMINTIC ACTIVITIES OF ETHANOLIC EXTRACT OF LEAVES OF *ALPINIA GALANGA*(L) Willd" in the partial fulfilment of the requirements for the award of B.Pharm in Pharmacognosy & Phytochemistry and this dissertation work is a bonafide research work done by them under the supervision of M. Vinay kumar and guidance at the department of Pharmacognosy& Phytochemistry, Aditya Pharmacy college, Surampalem, affiliated to Jawaharlal Nehru Technological University, Kakinada.

Dr. K. DIVAKAR, M. Pharm, Ph.D

PRINCIPAL,

Professor in Pharmaceutical Technology,

Aditya Pharmacy College,

Surampalem.

Place: Surampalem

Date:

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

The research work embodied in this thesis entitled "PRELIMINARY PHYTOCHEMICAL SCREENING, *IN-VITRO* ANTIBACTERIAL AND ANTHELMINTIC ACTIVITIES OF ETHANOLIC EXTRACT OF LEAVES OF *ALPINIA GALANGA* (L) Willd" was carried out by us in the Pharmacognosy Laboratories of Department of Pharmacognosy & Phytochemistry, Aditya Pharmacy college, Surampalem, affiliated to Jawaharlal Nehru Technological University, Kakinada, India, under the supervision of Mr.M.VinayKumar, M.Pharm, Assistant Professor in Pharmacognosy & Phytochemistry, Aditya pharmacy college, Surampalem.The extent and source of information derived from the existing literature have been indicated throughout the thesis at appropriate places. The work is original and has not been submitted in partial or full for any diploma or degree of this or any other University.

K. Sitamahalakshmi K.SITAMAHALAKSHMI (143G1R0043)

K. Sudheep K.SUDHEEP (143G1R0044)

M. Mounica M.MOUNICA (143G1R0045)

M. Hemalatha M.HEMALATHA (143G1R0046)

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CONCLUSION

- Preliminary tests for ethanolic extract of Alpinia galanga have shown that Carbohydrates , Alkaloids , Flavonoids , Tannins and steroids were present.
- When compared to gram negative bacteria, gram positive bacteria have shown more anti bacterial activity.
- Anti- helmintic activity for ethanolic extract was found to be near with standard Albendazole at the tested concentration(50mg/ml).
- Finally concluded that Ethanolic extract of *Alpinia galanga* has a promising example for discovery of new drugs from natural sources.

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III Year – I SEMESTER

T	P	C
3+1	0	3

MEDICINAL CHEMISTRY-II

UNIT - I

1. **Introduction to principles of chemotherapy,** chemotherapeutic index, drug resistance.
2. **Sulphonamides:** Sulfisoxazole, Sulphamethazole and Sulphathiazole.
3. **Antitubercular agents:** PASA, Isoniazid, Ethambutol
4. **Antileprotic agents:** Dapsone

LO : Definition, current status, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class.

UNIT - II

1. **Antimalarials:** Chloroquine, Primaquine and Pyrimethamine
2. **Anthelmintics:** Diethyl Carbamazine Citrate, Mebendazole, Tinidazole,
3. **Antiamoebic agents:** Metronidazole and Diloxanide furoate.
4. **Antifungal agents:** Clotrimazole, Fluconazole and Tolnaftate.

LO : Definition, current status, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class.

UNIT - III

1. **Antiviral agents:** Acyclovir, Zidovudine, Idoxuridine and Amantadine.
2. **Cytostatic agents:** Chlorambucil, Cyclophospamide, Carmustine, 5-Flouro Uracil and
   Mercaptopurine

LO : Definition, current status, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class.

UNIT - IV

Antibiotics:

1. **Penicillins:** Ampicillin, Amoxycillin

2. **Cephalosporins:** structures of important Cephalosporins (not synthesis)
3. **Tetracyclins:** Oxytetracycline, Doxycycline
4. **Aminoglycosides:** Streptomycin and Neomycin (structures).
5. **Miscellaneous:** Chloramphenicol, Rifampicin (only structure)

LO : Chemistry, structures of currently used drugs, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class.

UNIT - V

Water soluble vitamins: structures of B1, B2, B6, B12, Nicotinic acid, Nicotinamide, Folic acid and Ascorbic acid.

LO : Chemistry, structural features, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses, biological role.

UNIT - VI

Fat soluble vitamins: structures of Vitamin A, Retinoic acid, Vitamin D, Ergosterol

LO: Chemistry including reactions, structural features, interconversions, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses, biological role.

TEXT BOOKS

1. William O. Foye, Textbook of Medicinal Chemistry, Lea & Febiger, Philadelphia.
2. JH Block & JM Beale, Wilson & Giswold's Text book of organic Medicinal Chemistry and

   pharmaceutical chemistry by (Eds), 11th Ed, Lipincott, Raven, Philadelphia, 2004.
3. S. N. Pandeya, Textbook of medicinal chemistry, SG Publ. Varanasi, 2003.
4. Sri Ram, Medicinal Chemistry.
5. Rama Rao Nadendla, Medicinal Chemistry.

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"SYNTHESIS, CHARACTERIZATION & ANTIBACTERIAL ACTIVITY OF 2,3 DIPHENYL QUINOXALINE SULPHONAMIDE DERIVATIVES"

DISSERTATION SUBMITTED TO JNTU-K UNIVERSITYINPARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF PHARMACY

(2018)

Jawaharlal Nehru Technological University, Kakinada, A.P

BY:

N. MALAVIKA	**(143G1R0052)**
ODOGBO ELIZABETH O	**(143G1R0053)**
OLALEYE MODINAT .A.	**(143G1R0054)**
ONWUKAIKE O CHIJIOKE	**(143G1R0055)**
P.NARMADA	**(143G1R0056)**

Under the guidance of,

Ms. M.Bhagya lalitha M.S.Pharma
Asst. Professor

Department Of Pharmaceutical Chemistry
Aditya Pharmacy College
Surampalem-533437
2017-2018

CERTIFICATE

This is to certify that the dissertation entitled "synthesis, characterization and evaluation of antibacterial activity of 2,3 Diphenyl Quinoxaline Sulphonamide Derivatives submitted to the JNTU-K University, Kakinada, in partial fulfilment of the requirements for the award of the degree of Bachelor of Pharmacy is a record of original research work carried out by N.Malavika (143G1R0052), Odogbo Elizabeth(143G1R0053), Olaleye Modinat Ronke(143G1R0054), Onwukaike O. Chijioke (143G1R0055), P.Narmada (143G1R0056),under the supervision of Miss.Bhagya lalitha and it has been previously not submitted to any other University of Academic Instituition for any higher degree.

Place: Surampalem

Date: 22-03-2018

Dr.K.Divakar M.Pharm, Ph.D.

Principal and Professor,
Aditya Pharmacy College.

Internal Examiner

External Examiner

ABSTRACT

Quinoxaline have become attractive target of extensive research due to its inherent properties and therapeutic uses. Quinoxaline finds many pharmacological activities like antibacterial, antifungal, anti tuberculer, anti-inflammatory, anti-hyperglycemic, antitumor etc. The present study includes the synthesis of sulfonamide derivatives of quinoxaline, by using 2,3 diphenyl Quinoxaline sulphonyl chloride and substituted primary amines . All derivatives were characterized by IR, 1HNMR. Quinoxaline sulfonamide derivatives were then subjected to antimicrobial screening against different strains of bacteria viz., *Staphylococcus aureus, Bacillus subtilis, Escherichia coli, Proteus vulgaris* at 500µg/ml and 800 µg/ml concentration by using agar well diffusion technique. The results were compared with the standard antibiotics Gentamycin (50 µg/ml). The results of antibacterial susceptibility testing revealed that all sulfonamides derivatives showed more pronounced effect.

7. SUMMARY & CONCLUSION

- In the present study, sulphonamides from 2,3-Diphenyl quinoxaline were synthesized and characterized by IR and NMR spectral data.
- The synthesized compounds were screened for their antibacterial activity.
- All compounds exhibited moderate to potent antibacterial activity.
- Compounds PABASD, AAPSD & TUSD showed good antibacterial activity.

Future prospectus:

Further analysis of structure mass spectroscopy is required to interpret the synthesized compounds & more extensive study is needed to confirm the mode of action studies to optimize the effectiveness of this compounds.

III Year –II SEMESTER

T	P	C
0	3	2

PHARMACEUTICAL BIOTECHNOLOGY LAB

1. Isolation of antibiotic producing microorganism from soil.
2. Enzyme immobilization by Ca-alginate method.
3. Determination of minimum inhibitory concentration of the given antibiotic. Antibiotic assay by cup plate method.
4. Collection, Processing, Storage and fractionation of blood.
5. Standardization of Cultures.
6. Microbiological assay of Antibiotics / Vitamins.
7. Production of alcohol by fermentation techniques.
8. Comparison of efficacy of immobilized cells.
9. Sterility testing of Pharmaceutical products.
10. Isolation of mutants by gradient plate technique.
11. Preparation of bacterial vaccine.
12. Preparation of blood products / Human normal immunoglobulin injection.
13. Extraction of DNA.
14. Separation techniques : Various types of Gel Electrophoresis, Centrifugation.

SYNTHESIS, CHARACTERISATION AND ANTI BACTERIAL EVALUATION OF 6-[4-SUBSTITUTED PHENYL] - 4-PHENYL-1, 3-THIAZINE-2-AMINES

Dissertation Submitted to

JNT UNIVERSITY

KAKINADA

In Partial fulfillment for the award of the degree of

BACHELOR OF PHARMACY

BY

Pallavi Kumari (143G1R0057)

P.V.V. Prasad (143G1R0058)

P. Gowtham (143G1R0059)

P. Jyothi (143G1R0060)

P. Jaswanth (143G1R0061)

Under the guidance of

Mr. K. GOVINDARAO, M.Pharm. (Ph.D)

Associate Professor

ADITYA PHARMACY COLLEGE, SURAMPALEM, ANDHRA PRADESH, INDIA-533 437

BATCH: 2014- 2018

ADITYA PHARMACY COLLEGE

(Affiliated to PCI, AICTE & JNTUK)

Surampalem - 533437, E. G. District, Andhra Pradesh

CERTIFICATE

This is to certify that the dissertation work entitled a study on "SYNTHESIS, CHARACTERISATION AND ANTI BACTERIAL EVALUATION OF 6-[4-SUBSTITUTED PHENYL] - 4-PHENYL-1, 3-THIAZINE-2-AMINES" submitted in partial fulfillment of the degree in Bachelor of Pharmacy of the JNT University, Kakinada for the academic year 2014-2018. This is a bonafide work carried out by Pallavi Kumari (143G1R0057), P.V.V. Prasad (143G1R0058), P. Gowtham (143G1R0059), P. Jyothi (143G1R0060), P. Jaswanth (143G1R0061) under the direct guidance and supervision of Mr. K. GOVINDARAO, M.Pharm., (Ph.D)., Associate Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh.

(Internal Examiner)

(External Examiner)

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ABSTRACT

Claisen- Schmidt condensation of acetophenone and aryl aldehydes yields chalcone derivatives which on treatment with thiourea undergo cyclization in basic medium to yield 6-[4-substituted phenyl]- 4-phenyl-6H-1,3-thiazine-2-amines. About this scheme we synthesized five derivatives of thiazines and a melting point of the reaction products were determined by melting point apparatus and was recorded. Purity of the compounds was ascertained by Thin Layer Chromatography on silica gel plates using iodine as visualizing agent. The structures of the synthesized compounds were characterized and confirmed by IR, ^{1}H NMR. This scheme of reaction went to completion within 3 hr. After completion of reaction and work up the products were identified and characterized by using IR and $_1$HNMR techniques and their structures were elucidated as 4, 6-diphenyl-6H-1,3-thiazin-2-amine, 6-[4-(dimethyl amino) phenyl]-4-phenyl-6H-1, 3-thiazin-2-amine, 6-[4-(methoxy) phenyl]-4-phenyl-6H-1, 3-thiazin-2-amine, 6-[4-(chloro) phenyl]-4-phenyl-6H-1, 3-thiazin-2-amine, 6-[4-(notro) phenyl]-4-phenyl-6H-1, 3-thiazin-2-amine. The isolated yield was 80%, 82%, 81%, 85%, 83%. In the study of antibacterial activity, all the synthesized compounds could show the activity, among these the compounds G1 (4, 6-diphenyl-6H-1,3-thiazin-2-amine), G3 (6-[4-(methoxy) phenyl]-4-phenyl-6H-1, 3-thiazin-2-amine), G5 (6-[4-(notro) phenyl]-4-phenyl-6H-1, 3-thiazin-2-amine), show maximum significance against all the organisms. But the maximum significance shows against *E. coli* & *S. Aeroginosa* the data given in the Table No-1. Rest of the compounds shows poor to moderate activity when compared to Ciprofloxacin as standard drug.

Keywords: Chalcone, thiourea, aromatic aldehydes, sodium hydroxide, Claisen- Schmidt condensation, cup-plate method.

ompounds shows poor to moderate activity when compared to standard drug. Therefore a etailed study of toxicity is necessary.

There is no such a thing as completely safe drugs. Drugs are powerful tools, which alter hysiological processes for the better or for the worse. A society that wishes to benefit from em will not achieve all the benefits open to it, if it ignores the fact and seeks for impossible andards of harmlessness.

Further the detailed structural activity relationship studies are required along with the olecular manipulation i.e. molecular modeling may give better drugs. Molecules prepared for e biological testing do not always turn out as potential new drugs, but may be intended to serve s models for evaluation of hypothesis.

IV Year –I SEMESTER

T	P	C
0	3	2

CHEMISTRY OF NATURAL PRODUCTS LAB

1. Preparation of different alkaloids testing reagents like Dragondroff, Mayer, Wagner's, etc., and testing some alkaloids and plant extracts using these reagents.
2. Identification of alkaloids by specific colour tests.
3. Test for steroids, steroidal glycosides and cardiac glycosides. Liberman-Burchard test, Salkowski reaction, Kedde reaction etc.
4. Tests for flavanoids and their glycosides. Shinoda test (Mg/Hcl test), $Fecl_3$ test.
5. TLC and examination of alkaloids, steroids, steroidal glycosides and cardiac glycosides.
6. Identification of natural products.
7. Extraction of caffeine from tea leaves.
8. Extraction of lactose from milk.
9. Extraction of nicotine from tobacco.
10. Extraction of piperine from black pepper.
11. Extraction of lycopene from tomatoes.
12. Extraction of β-carotene from carrots.
13. Volatile oil production by steam distillation ***(demonstration only).***

TEXT BOOKS

1. Indian Pharmacopoeia-1996.
2. Weagners, Phytochemical methods of Drug Analysis.
3. C.K.Kokate, Practical Pharmacognosy.

IV Year –I SEMESTER

T	P	C
0	0	0

PROJECT COMMENCEMENT

A STUDY ON PRELIMINARY PHYTOCHEMICAL SCREENING & IN-VITRO ANTIBACTERIAL AND ANTHELMINTIC ACTIVITY OF ETHANOLIC EXTRACT OF *PROSOPIS JULIFLORA*

Dissertation Submitted to

JNT UNIVERSITY

KAKINADA

In partial fulfillment for the award of the degree of

BACHELOR OF PHARMACY

BY

S. Samarpan Kumar(143G1R0067)

Satish Kumar(143G1R0068)

S. Naveen Chand(143G1R0069)

S. Devi Priya(143G1R0071)

Sushmita Singh (143G1R0072)

Under the guidance of

S.Nageswara Rao, M.Pharm.,(Ph.D.)

Associate Professor

Aditya Pharmacy College, Surampalem, Andhra Pradesh, India-533 437

Batch: 2014- 2018

ADITYA PHARMACY COLLEGE
(Affiliated to PCI, AICTE & JNTUK).
Surampalem-533437, E.G.District, Andhra Pradesh.

CERTIFICATE

This is to certify that the dissertation work entitled a study on "A STUDY ON PRELIMINARY PHYTOCHEMICAL SCREENING & IN-VITRO ANTIBACTERIAL AND ANTHELMINTIC ACTVITY OF ETHANOLIC EXTRACT OF *PROSOPIS JULIFLORA*"submitted in partial fulfillment of the degree in Bachelor of Pharmacy of the JNT University, Kakinada for the academic year 2014-2018. This is a bonafide work carried out by *S. Samarpan Kumar(143G1R0067), Satish Kumar (143G1R0068), S. Naveen Chand (143G1R0069), S. Devi Priya (143G1R0071), Sushmita Singh (143G1R072)*, under the direct guidance and supervision of S. Ngeswara Rao M.Pharm., (Ph.D.), Associate Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh.

(Internal Examiner)

(External Examiner)

ADITYA PHARMACY COLLEGE * SURAMPALEM

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SURAMPALEM 533 437

DECLARATION

We hereby declare that the dissertation work entitled "**A STUDY ON PRELIMINARY PHYTOCHEMICAL SCREENING & IN-VITRO ANTIBACTERIAL AND ANTHELMINTIC ACTIVITY OF ETHANOLIC EXTRACT OF *PROSOPIS JULIFLORA***" in partial fulfillment of the degree in Bachelor of Pharmacy of the JNT Unversity, Kakinada for the academic year 2013-2017, was carried out by us in the library and laboratories of Aditya Pharmacy College, Surampalem, Andhra Pradesh under the valuable and efficient guidance and supervision of Mr. S.Nageswara Rao, M.Pharm.,(Ph.D.),.Associate Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh. We also declare that the matter embodied in it is a genuine work.

S. Samarpan Kumar
Satish Kumar
S. Naveen Chand
S. Devi Priya
Sushmita Singh

S. Samarpan Kumar (143G1R0067)
Satish Kumar (143G1R0068)
S. Naveen Chand (143G1R0069)
S. Devi Priya (143G1R0071)
Sushmita Singh (143G1R0072)

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SUMMARY AND CONCLUSION:

- The preliminary phytochemical screening of the crude extracts revealed that ,the leaves of *prosopis juliflora* extract containsflavanoids and tannins .
- The antibacterial activity of leaves of*Prosopisjuliflora* may be due to the presence of flavonoids.
- The results obtained in the experimental study of antibacterial activity suggest that the ethanolic extracts of leaves of *Prosopis julifloras*has broad spectrum of activity, means it is having the ability to kill both gram+ve and gram-ve bacteria.
- The anthelmintic activity of *prosopis juliflora* may be due to the presence of tannins
- The results obtained in the experimental study of anthelmintic activity suggest that the ethanolic extracts of leaves of *Prosopis juliflora* has beneficial anthelmintic activity against the Indian earth worms(Pherithimaposthuma)
- so,it can be used in the control of Helmintic infection's namely Ascariasis,Hookwarm infections etc....

II Year – II SEMESTER

T	P	C
3+1	0	3

MEDICINAL CHEMISTRY-I

UNIT-I

Heterocyclic compounds:

1. Five and six membered ring systems with heteroatoms: Furan, pyrrole, thiophene, pyridine, imidazole, pyrazole, oxazole, isoxazole, thiazole and pyrimidine.
2. Fused ring systems with heteroatoms: Quinolines, isoquinolines, acridine, benzimidazole and phenothiazine.

LO : Nomenclature (numbering), one or two methods of preparation, important reactions, mechanisms and examples of drugs having the above ring systems.

UNIT-II

1. **Drug activity and physico-chemical properties:** solubility, partition coefficient, hydrogen bonding, chelation, surface activity, bioisosterism, optical and geometrical isomerism, prodrugs and soft drugs.
2. **Mechanism of drug action:** receptor theories, enzyme stimulation and enzyme inhibition.
3. **Drug metabolism:** Phase I and Phase II reactions, factors affecting drug metabolism.

LO : Concepts involving receptors, drug-receptor interaction forces, mechanisms, equations, structures, advantages.

UNIT-III

Drugs acting on CNS:

1. Hypnotics and anxiolytics: Phenobarbital, diazepam and alprazolam.
2. Antipsychotics: chlorpromazine and haloperidol.
3. Antiepileptics: phenytoin, carbamazepine, valproate sodium.
4. Antidepressants: imipramine, amitriptyline, Isocarboxazide, iproniazide.
5. General anaesthetics: ketamine, halothane and thiopental sodium.

LO : Definition, scope, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class.

UNIT-IV

1. **Adrenergic drugs:** Amphetamine, salbutamol, ephedrine, phenylephrine and dopamine.
2. **Adrenergic blockers:** Prazosine, tolazoline, Propranolol, atenolol
3. **Cholinergic drugs:** Carbachol, bethanichol.
4. **Anticholinergics:** propantheline, dicyclomine.
5. **Neuromuscular blockers:** succinyl choline.

LO : Definition, scope, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class.

UNIT-V

1. **Analgesics and Non-steroidal anti-inflammatory agents (NSAIDs) :** paracetamol, aspirin, ibuprofen, indomethacin, diclofenac.
2. **Narcotic analgesics :** mepridine, methadone.
3. **Local anaesthetics :** benzocaine, procaine, lignocaine and dibucaine

LO : Definition, scope, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class, an understanding of morphinans, its agonists and antagonists.

UNIT-VI

1. **Oral antihyperglycemic agents**: tolbutamide, gliclazide, glipizide, glibenclamide, metformin and pioglitazone.
2. **Thyroid drugs:** methimazole, propylthiouracil.
3. **H1-receptor antagonists:** diphenhydramine, chlorpheniramine, chlorcyclizine, cetrizine.
4. **H2-receptor antagonists:** ranitidine
5. **Proton pump inhibitors:** Omeprazole, rabeprazole, lansaprazole.

LO : Definition, scope, classification, mode of action, Structure-Activity Relationship (SAR) wherever applicable, therapeutic uses and synthesis of compounds as given above under each class, an understanding of morphinans, its agonists and antagonists.

TEXT BOOKS

1. William O. Foye, Textbook of Medicinal Chemistry, Lea Febiger, Philadelphia.

INVITRO ANTI-HELMINTHIC & ANTI-INFLAMMATORY ACTIVITY OF ETHANOLIC PLANT EXTRACT OF *AVICENNIA OFFICINALIS*

DISSERTATION SUBMITTED TO

JNTU KAKINADA

In partial fulfillment for the requirement of the degree of

BACHELOR OF PHARMACY

BY

Preethi Undru (143G1R0062)

Lakshmi Sudha Pulagam (143G1R0063)

Lakshmi Priya Rangula (143G1R0064)

Tejaswi Reddy (143G1R0065)

Yogiraj sakhare (143G1R0066)

Under the guidance of

K. Hari Kamesh Kiran (m.pharm)

Assistant Professor

ADITYA PHARMACY COLLEGE, Surampalem, Andhra Pradesh, India-533 437

Batch: 2014- 2018

ADITYA PHARMACY COLLEGE
(Affiliated to PCI, AICTE &JNTUK).
Surampalem.533437,E.G.District,AndhraPradesh.

CERTIFICATE

This is to certify that the dissertation work entitled a study on "INVITRO ANTI-HELMINTHIC & ANTI-INFLAMMATORY ACTIVITY OF ETHANOLIC PLANT EXTRACT OF *AVICENNIA OFFICINALIS*" submitted in partial fulfillment of the degree in Bachelor of Pharmacy of the JNT University, Kakinada for the academic year 2014-2018. This is a bonafide work carried out by *Preethi undru (143G1R0062), Lakshmi Sudha Palagam (143G1R0063), Lakshmi Priya Rangula (143G1R0064), Tejaswi Reddy (143G1R0065), Yogiraj sukhare (143G1R0066)*, under the direct guidance and supervision of, ***K. Hari Kamesh Kiran,(m.pharm)*** Assistant Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh.

(Internal Examiner)

(External Examiner)

ADITYA PHARMACY COLLEGE * SURAMPALEM *

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

We hereby declare that the dissertation work entitled "INVITRO ANTI-HELMINTHIC & ANTI-INFLAMMATORY ACTIVITY OF ETHANOLIC PLANT EXTRACT OF *AVICENNIA OFFICINALIS*" in partial fulfillment of the degree in Bachelor of Pharmacy of the JNT Unversity, Kakinada for the academic year 2014-2018, was carried out by us in the library and laboratories of Aditya Pharmacy College, Surampalem, Andhra Pradesh under the valuable and efficient guidance and supervision of K. Hari Kamesh Kiran, Assistant Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh. We also declare that the matter embodied in it is a genuine work.

Preethi undru (143G1R0062). Preethi . U

Lakshmi Sudha Pulagam (143G1R0063). Lakshmi Sudha . P

Lakshmi Priya Rangula(143G1R0064). Lakshmi Priya . R

Tejaswi Reddy (143G1R0065). R. Tejaswi

Yogiraj sakhare (143G1R0066). yogiraj Sakhare .

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Aditya Pharmacy College

7. CONCLUSION :

Medicinal plants are potential renewable natural resources and are generally considered to play a beneficial role in human health care. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body. The most important of these bioactive compounds are alkaloids, flavonoids, tannins and phenolic compounds.

This thesis establishes a marked anthelminthic and anti-inflammatory activity of ethanolic extract of the whole plant of Avicennia officinalis. However actual anti-inflammatory and anti-helminthic ingredients need to be extracted and identified also its tolerable levels in the human body as well as any toxic effects on human and animal tissues has to be investigated accordingly. This investigation has opened up the possibility of the use of this plant in drug development. However, before coming to the conclusive statement, further research is needed to investigate the bio-active constituents which are responsible for this biological activities.

IV Year –I SEMESTER

T	P	C
3+1	0	4

PHARMACEUTICAL ANALYSIS – II

UNIT – I

Visible, UV & IR Spectrophotometry: Principle, Electron Transition, Beer-Lamberts Law & Deviations, Chromophores, Instrumentation – Construction of Single Beam and Double Beam Spectrophotometers, Applications.

LO : To understand principles, instrumentations and working of UV and its Spectrophotometers – applications with examples.

UNIT - II

NMR, Electron Spin Resonce Spectroscopy and Mass Spectrometry: Basic Principle, Instrumentation and Applications.

LO : To understand principles, instrumentations, applications with examples of NMR, ESR, Mass spectrometry.

UNIT - III

Basic Principles and applications of differential thermal analysis (DTA) and differential scanning colorimetry (DSC).

Basic Principles and applications of Atomic absorption spectroscopy, XRD, Emission spectroscopy and Raman spectroscopy.

Optical rotatory dispersion (ORD) and Circular dichroism: General Principle and Applications.

Radio Immuno Assay & Enzyme Linked Immuno Sorbate Assay.

LO : To understand basic principles and applications of DTA, DSC, XRD, Atomic absorption, Emission, Raman, ORD and Radio Immuno Assay.

UNIT – IV

Chromatography: Column chromatography, Paper chromatography, TLC, Ion exchange chromatography. Gel chromatography.

LO : To understand principles and procedures of various types of chromatography with examples.

UNIT – V

GLC, HPLC, HPTLC

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SURAMPALEM 533 437

LO : To understand principles, instrumentations and applications of GLC, HPLC, HPTLC .

UNIT – VI

LCMS and Electrophoresis: Scope, Different types Electrophoresis and applications.

LO : To understand principles, instrumentations and applications of LCMS and Electrophoresis.

TEXT BOOKS

1. R.M. Silvesterin and G.C. Bassler.Spectrometric Identification of Organic Compounds.
2. AH Beckett & Stenlake, Text book of Practical Pharmaceutical chemistry, Vol.I&II CBS Publ.
3. AI Vogel, Quantitative Chemical Analysis.
4. Hobart. H. Willard and others, Instrumental methods of analysis, CBS publ and Distributors New Delhi.
5. Robert D. Brown, Introduction to Instrumental Analysis.
6. Skoog, Principles of Instrumental Analysis.
7. B.K.Sharma, Instrumental and Chemical Analysis, Goel Publ House , Hyderabad.

REFERENCES

1. Settle, Handbook of Instrumental Techniques for Analytical Chemistry.
2. Y.Anjaneyulu & Maraiah, Quality Assurance & Quality Management in Pharmaceutical Industry.
3. P.D. Sethi, Quantitative analysis of Drugs and Pharmaceuticals.
4. K. A. Connors, A Textbook of pharmaceutical analysis, Wiley Interscienc, NY.
5. A.M. Knevel & F.E. Digengl, Jenkin's quantitative pharmaceutical chemistry, Mc Graw Hill Book Co., NY.
6. Pharmacopoeia (IP, BP, USP, PhI, Eu. PhI).

SYNTHESIS AND BIOLOGICAL EVALUATION OF NOVEL SCIFF BASES DERIVED FROM 6-AMINO PENICILLANIC ACID BY USING ALIPHATIC ALDEHYDES

DISSERTATION SUBMITTED TO THE JNTU-K IN PARTIAL FULFILMENT FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE
IN

PHARMACY

SUBMITTED BY

K. VINAY KUMAR REDDY
(143G1R0083)

G. SHAMEER REDDY
(133G1R0020)

USMAN AL-MUSTAPHA ORUMA
(143G1R0084)

ROHAN PRATIHAR
(133G1R0072)

UNDER THE GUIDANCE OF

CH. HEMANTH KUMAR
(M. Pharm)
Assistant Professor
Dept. of Pharmaceutical Analysis

Aditya Pharmacy College
Surampalem, East Godavari dist, 533437

(2018)

ADITYA PHARMACY COLLEGE

(Affiliated to JNTUK)

CERTIFICATE

This is certify that project entitled as **"Synthesis and Biological Evaluation of Novel Schiff Bases Derived from 6- amino penicillanic acid with aliphatic aldehydes"** by K. Vinay Kumar Reddy, Usman Al-Mustapha Oruma, G. Shameer Reddy, Rohan Pratihar, submitted in the partial fulfillment for the award of Degree of Bachelor of Pharmacy were carried out at our college under the guidance and supervision of **Mr. Ch. Hemanth Kumar**, Assistant Professor, Department of Pharmaceutical Analysis, Aditya Pharmacy of College, Surampalem during academic year 2014-2018 Place: Surampalem

Dr.K.Divakar,
M.Pharm, Ph.D
Principal and Professor,
Aditya Pharmacy College

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

Place: **Surampalem**

Date: 22/03/18

Internal Examiner

ADITYA PHARMACY COLLEGE * SURAMPALEM *

External Examiner

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

The project embodied in this thesis entitled "**Synthesis and Biological evaluation of New Schiff bases derived from 6-Aminopenicillanic acid with aliphatic aldehydes**" was carried out in the department of pharmaceutical chemistry under the guidance of **CH.Hemanth Kumar , Aditya Pharmacy College, Surampalem.** The content and source of information derived from the existence literature have been indicated throughout thesis of the project work at appropriate places.

K. VINAY KUMAR REDDY
(143G1R0083)

USMAN AL-MUSTAPHA ORUMA
(143G1R0084)

G. SHAMEER REDDY
(133G1R0020)

ROHAN PRATIHAR
(133G1R0072)

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

6. SUMMARY& CONCLUSION

In the present study, Schiff bases from 6- Amino Penicillanic acid were synthesized and characterized by IR spectral data. The synthesized compounds were screened for their antibacterial activity. All compounds exhibited moderate to potent antibacterial activity.

Future prospectus:

Further analysis of structure by NMR, mass spectroscopy is required to interpret the synthesized compounds.

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III Year –I I SEMESTER

T	P	C
3+1	0	4

PHARMACEUTICAL TECHNOLOGY - II

UNIT - I

Capsules: Advantage and disadvantages of capsule dosage forms, material for production of hard and soft gelatin capsules, sizes of capsules, capsule filling, soft processing problems in capsule manufacturing, importance of base absorption and minimum/gm factors in soft capsules, quality control, stability testing and storage of capsule dosage forms.

LO : To understand Capsule formulation, Types, Manufacturing and evaluation – Quality Control – Stability testing-storage.

UNIT - II

Microencapsulation: Types of microencapsulation and importance of microencapsulation in pharmacy, microcapsulation by coacervation phase separator, multi orifice centrifugal separation. Spray drying, spray congealing, polymerization complex emulsion, air suspension technique, and pan coating techniques, evaluation of microcapsules.

LO : To understand microencapsulation – Applications, Methods of Preparations. evaluation – Applications of Microcapsules.

UNIT - III

Tablets: Formulation of different types of tablets, granulation technology on large-scale by various techniques, types of tablet compression machinery and the equipments employed evaluation of tablets.

LO : To understand tablet formulations, additives- manufacturing methods-equipment-Evaluation of quality & Control.

UNIT - IV

Coating of Tablets: Types of coating, coating materials and their selection, formulation of coating solution, equipment for coating, coating processes, evaluation of coated tablets.

LO : To understand types of tablet coating – coating solutions- Equipment-Process- Evaluation of Coating tablets.

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UNIT - V

Parenteral Products

a. Preformulation factors, routes of administration, water for injection, treatment

apyrogenicity, non-aqueous vehicles, isotonicity and methods of its adjustment.

b. Formulation details, container and closures and selection.

c. Prefilling treatment, washing and sterilization of containers and closures, preparation of

solution and suspensions, filling and closing of ampules, vials, infusion fluids,

lyophilization & preparation of sterile powders, equipment for large-scale manufacture

and evaluation of parenteral products.

d. Aseptic techniques, sources of contamination and method of prevention. Design of

aseptic area, laminar flow benches, services and maintenance.

LO : To understand Formulations, Preformulations, additives, Manufacturing methods, containers, Packaging, evaluation of Parentrals – quality control, Types of sterile powders, aseptic processing facilities.

UNIT - VI

Packaging of Pharmaceutical products:

Packaging components, types, specifications and methods of evaluation as per I.P. Factors influencing choice of containers, package testing, legal and other official requirements for containers, packing testing.

Methods of packing of solid, liquid and semi-solid dosage forms, Factors influencing packing material, stability aspects of packaging.

LO : To understand Packaging components- types, specifications and evaluation methods of packaging materials and containers- legal and official requirements.

TEXT BOOKS

1. L. Lachman, H.A, Lieberman and J.L. Kanig, Theory & Practice of industrial pharmacy, Lea & Febieger, Philadelphia Latest Edn.
2. HC Ansel introduction to Pharmaceutical Dosage forms .
3. Pharmaceutical Dosage forms Tablet by Lieberman, Lachman.

4. CVS. Subramanyam, Pharmaceutical production and management, Vallabh Prakashan, New Delhi 2005.

REFERENCES

1. Sagarian & MS Balsam, Cosmetics Sciences &Technology,Vol.1, 2 & 3
2. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences
3. E.A.Rawlkins Bentley's Text Book of Pharmaceutics, Elbs publ
4. S.H. Willing, M.M Tucherman and W.S. Hitchings IV, Good Manufacturing Practices for

   Pharmaceuticals: A Plan for Total Quality Control, 2nd ed, Marcel Dekker, Inc., New York

   1998.
5. Gilbert S. Banker and Christopher T Rhodes, Modern Pharmaceutics, IVth ed, marcel

   dekker, usa, 2005.
6. Yiew chien, novel drug delivery systems, 2nd ed, marcel dekker 2003.
7. Robert. A. Nash, Pharmaceutical Process Validation, 3rd Ed Marcel Dekker, 2003.
8. Good Manufacturing Practices – Schedule M. Read With The Drugs And Cosmetic Rules

   1945
9. M.E. Aulton, Pharmaceuitcs- The science of Dosage form Design 2nd ed.

"FORMULATION AND EVALUATION OF CIPROFLOXACIN TABLETS BY USING RAW BANANA POWDER AS NATURAL SUPER DISINTEGRANT"

Dissertation submitted to the JNTU-K University in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy.

(2018)

Jawaharlal Nehru Technological University, Kakinada, A.P

BY:

V.RADHIKA	(143G1R0078)
V.USHASRI LAVANYA	(143G1R0079)
V.SIRISHA	(143G1R0080)
Y.UMA PRIYANKA	(143G1R0081)
Y.JAYASRI	(143G1R0082)

Under the guidance of,

Mrs.SRIDEVI GOWRIPATTAPU M.Pharm

Asst. Professor

Department of pharmaceutics

Aditya Pharmacy College

Surrampalem-533437

2017-2018

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

CERTIFICATE

This is to certify that the dissertation entitled ***"Formulation and Evaluation of Ciprofloxacin tablets by using Raw banana powder as natural super disintegrant"****, submitted to the JNTU-K University, Kakinada, in partial fulfilment of the requirements for the award of the degree of* ***Bachelor of Pharmacy*** *is a record of original research work carried out by* ***V.Radhika(143G1R0078), V.Usha sri lavanya (143G1R0079), V.Sirisha(143G1R0080), Y.Umapriyanka(143G1R0081), Y.Jayasri(143G1R0082*** *under the supervision of* ***Mrs. Sridevi Gowripattapu*** *and it has been previously not submitted to any other University of Academic Institution for any higher degree.*

Dr. K. Divakar, M.Pharm, Ph.D.
Principal and Professor,
Aditya Pharmacy College,
Surampalem.

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

Place: Surampalem
Date: 22/3/2018

Internal Examiner

External Examiner

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

The project embodied in this thesis entitled "Formulation and Evaluation of Ciprofloxacin tablets by using raw banana powder as natural super disintegrant", was carried out in the Department of Pharmaceutics under the guidance of Mrs.Sridevi Gowripattapu, M.Pharm, Aditya Pharmacy College, Surampalem. The extent and source of information derived from the existence literature have been indicated throughout thesis of the project work at appropriate places.

V.Radhika (143G1R0078) V. Radhika

V.Ushasri lavanya(143G1R0079) V. Ushasri lavanya

V.Sirisha (143G1R0080) V. Sirisha

Y.Uma priyanka (143G1R0081) Y. Uma Priyanka

Y.Jayasri (143G1R0082) Y. Jayasri

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SURAMPALEM-533 437

9. SUMMARY AND CONCLUSION

From the experimental data, it can be concluded that

- The approach of the present study was to make a comparative evaluation of drug release profile between natural super disintegrant (banana powder) & synthetic super disintegrant (Cross Carmellose sodium).
- Oro dispersible tablets of ciprofloxacin were prepared and evaluated. In the present study 4 formulations were prepared. Two formulations with natural super disintegrant and other two formulations with synthetic super disintegrant.
- Standard curve of ciprofloxacin was determined in p^H7.4 phosphate buffer by plotting absorbance V/s concentration at 257 nm and it follows the Beer's law. The R^2 is 0.999 respectively.
- Preformulation studies of Ciprofloxacin were performed, the FT-IR analysis revealed that the natural superdisintegrant raw banana powder used was compatible with Ciprofloxacin. The correlation value is 0.095.
- Angle of repose was less than 25° and Carr's index values were less than 20 for the formulations of all the batches indicating excellent to fair flowability and compressibility. Hausner's ratio was less than 1.256 for all the batches indicating good flow properties. The pre and post compression studies shown that the formulation is suitable for ODT.
- Ciprofloxacin ODTS can be formulated using direct compression technique. The in vitro studies have shown for F4 that this is a potential drug delivery system for ciprofloxacin with considerably good stability and release profile.

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- Disintegrant action of banana powder 25mg (natural) is faster than Cross carmellose sodium (synthetic).

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II Year – II SEMESTER	T	P	C
	3+1	0	3

PHARMACOGNOSY – II(50 Hrs)

Definition, general tests and detailed pharmacognostic study of the following drugs.

UNIT I 08

Glycoside containing drugs:

a. **Saponin Glycosides** : Glycyrrhiza, Ginseng, Discorea, Sarasaparilla & Senega.

b. **Cardioactive Glycosides** : Digitalis, Squill, Strophanthus & Thevetia.

c. **Anthraquinone Glycosides** : Aloe, Senna, Rhubarb & Cascara.

d. **Bitter Glycosides** : Psoralea, Gentian & Chirata.

LO : To understand that Glycisides are isolated from plant sources and have varied action based on aglycone part.

UNIT II 10

Alkaloid containing drugs:

a. **Pyridine – Piperidine derivatives** : Tobacco & Lobelia

b. **Tropane** : Belladona, Hyoscyamus, Datura, Coca & Aswagandha.

c. **Quinoline & Isoquinoline** : Cinchona, Ipecac, Opium.

d. **Indole** : Ergot, Rauwolfia, Vinca, Nux-vomica

e. **Imidazole** : Pilocarpus

f. **Steroid** : Kurchi

a. **Alkaloidal amine** : Ephedra & Colchicum

b. **Glycoalkaloid** : Solanum

c. **Purine** : Coffee, Tea.

LO : To understand that Alkaloids of different structures are synthesized by different plants and possess varied activities based on structure.

UNIT - III

Study of Tannins & Tannin containing drugs: Gambir, Black Catechu, Myroblan&Arjuna. **Study of resins &drugs contining resins**: Benzoin, Asafoetida, Balsam of Tolu, Podophyllum.

LO : To understand that Tannins and Resins and their combination products are produced by different plants.

UNIT- IV 02

Biological sources, preparations, identification tests and uses of the following enzymes: Diastase, Papain, Pepsin, Trypsin, Pancreatin.

LO : To understand that different enzymes of useful nature are produced by plants.

UNIT-V 10

Biogenesis of Phytopharmaceuticals:

General techniques of biosynthetic studies and basic metabolic pathways.

Brief introduction to biogenesis of secondary metabolites of pharmaceuitcal importance.

Biosynthesis of -Tropane, Quinoline, Opium and Indole alkaloids, Steroids and Anthraquinone glycosides.

LO : To understand that Compounds of varied chemical nature are produced by plants (chemodiversity).

UNIT – VI 04

Study of plant fibers like cotton, cotton wood pulp, jute, hemp and flaxused in surgical dressing and related products.

Theapplications of natural dyes like turmeric, henna, saffron, cochineal and marigold in pharmacy.

LO : Plants exhibit a lot of diversity in producing fibres useful for fabrics as well as Dyes to colour them.

TEXT BOOKS

1. Kokate C.K , Purohit AP &Gokhale, The Pharmacognosy S.B (Nirali)
2. Trease and Evans, Pharmacognosy, Latest Edition.
3. Tyler, Brady & Robert, Pharmacognosy.
4. Khare C.P, Indian Medicinal plants – An Illustrated dictionary.

REFERENCES

1. Atal C.K & Kapur B.M, Cultivation & Utilization of Medicinal Plants.
2. Wallis, Textbook of pharmacognosy, Pub by CBS Publishers and distributors, New Delhi.
3. Ayurvedic Pharmacopoeia of India, Pub by Govt. Of India.

"SYNTHESIS CHARACTERISATION AND BIOLOGICAL EVALUATION OF BENZIMIDAZOLES DERIVATIVES"

Dissertation submitted to the JNTU-K University in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy.(2018)

Jawaharlal Nehru Technological University, Kakinada, A.P

BY:

T.SAMANVAI (143G1R0073) **T.ADITYA GOPAL (143G1R0074)**

T.N.V.SAIRAM (143G1ROO75) **T.HOQUE ANSARI (143G1R0076)**

UTKARSH VERMA (143G1R0077)

Under the guidance of,

Mrs.SRILAKSHMI.D M.Pharm,(ph.D) ,

Asst. Professor

Department of pharmaceutical chemistry

Aditya Pharmacy College

Surrampalem-533437

2014-2018

CERTIFICATE

This is to certify that the dissertation entitled ***"Synthesis Characterisation and Biological Evaluation of benzimidazoles derivatives"****, submitted to the JNTU-K University, Kakinada, in partial fulfilment of the requirements for the award of the degree of* ***Bachelor of Pharmacy*** *is a record of original research work carried out by T.Samanwai(143G1R0073), T.Aditya Gopal (143G1R0074), T.N.V.Sairam (143G1R0075), Tozammel Hoque Ansari (143G1R0076), Utkarsh Verma (143G1R0077). We have done this research work under the supervision of* ***Mrs. Sri Lakshmi.D, M Pharm (Ph.D)*** *and it has been previously not submitted to any other University of Academic Institution for any higher degree.*

Place: Surampalem

Date: 22/03/18.

Dr. K. Divakar, M.Pharm, Ph.D.
PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

Internal Examiner

External Examiner

ADITYA PHARMACY COLLEGE * SURAMPALEM

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SURAMPALEM 533 437

ABSTRACT

O-phenylene diamine when treated with aromatic acids in the presence of ammonia yields substitiuted benzimidazoles. We synthesized six derivatives of benzimidazoles and melting point was determined, the purity of the compounds was ascertained by thin layer chromatography on silica gel plates.

Total six compounds were synthesized and all the compounds gave good percentage of yields, their characterization has done on the basis of IR and ^{1}H NMR. The entire reaction has come to an end within 45mins. All the compounds were subjected to biological evaluation where they show good anti-bacterial and anti-helminthic activity.

From the present investigation it is concluded that the synthesized six derivatives of benzimidazoles gave good yield, characterization was performed by IR & ^{1}H NMR and showed good anti bacterial and antihelmintic activity.

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CONCLUSION AND FUTURE SCOPE

An efficient and simple method was developed for the synthesis of benzimidazoles. In this work we synthesized a total of six compounds by using used different aromatic acids

Compounds were synthesized by using O-phenelyene diamine as the starting compound which on treatment with aromatic acids in presence of water yields different substituted benzimidazoles.

The reaction was ending after 45 mins, which on further treatment with ammonia and water gives the crude product.

The crude product was recrystallised by using 10% ethanol. All the compounds gave good yields and their physical data was given in Table 2. Analytical evaluation was carried out by IR and ^{1}H NMR and the results were given in Fig 1-12.

Biological activities of the compounds such as anti-bacterial and anti-helminthic activities were performed.All the compounds gave good results(table no 3 and 4) except compound 4 which didn't showed anti-helminthic activity due to the presence of 2-carboxylic acid groups.

All the synthesized compounds can be futher utilized for performing mass spectroscopy to analyze the structures and the compounds are treated with alkyl halides yields substituted benzimidazoles which are of more active than the obtained compounds and also have more biological activities than the synthesized compounds.

Obtained compounds can be used as starting compounds for obtaining more substituted benzimidazole derivatives.

IV Year –II	T	P	C
SEMESTER	3+1	3	3

QUALITY ASSURANCE, GMP & GLP

UNIT - I

Concept of Quality assurance, philosophy of GMP, CGMP and GLP.

LO : To understand Concept of Quality assurance, philosophy of GMP, CGMP and GLP.

UNIT - II

Organization and personnel, responsibilities, training hygiene - Premises: Location, design, plant layout, construction, maintenance and sanitations, environmental control, sterile areas, control of contamination.

LO : To understand organization and personnel, responsibilities, training hygiene - Premises: Location, design, plant layout, construction, maintenance and sanitations, environmental control, sterile areas, control of contamination.

UNIT - III

Equipments: Selection, purchase specifications, maintenance, clean in place, sterilize in place - Raw materials: Purchase specifications, maintenance of stores, selection of vendors, controls and raw materials.

LO : To understand selection, purchase specifications, maintenance, clean in place, sterilize in place - Raw materials: Purchase specifications, maintenance of stores, selection of vendors, controls and raw materials.

UNIT - IV

Manufacture and controls on dosage forms, manufacturing documents master formula, batch formula records, standard operating procedures, quality audits of manufacturing processes and facilities - In process quality control on various dosage forms: sterile, biological products and non-sterile, standard operating procedures for various operations like cleaning, filling, drying, compression, coating. Packaging and labeling controls.

LO : To understand manufacture and controls on dosage forms, manufacturing documents master formula, batch formula records, standard operating procedures, quality audits of manufacturing processes and facilities - In process quality control on various dosage

forms: sterile, biological products and non-sterile, standard operating procedures for various operations. Packaging and labeling controls.

UNIT - V

Quality Control Laboratory: Responsibilities, good laboratory practices, routine controls, instruments, protocols, non-clinical testing, controls on animal house, data generation and storage, quality control documents, retention samples, records, audits of quality control facilities - Finished products release: quality review, quality audits and batch release document.

LO : To understand responsibilities, good laboratory practices, routine controls, instruments, protocols, non-clinical testing, controls on animal house, data generation and storage, quality control documents, retention samples, records, audits of quality control facilities - Finished products release: quality review, quality audits and batch release document.

UNIT - VI

Distribution and Distribution records: Handling of returned goods, recovered materials and reprocessing Complaints and recalls, evaluation of complaints, recall procedures, related records and documents.

LO : To understand handling of returned goods, recovered materials and reprocessing. Complaints and recalls, evaluation of complaints, recall procedures, related records and documents.

TEXT BOOKS

1. The International Pharmacopoeia Vol. 1,2,3,4, 3rd edition General methods of analysis quality specifications for Pharmaceutical substances, Excipients, dosage forms.
2. Quality Assurance of Pharmaceuticals: A compendium of guidelines and related material Vol. 1 and Vol. 2., WHO, (1999).
3. GMP-Mehra.
4. Pharmaceutical Process validation by Berry and Nash

REFERENCE BOOKS

1. Basic tests for Pharmaceutical substances - WHO (1988 &1991)
2. How to practice GMP's – P.P.Sharma
3. The Drugs and Cosmetic Act 1940- Vijay Malik.
4. Q.A Manual by D.H.Shah.
5. SOP Guidelines by D.H.Shah.
6. Quality Assurance Guide by OPPI.

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

"FORMULATION AND EVALUATION OF ATORVASTATIN LIQUISOLID TABLETS "

Dissertation submitted to the JNTU-K University in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy.

(2018)

Jawaharlal Nehru Technological University, Kakinada, A.P

BY:

A. DivyaBharathi (143G1R0002)

A.DivyaJyothi (143G1R0003)

A.Vijaya MOUNIKA (143G1R0004)

Under the guidance of,

Mrs. Madhavi Latha Samala M.Pharm (Ph.D.)

Asst. Professor

Department of pharmaceutics

Aditya Pharmacy College

Surrampalem-533437

2014-2018

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

CERTIFICATE

This is to certify that the dissertation entitled ***"Formulation and Evaluation of Atorvastatin Calcium Liquisolid Tablets"****, submitted to the JNTU-K University,Kakinada, in partial fulfilment of the requirements for the award of the degree of* ***Bachelor of Pharmacy****is a record of original research work carried out by A.DivyaBharathi (143G1R0002), A.DivyaJyothi (143G1R0003), A.VijayaMounika (143G1R0004), under the supervision of* ***Mrs.MadhaviLathaSamala****and it has been previously not submitted to any other University of Academic Instituition for any higher degree.*

Place: Surampalem

Date: 22/3/18

Dr. K. Divakar, M.Pharm, Ph.D.

Principal and Professor,

Aditya Pharmacy College

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

Internal Examiner 4/4/18

External Examiner

DECLARATION

The project embodied in this thesis entitled "Formulation and Evaluation of Atorvastatin Calcium Liquisolid Tablets", was carried out in the Department of Pharmaceutics under the guidance of Mrs.MadhaviLathaSamala, M.Pharm,(Ph.D.),Aditya Pharmacy College, Surampalem. The extent and source of information derived from the existence literature have been indicated throughout thesis of the project work at appropriate places.

A. DivyaBharathi (143G1R0002)

A.DivyaJyothi (143G1R0003) A. Sri Divya Jyothi.

A. VijayaMounika (143G1R0004) A. Vijay Mounika

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SURAMPALEM 533 437

SUMMARY AND CONCLUSION

Atorvastatin Calcium immediatereleasetablets were prepared by Liquisolid and Direct compression methods by using three different excipient ratios of 5,10,15 andsuper-disintegrant such cross carmellose sodium with Propylene glycol and other excipients like aerosil 200, avicel pH 102, magnesium stearate and talc.

The prepared Liquisolid blends of formulations F_1, F_2, F_3 and Direct compression blends (F_4) were evaluated for their flow properties. All the blends showed good to excellent flow. The blends were compressed in to tablets and the tablets were characterized based upon their physicochemical characteristics like hardness, thickness, friability, weight variation, assay, disintegration test and in-vitro dissolution studies.

The liquisolid formulations showed faster drug release profiles when compared with the direct compression technique. Among all the formulations, F_1liquisolid formulation consisting of carrier and coating excipient ratio 5 showed faster disintegration rate i.e., within 1 min 10 sec and about 95%drug release with at the end of 60 min.

From the present study it can be concluded that the liquisolid system has more advantage than the conventional direct compression technique showing its maximum acceptance in the pharmaceutical industry. Many research works are being carried out on the formulation of fast and immediate release dosage forms based on liquisolid systems.

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SURAMPALEM 533 437

III Year –II SEMESTER

T	P	C
0	3	2

PHARMACOLOGY LAB

1. To calculate the p^{A2} value of mepyramine or chlorampheniramine using histamine as agonist on guinea pig ileum.
2. To record the CRC of 5-HT on rat fundus preparation.
3. To record the CRC of histamine on guinea pig ileum preparation.
4. To study the inotropic and chronotropic effects of drugs on isolated frog heart.
5. To study the effects of drugs on isolated normal and hypodynamic frog heart.
6. Experiments pertaining to analgesia. (*Only demonstration).*
7. Experiments pertaining to anti-convulsant activity. (*Only demonstration).*
8. Experiments pertaining to anti-inflammatory activity (*Only demonstration).*
9. To study the effect of drugs on rat ileum.
10. To determine the hypoglycemic activity of drugs (second generation anti-diabetic drugs) on rabbits / albino rats. ***(Only demonstration).***

ADITYA PHARMACY COLLEGE * SURAMPALEM

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

"IN-VITRO EVALUATION OF ANTI-HELMINTHIC & ANTI-INFLAMMATORY ACTIVITY OF ETHANOLIC PETIOLE EXTRACT OF ABLEMOSCHUS ESCULENTUS"

Dissertation submitted to the JNTU-K University in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy.

(2018)

Jawaharlal Nehru Technological University, Kakinada, A.P

BY:

M. RANI (143G1R0047)

M. HANISHA (143G1R0050)

M. MADHU CHANDANA(143G1R0048)

N. YAMUNA (143G1R0051)

M. TEJA SREE (143G1R0049)

Under the guidance of,

Mrs. K. DURGA DEVI (M. Pharm)

Asst. Professor

Department of pharmacognosy

Aditya Pharmacy College, Surampalem-533437

(2014-2018)

CERTIFICATE

This is to certify that the dissertation entitled "IN-VITRO EVALUATION OF ANTI-HELMINTHIC &ANTI-INFLAMMATORY ACTIVITY OF ETHANOLIC PETIOLE OF ABLEMOSCHUS ESCULENTUS" submitted to the JNTU-K University,Kakinada, in partial fulfilment of the requirements for the award of the degree of ***Bachelor of Pharmacy*** *is a record of original research work carried out by M.Rani(143G1R0047), M.Madhu chandana (143G1R0048), M. Teja sree (143G1R0049), M. Hanisha (143G1R0050), N. Yamuna (143G1R0051), under the supervision of* ***Mrs.Durga devi*** *and it has been previously not submitted to any other University of Academic Institution for any higher degree.*

Place: Surampalem

Date: 28-03-2018

ADITYA PHARMACY COLLEGE SURAMPALEM

Dr.K.Divakar, M.Pharm, Ph.D
Principal and Professor
Aditya Pharmacy College

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

Internal Examiner

External Examiner

ADITYA PHARMACY COLLEGE SURAMPALEM

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

We hereby declare that the dissertation work entitled "IN-VITRO EVALUATION OF ANTI-HELMINTHIC &ANTI-INFLAMMATORY ACTIVITY OF ETHANOLIC PETIOLE OF *ABLEMOSCHUS ESCULENTUS*"partial fulfillment of the degree in Bachelor of Pharmacy of the JNT Unversity, Kakinada for the academic year 2014-2018, was carried out by us in the library and laboratories of Aditya Pharmacy College, Surampalem, Andhra Pradesh under the valuable and efficient guidance and supervision of **Mrs.Durga Devi** Assistant Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh. We also declare that the matter embodied in it is a genuine work.

M. Rani (143G1R0047), M. Rani

M.Madhu chandana (143G1R0048), M. Madhu chandana

M.Teja sree (143G1R0049), M. Teja Sree

M.Hanisha (143G1R0050), M. Hanisha

N.Yamuna (143G1R0051) N. Yamuna.

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SURAMPALEM 533 437

6.CONCLUSION

From the preliminary phytochemical screening, the ethanolic extract of ablemoschus esculentus contains carbohydrates, alkaloids and saponins were present. The *in vitro* anti helminthic and anti inflammatory methods, we can conclude that the ethanolic extract of Ablemoschus esculentus showed a significant anti helminthic and anti inflammatory activities. From the review of literature, these results were somewhat similiar to leaf and seed extracts. Further research study is required to gain closure insights into the exact mechanism of action.

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

I Year – I SEMESTER

T	P	C
3+1	0	3

DISPENSING PHARMACY & ETHICS

UNIT-I

Dispensing Pharmacy: Principles of dispensing, form of prescription, handling of prescription, source of errors for prescription, care required in dispensing procedures including labelling of dispensed products. Weights and Measures, introduction to Latin terms, Percentage calculations, alligation method, proof spirit calculations, displacement value and calculations of isotonicity adjustment. General dispensing procedure- posology calculations of doses.

LO : To understand dispensing principles, procedures, calculations involved, doses.

UNIT-II

Principles involved and procedures adopted in dispensing of the following classes of preparations.

(i) Mixtures
(ii) Solutions – A study of the following solutions – Cresol with soap solution IP, Aqueous Iodine solution IP, Strong solution of Iodine IP, weak iodine solution IP, strong solution of Ammonium acetate.
(ii) emulsions (iv) powders (v) lotions & liniments (vi) ointments

LO : To understand principles and procedures involved in the dispensing of various categories of products.

Unit-III

Dosage forms – Purpose, classification, definitions and general characteristics of the following dosage forms

Solids : Tablet and capsules.

Liquid orals : Elixirs, Syrups, Linctus, Suspensions and Emulsions.

Liquids for external use : Lotions & liniments applications.

Semi solids : Ointments, Creams, Gels, Suppositories and Pessaries.

LO : To understand dosage forms and their general characteristics.

UNIT-IV

Incompatibilities: Physical, chemical and therapeutic incompatibilities – methods of overcoming and handling of incompatible prescriptions.

LO : To understand incompatibility and methods of overcoming incompatibility.

UNIT-V

Extraction and galenical products: Principle and methods of extraction - preparation of infusions, tinctures, dry, soft and liquid extracts.

LO : To understand extraction and galenical products – Principles and procedures.

UNIT-VI

Pharmacy Ethics as prescribed by PCI.

LO: To understand Ethics related to Pharmacy profession as prescribed by PCI.

TEXT BOOKS

1. Cooper & Gunns Dispensing Pharmacy, CBS, Publ. and Distributors New Delhi.
2. R.M Metha, Dispensing Pharmacy.
3. NK Jain and GD Guptha, Modern Dispensing Pharmacy, Pharma Med Press.
4. Sanmathi BS and Anshu Guptha, Dispensing Pharmacy – A Practical Manual, Pharma Med Press.

REFERENCES

1. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences.
2. E.A. Rawlkins, Bentley's Text Book of Pharmaceutics, Elbs publ.
3. Hoover, Dispensing of Medication.

ADITYA PHARMACY COLLEGE * SURAMPALEM *

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF SOFOSBUVIR BY CHEMICAL DERIVATISATION METHOD

is a Dissertation Submitted to the

JNT University, Kakinada

in Partial Fulfillment of the Requirements for the Award of the Degree of

Bachelor of Pharmacy

By

D.K.Priyanka (143G1R0037)
K.Swetha Priyanka (143G1R0038)
K.Anusha (143G1R0039)
K Lalitya(143G10040)
K Indhu Manisha Reddy (143G1R0041)
Krishna Churgarai (143G1R0042)

Under the guidance

Dr. D.Sathis Kumar, M.Pharm. Ph.D.,

Associate Professor

Department of Pharmaceutical Analysis &Quality Control,
Aditya PharmacyCollege
Surampalem – 533 437

2014-2018

ADITYA PHARMACY COLLEGE
(Approved by AICTE & PCI and affiliated to JNT University, Kakinada)
Aditya Nagar, ADB Road, Surampalem, E. G. Dist., A.P.
Pin: 533437,Ph: 08852 200005

Dr. K. Divakar, *M. Pharm., Ph. D.*
Principal & Professor

CERTIFICATE

This is to certify that the dissertation work entitled "METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF SOFOSBUVIR BY CHEMICAL DERIVATISATION METHOD"is submitted to the JNT University, Kakinada in partial fulfillment for the award of the degree of Bachelor of Pharmacy. This is a bonafied work carried out by D.K.Priyanka(143G1R0037), K..Swetha Priyanka(143G1R0038), K.Anusha(143G1R0039), K.Lalitya(143G1R0040), K.Indhu Manisha Reddy(143G1R0041), Krishna Churgarai(143G1R0042) under the guidance of supervision of Dr. D.SATHIS KUMAR, Associate Professor, Aditya Pharmacy College, Surampalem.

ADITYA PHARMACY COLLEGE SURAMPALEM

Place: Surampalem
Date: 22/03/18

Principal
(Dr.K.Divakar)
Aditya Pharmacy College
SURAMPALEM-533 437

ADITYA PHARMACY COLLEGE SURAMPALEM

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

ABSTRACT

A simple, economic, accurate chemical derivatisation method was developed for the Sofosbuvir in UV spectrophotometric method. Ferric chloride reagent was used for the chemical derivatisation. The maximum absorption was observed at 400 nm. The linearity range was found to be 5-25µg /ml. The proposed method was validated. The reports was expressed that the proposed method was found to be simple, precise, accurate and rapid for determination of Sofosbuvir from pure and its dosage forms.

Keywords: Sofosbuvir, Ferric chloride, Linearity, Robustness,

1.2.CONCLUSION:

- The present developed method was precise, specific, rugged, linear and accurate.
- The advantages of optimised method was its specific procedure for sofosbuvir estimation.
- The satisfying recoveries and low coefficient of variation confirmed the suitability of proposed method for routine analysis of sofosbuvir in bulk drug.

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

III Year – I SEMESTER

T	P	C
3+1	0	3

PHARMACOLOGY – I

UNIT - I

General Pharmacology: Introduction to pharmacology, sources of drugs, dosage forms and routes of administration, mechanism of action, Structural activity and relationship (SAR), factors modifying drug action, tolerance and dependence; Pharmacogenetics; Enzyme Induction & Inhibition; Absorption, distribution metabolism and excretion of drugs; Principles of drug discovery and development of new drugs.

LO : Knowledge imparting basic concepts of Pharmacology, mechanism of action of drugs, SAR, Pharmacokinetics and drug discovery.

UNIT - II

Pharmacology of Autonomic Nervous System:

Neurohumoral transmission in peripheral nervous system (autonomic and Somatic).

Parasympathomimetics & parasympatholytics, sympathomimetics & sympatholytics.

Ganglionic-stimulants and blocking agents, skeletal muscle relaxants.

LO : To understand the basics of physiology and neurotransmitters and their roles. To gain knowledge on the drugs acting on ANS and muscle relaxants.

UNIT - III

Drugs acting on Central Nervous System:

Neurohumoral transmission in the C.N.S, General anesthetics, Alcohols and Disulfiram, Sedatives, hypnotics, & anti-anxiety agents.

LO : To understand the role of neurotransmitters in the CNS and pharmacology of various classes of drugs acting on CNS.

UNIT - IV

Analgesics, Antipyretics, Anti-inflammatory and Anti-gout drugs, Narcotic analgesics & antagonists, Pharmacology of Local Anaesthetics

LO : To have knowledge on the pathophysiology on Analgesia, pyretics, inflammation, gout and drugs used in the above treatment.

UNIT - V

Antipsychotics & Lithium, Antidepressants, Pharmacology of Anti-epileptic drugs,

Pharmacological management of Parkinsonism & other movement disorders, C.N.S. stimulants, Drug Addiction & Drug Abuse.

LO : To impart knowledge on pathophysiology of various disease conditions of the above topics and pharmacology of drugs.

UNIT - VI

Drugs Acting on the Gastrointestinal Tract

Antacids, Antisecretory & Anti-ulcer Drugs, Laxatives & Antidiarrhoeal drugs, Appetite Stimulants & Suppressants, Emetics & Anti-emetics, Carminatives, Demulcents, Protectives, Adsorbents, Astringents, Digestants, Enzymes & Mucolytics.

LO : To impart knowledge on pathophysiology and conditions relating to peptic ulcers and emesis and to understand the pharmacology of drugs used in GIT disorders.

TEXT BOOKS

1. Sathoskar, Pharmacology and pharmacotherapeutics Vol. 1 & 2, Publ by Popular Prakashan, Mumbai.
2. Bertram. G. Katzung, Basic and clinical pharmacology, 9th Edn.
3. Tripathi, Text book of Pharmacology.
4. Rang & Dale, Text book of Pharmacology.

REFERENCE BOOKS

1. J.G. Hardman and Lee E. Limbard, Good Mann & Gilmann, The Pharmacological basis of therapeutics, Mc Graw hill, Health Professions Dvn.
2. H.P Rang, M. M. dale & J.M. Ritter, Pharmacology, Churchill living stone, 4th Ed.
3. J. Crossland, Lewis's Pharmacology, Church living stone.
4. Ruth Woodrow, Essentials of Pharmacology for Health Occupations.

IN-VITRO ANTI-INFLAMMATORY AND ANTI-MICROBIAL ACTIVITY OF ETHANOLIC LEAVES EXTRACT OF *OXALIS CORNICULATA*

Dissertation Submitted to

JNT UNIVERSITY

KAKINADA

In partial fulfillment for the award of the degree of

BACHELOR OF PHARMACY

BY

G. Siva Jyothirmayei	*(143G1R0031),*
V.Harika	*(143G1R0032),*
J.Divya Sree	*(143G1R0033),*
K.N.K.L.R.Spandana	*(143G1R0034),*
K.Deepthi Priya	*(143G1R0035),*
K.Sirisha	*(143G1R0036)*

Under the guidance of

A.Tirupathi Rao, M.Pharm.,(Ph.D.)

Assistant Professor

ENLIGHTENS THE NESCIENCE

Aditya Pharmacy College, Surampalem, Andhra Pradesh, India-533 437

Batch: 2014- 2018

ADITYA PHARMACY COLLEGE
(Affiliated to PCI, AICTE & JNTUK).
Surampalem-533437, E.G.District, Andhra
Pradesh.

CERTIFICATE

This is to certify that the dissertation work entitled a study on "IN-VITRO ANTI-INFLAMMATORY AND ANTI-MICROBIAL ACTIVITY OF ETHANOLIC LEAVES EXTRACT OF *OXALIS CORNICULATA*" submitted in partial fulfillment of the degree in Bachelor of Pharmacy of the JNT University, Kakinada for the academic year 2014-2018.
This is abonafide work carried out, by *G.ShivaJyothirmayei (143G1R0031) , V.Harika (143G1R0032) ,J.DivyaSree(143G1R0033), K.N.K.L.R.Spandana (143G1R034) , K.DeepthiPriya (143G1R0035) ,K .Sirisha (143G1R0036),*
under the direct guidance and supervision of A. Tirupathi Rao M.Pharm., (Ph.D.), Assistant Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh.

(Internal Examiner) 4/4/18

(External Examiner)

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

We hereby declare that the dissertation work entitled "IN-VITRO ANTI-INFLAMMATORY AND ANTI-MICROBIAL ACTIVITY OF ETHANOLIC LEAVES EXTRACT OF *OXALIS CORNICULATA*" in partial fulfillment of the degree in Bachelor of Pharmacy of the JNT Unversity, Kakinada for the academic year 2014-2018, was carried out by us in the library and laboratories of Aditya Pharmacy College, Surampalem, Andhra Pradesh under the valuable and efficient guidance and supervision of Mr. A.Tirupathi Rao, M.Pharm.,(Ph.D.),.Assistant Professor, Aditya Pharmacy College, Surampalem, Andhra Pradesh. We also declare that the matter embodied in it is a genuine work.

G.Siva Jyothirmayei(143G1R0031), G. SivaJyothirmayei.

V.Harika (143G1R0032), V. Harika.

J.Divya Sree (43G1R0033), J. DivyaSree

K.N.K.L.R.Spandana(143G1R0034), K. N. K. L. R. Spandana.

K.Deepthi Priya(143G1R0035), K. Deepthi priya

K.Sirisha (143G1R0036). K. Sirisha.

ADITYA PHARMACY COLLEGE - SURAMPALEM

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SURAMPALEM 533 437

7. DISCUSSION AND CONCLUSION

The data presented in this study demonstrate ethanolic extracts of ***Oxalis corniculata*** possess Anti-inflammatory activities and Anti- microbial activity

ANTI-INFLAMMATORY ACTIVITY:

Discussion

Oxalis corniculata belonging to family Oxalidaceae is a green commonly found herb in India. This plant is believed to be having manifold pharmacological diversities. I decided to work on this plant to find out their usefulness to human being.

There are certain problems in using animals in experimental pharmacological research, such as ethical issues and the lack of rationale for their use when other suitable methods are available or could be investigated. Hence, in the present study the protein denaturation bioassay was selected for in vitro assessment of anti- inflammatory property of ethanol extract of lotus. Denaturation of tissue proteins are one of the well-documented causes of inflammatory and arthritic diseases. Production of auto antigens in certain arthritic diseases may be due to denaturation of proteins in vivo. Agents that can prevent protein denaturation therefore, would be worthwhile for anti-inflammatory drug development.

Leukocyte proteinases play an important role in the development of tissue damage during inflammatory reactions and significant level of protection was provided by proteinase inhibitors. Extract of Oxalis corniculata plant shown significant activity at 400µg(68.81%) and the standard Aspirin shown 95.63%.

The ethanolic extract showed significant in-vitro antiinflammatory activity as compared to standard. The ethanolic extract showed significant antiinflammatory activity (83.82 %) at the dose of 400µg/ml. Aspirin as standard showed maximum protection at 87.77%.

Conclusion :

Scientists have realized an immense potential in natural products from medicinal plants to serve as alternate source of combating infections in human beings which may also be of lower cost and lesser toxicity. Further investigations are required in order to isolate more new compounds from the plant

extracts and to test their bioactivities with the aim of increasing the drug arsenal currently used in the treatment and prophylaxis of human and animal diseases. It is very necessary to introduce new and biologically safe and active drugs eco-friendly in nature and effective as antibacterial agents.

In this research study, the ethanolic extracts of Oxalis corniculata had reported for presence of anti inflammatory activity. On observation of results for anti inflammatory activity, it was concluded that the leaves of Oxalis corniculata has good anti inflammatory activity.

ANTIMICROBIAL ACTIVITY:

Discussion:

In the present investigation, the antimicrobial efficacy of the ethanolic extract og Oxalis corniculata was quantitatively assessed on the basis of zone of inhibition. The zone of inhibition of plant extract was compared with that of standard.

The ethanolic extract showed maeked antimicrobial activity against pathogenic microorganism. The results showed that the 50mg/ml concentration of *Oxalis corniculata* (ethanolic extract) have highest antimicrobial activity on *Staphylococcus aureus*, this showed zone inhibition of 22.4mm diameter. At 25mg/ml concentration *Micrococcus luteus* showed highest zone of inhibition of 18mm and at 12.5mg/ml *Staphylococcus aureus* showed highest zone of inhibition 14.5mm. The standard ceftriaxone showed highest antimicrobial activity on *Staphylococcus aureus* ,with zone of inhibition 14mm diameter.

Conclusion:

Many plants were investigated for their antimicrobial activity by many scientists of different parts of world. The ethanolic extract of leaves of *Oxalis corniculata* posses antimicrobial activity.

From the above results it can be concluded that the ethanolic extract of *Oxalis corniculata* has potential Antimicrobial activity, so it can be used in the treatment of infectious diseases caused by many microorganisms.

ADITYA PHARMACY COLLEGE * SURAMPALEM *

PRINCIPAL
Aditya Pharmacy Colle
SURAMPALEM 533 43

IV Year –I SEMESTER

T	P	C
3+1	0	4

CHEMISTRY OF NATURAL PRODUCTS

UNIT-I

Carbohydrates : Classification and general properties. Knowledge of structure including Sterio Chemistry of glucose. General treatment of pharmaceutically important carbohydrates-maltose, lactose, starch, cellulose and dextrin.

LO : Introduction, basic understanding, structures, features, stabilities and uses.

UNIT-II

Amino acids and proteins : Classification and general reactions of amino acids and their relationship to proteins and polypeptides. Methods of preparation of amino acids, classification and general reactions of proteins, degradation of proteins-hydrolysis and end group analysis-protein hormones, oxytocin.

LO : Introduction, basic understanding, structures, features and uses.

UNIT-III

1. **Purines and xanthine derivatives:** Structure and synthesis of uric acid, Theobromine, theophylline, and caffeine. General aspects of nucleoproteins and nucleic acids,
2. **Lipids:** Fixed oils and fats. Fatty acids: chemistry and analysis of oils and fats.

LO : Introduction, basic understanding, structures, methodologies, significance and uses.

UNIT-IV

Terpenes : Occurrence, general methods of isolation and classification, chemistry of citral, limonene, ∝-terpeneiol, carvone, camphor and menthol.

LO : Introduction, basic understanding, structures, chemistry and structural features, important degradative reactions, uses.

UNIT-V

Alkaloids : Classification, general methods of isolation, general methods of structural determination, chemical tests for alkaloids. Chemistry and uses of Ephedrine, Nicotine, Papaverine and Atropine.

LO : Introduction, basic understanding, structures, chemistry and structural features, important degradative reactions, uses.

UNIT-VI

1. Vitamins: Classification, chemistry, physiological role and uses of Thiamine, Riboflavin and Ascorbic acid. Skeletal structures of vitamins official in I.P.
2. Steroids: Nomenclature and skeletal structures of Ergosterol, Stigmasterol, Cholesterol Diosgenin, Hecogenin. Chemical tests for steroids.

LO : Introduction, basic understanding, structures, chemistry and structural features, important degradative reactions, uses.

TEXT BOOKS

1. O.P.Agarwal, Natural products by. Vol.1 & 2, Goel publications – Meerut.
2. JB Harborne, Phyto Chemical methods.
3. I L Finar, Organic chemistry, Vol. 1 & 2, the English language book society, London, New Delhi.

REFERENCES

1. RT Morrison and R.N BOYD, Organic chemistry, Allyn and Bacon, inc., boston
2. Me – Wolf, ed., Burger's medicinal chemistry, J. Wiley & sons, NY.
3. F.G. Mann & B. Saunders, Practical Organic chemistry Longmans green & Co. Ltd., UK.
4. RM. Acheson, an introduction to the chemistry of heterocyclic compounds, Interscience NY.
5. Duquesn & others, Practical Pharmacognosy, CBS Publ.

"DETERMINATION OF FAT & CALCIUM CONTENT IN VARIOUS BRANDS OF MILK"

Dissertation submitted to the JNTU-K University in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy.

(2018)

Jawaharlal Nehru Technological University, Kakinada, A.P

BY:

B.Prasanth (143G1R0016) **Bijoy Bhaskar Paul (143G1R0017)**

B.Rajasree Satyanarayana (143G1R0018)

CH.R.R.Parimala (143G1R0019) **CH.Satyavani (143G1R0020)**

Under the guidance of,

Mr.Y.SURENDRANATH REDDY M.Pharm.(Ph.D) F.A.G.E.,

Associate Professor

Department of Pharmaceutical Analysis

Aditya Pharmacy College

Surampalem-533437

2014-2018

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

CERTIFICATE

This is to certify that the dissertation entitled ***"Determination of fat & calcium content in various brands of milk"****, submitted to the JNTU-K University, Kakinada, in partial fulfillment of the requirements for the award of the degree of* ***Bachelor of Pharmacy*** *is a record of original research work carried out by* B.Prasanth (143G1R0016), Bijoy Bhaskar Paul (143G1R0017), B.Rajasree Satyanarayana (143G1R0018), CH.R.R.Parimala (143G1R0019), CH.Satyavani (143G1R0020) *under the supervision of* ***Mr.Y.SURENDRANATH REDDY*** *and it has been previously not submitted to any other University of Academic Institution for any higher degree.*

Place: Surampalem

Date: 22/3/2018

ADITYA PHARMACY COLLEGE • SURAMPALEM •

Dr. K.Divakar (M.Pharm., Ph.D)

Principal and Professor,
Aditya Pharmacy College
Aditya Pharmacy College

Internal Examiner

ADITYA PHARMACY COLLEGE • SURAMPALEM • 533 437

External Examiner

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

*The project embodied in this thesis entitled "**Determination of fat & calcium content in various brands of milk**", was carried out in the Department of Pharmaceutical Analysis under the guidance of Mr.Y.SURENDRANATH REDDY M.Pharm, F.A.G.E., Ph.D, Aditya Pharmacy College. Surampalem. The extent and source of information derived from the existence literature have been indicated throughout thesis of the project work at appropriate places.*

B.Prasanth (143G1R0016) B.Prasanthchowdary

Bijoy Bhaskar Paul (143G1R0017) B.paul

B.Rajasree Satyanarayana (143G1R0018) B. Rajasree

CH.R.R.Parimala (143G1R0019) CH.R.R Parimala

CH.Satyavani (143G1R0020) Ch.Satya Vani

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SUMMARY AND CONCLUSION:

Summary:

Summary:

We took different brands of milk and we evaluated both fat and calcium contents in those brands. The following is the summary:

Agrigold milk brand showed 2.8g of fat content when compared to it standard value 3g similarly it showed 125mg of calcium content when compare to its standard value 130mg

Jersey milk brand showed 5g of fat content when compared to it standard value 6g similarly it showed 145mg of calcium content when compare to its standard value 150mg.

Heritage milk brand showed 2.9g of fat content when compared to it standard value 3g similarly it showed 120mg of calcium content when compare to its standard value 126mg.

Vishaka milk brand showed 2.7g of fat content when compared to it standard value 3g similarly it showed 139mg of calcium content when compare to its standard value 140mg.

Amul milk brand showed 2.9g of fat content when compared to it standard value 3g similarly it showed 148mg of calcium content when compare to its standard value 150mg.

Nandini milk brand showed 1.4g of fat content when compared to it standard value 1.6g similarly it showed 126mg of calcium content when compare to its standard value 127mg.

Tirumala milk brand showed 5.5g of fat content when compared to it standard value 6g similarly it showed 139mg of calcium content when compare to its standard value 140mg.

Arokya milk brand showed 1.8g of fat content when compared to it standard value 2g similarly it showed 110mg of calcium content when compare to its standard value 120mg.

Srichakra milk brand showed 3.2g of fat content when compared to it standard value 3.35g similarly it showed 136mg of calcium content when compare to its standard value 138mg.

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IV Year –II SEMESTER

T	P	C
3+1	0	4

CONTROLLED RELEASE AND NOVEL DRUG DELIVERY SYSTEMS

UNIT - I

Controlled and sustained release: Factors to be considered – Principles involved in their design – regulatory considerations.

LO : To understand Controlled and sustained release: Factors to be considered – Principles involved in their design – regulatory considerations.

UNIT - II

Oral Control Drug Delivery Systems: Fundamentals, Dissoultion Controlled, Diffusion Controlled, Ion Exchange Resins, Osmotic based systems, pH Independent Systems and altered density systems.

LO : To understand fundamentals, Dissoultion Controlled, Diffusion Controlled, Ion Exchange Resins, Osmotic based systems, pH Independent Systems and altered density systems.

UNIT - III

Transdermal Drug Delivery Systems: Fundamentals, types of TDDS, Materials Employed and Evaluation of TDDS.

LO : To understand fundamentals, types of TDDS, Materials Employed and Evaluation of TDDS.

UNIT - IV

Mucoadhesive Delivery Systems: Mechanism of bioadhesion, mucoadhesive materials, forumulation and evaluation of mucoadhesive-based systems.

LO : To understand mechanism of bioadhesion, mucoadhesive materials, forumulation and evaluation of mucoadhesive-based systems.

UNIT - V

Targeted Drug Delivery Systems: Fundamentals and applications, formulation and evaluation of liposomes, resealed erythrocytes and nano particles.

LO : To understand fundamentals and applications, formulation and evaluation of liposomes, resealed erythrocytes and nano particles.

UNIT - VI

Study of polymers for controlled release – Classification, study of biodegradable polymers & hydrogels – their applications.

LO : To understand classification, study of biodegradable polymers & hydrogels – their applications.

TEXT BOOKS

1. N.K. Jain, Control Drug Delivery Systems by
2. Y.Anjaneyulu&Maraiah, Quality Assurance & Quality Management in Pharmaceutical
   Industry.
3. L. Lachman, H.A, Lieberman and J.L. Kanig, Theory & Practice of industrial pharmacy by,
   Lea &Febieger, Philadelphia Latest Edn.
4. Shobhan Rani Hiremath Text Book of Industrial Pharmacy.

REFERENCES

1. Leon ShargelIsadoreKanfer, Generic Drug Product Development, Solid Oral Dosage
   Forms, Marcel Dekker.
2. Sagarian& MS Balsam, Cosmetics Sciences &Technology.Vol.1, 2 & 3
3. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences
4. E.A Rawlkins, Bentley's Text Book of Pharmaceutics, ELBS publ
5. HC Ansel, Introduction to Pharmaceutical Dosage forms
6. S.H. Willing, M.M Tucherman and W.S. Hitchings IV, Good Manufacturing Practices for
   Pharmaceuticals: A Plan for Total Quality Control, Marcel Dekker, Inc., New York
7. Gilbert S. Banker and Christopher T Rhodes, Modern Pharmaceutics, IVthed, marcel
   dekker, USA, 2005.
8. YiewChien, novel drug delivery systems, 2nded, marcel dekker 2003.
9. Robert. A. Nash, Pharmaceutical Process Validation, 3rd Ed Marcel Dekker, 2003.
10. Good Manufacturing Practices – Schedule M, Read with The Drugs And Cosmetic Rules
    1945.
11. M.E. Aulton, Pharmaceuitcs- The science of Dosage form Design 2nded.
12. AukunuruJithan, Oral Drug Delivery Technology.

"FORMULATION AND EVALUATION OF FAST DISINTEGRATING TABLETS OF ZIDOVUDINE USING NATURAL AND SYNTHETIC POLYMERS"

Dissertation submitted to the JNTU-K University in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy.

(2018)

Jawaharlal Nehru Technological University, Kakinada, A.P

BY:

Arka Prakash Kole (143G1R0011) **Arup Kumar Dolai (143G1R0012)**

B. Abhishek (143G1R0013) **B. Mounika (143G1R0014)**

B. Sudarshan (143G1R0015)

Under the guidance of,

Miss. V. Parimala M.Pharm

Asst. Professor

Department of pharmaceutics

Aditya Pharmacy College

Surrampalem-533437

2017-2018

CERTIFICATE

*This is to certify that the dissertation entitled "**Formulation and Evaluation of fast disintegrating tablets of zidovudine using natural and synthetic polymers**", submitted to the JNTU-K University, Kakinada, in partial fulfilment of the requirements for the award of the degree of **Bachelor of Pharmacy**is a record of original research work carried out by Arka Prakash Kole (143G1R0011), Arup Kumar Dolai (143G1R0012), B. Abhishek (143G1R0013), B. Mounika (143G1R0014), B. Sudarshan (143G1R0015), under the supervision of **Ms. V. Parimala** and it has been previously not submitted to any other University of Academic Instituition for any higher degree.*

Place: Surampalem

Date: 22/03/2018

Dr.K.Divakar, M.Pharm, Ph.D

Principal and Professor,

Aditya Pharmacy College

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM-533 437

Internal Examiner 4/4/18

External Examiner

ADITYA PHARMACY COLLEGE
SURAMPALEM

ADITYA PHARMACY COLLEGE
SURAMPALEM

DECLARATION

*The project embodied in this thesis entitled "**Formulation and Evaluation of fast disintegrating tablets of zidovudine using natural and synthetic polymers**", was carried out in the Department of Pharmaceutics under the guidance ofMs. Parimala , M.Pharm, Aditya Pharmacy College, Surampalem. The extent and source of information derived from the existence literature have been indicated throughout thesis of the project work at appropriate places.*

Arka Prakash Kole	(143G1R0011)	Arka Prakash Kole
Arup Kumar Dolai	(143G1R0012)	Arup Kumar Dolai
B. Abhishek	(143G1R0013)	B. Abhishek
B. Mounika	(143G1R0014)	B. Mounica
B. Sudarshan	(143G1R0015)	B. Sudarshan

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Fast disintegrating tablets containing Zidovudine as drug were formulated by wet granulation method as F1, F2, F3,F4, for which evaluation tests were performed.

Chapter 6: Results

In this chapter all the results were presented in the form of tables, graphs and figures.

CONCLUSION:

- In the present investigation, an attempt was made to develop fast dissolving tablets of zidovudine tablets as anti-viral used to treat HIV as a model drug.
- Standard graph of zidovudine in phosphate buffer was prepared by using UV spectrophotometer at λmax of 266 nm. It had good reproducibility and this method was used to find out concentration of zidovudine from formulation.
- The ultimate goal of formulation of zidovudine fast dissolving tablets is to get optimal treatment with maximal safety. Compared with sustained release formulation immediate release formulation avoids dose dumping and allows fast onset of action, which has the advantage of greater convenience and potentially improved compliance. This can be reasonably accomplished by development of tablets using super disintegrant.
- Formulation development included formulation of fast disintegrating zidovudine tablets by using synthetic polymers like sodium starch glycolate, cross carmellose and natural polymers like guar gum and fenugreek as super disintegrants.
- Among the four formulations F1 formulation containing SSG as super disintegrant is the optimized formulation with disintegration time 1 min 45 sec.

- Thus, the objective of this research work was fulfilled by developing fast disintegrating drug delivery system with less disintegration time of tablets containing zidovudine as a model drug and the Success of the fast disintegrating studies recommend the product which may improve patient compliance.

II Year – I SEMESTER

T	P	C
3+1	0	3

PHYSICAL PHARMACY -II(50 Hrs)

UNIT-I 08

Solubility and Distribution Phenomena : Solvent-solute interaction, solubility of gases in liquids, liquids in liquids, solids in liquids, distribution of solutes in immiscible solvents.

Introduction to phenomena of diffusion : Ficks first law and second law.

LO : To understand the solubility and distribution phenomenon and laws of diffusion.

UNIT-II

Kinetics: Rates and orders of the reaction. Influence of temperature and other factors on reaction rates. Decomposition and stabilization of medicinal agents, kinetics in the solid state and accelerated stability analysis (relevant numerical problems). 10

LO : To understand kinetic rates, order of reaction, decomposition pathways and methods of stabilization, stability testing methods, accelerated stability analysis.

UNIT-III

Interfacial Phenomena: Liquid interfaces, measurement of surface and interfacial tensions, adsorption at liquid interfaces. Surface active agents and systems of hydrophilic-lipophillic classification. Adsorption at solid interfaces. Electrical properties of interfaces. 08

LO : To understand theory of interfacial phenomenon, absorption, surfactants and theoretical properties of interfaces.

UNIT-IV

Micromeritics: Particle size and size distribution, methods for determining surface area, methods for determining particle size, pore size, particle shape and surface area, derived properties of powders.

08

LO : To learn micromeritic characteristics and their applications and significance.

UNIT-V

Rheology: Newtonian system, non-Newtonian system, thixotrophy, measurement and applications in formulations. Determination of viscosity and its applications. 08

LO : To understand rheology, types of flow, thixotrophy, its applications and viscosity.

UNIT –VI

Colloids: Introduction, types of colloidal systems, solubilization, Stability of colloids, optical properties, kinetic properties, electrical properties and Donnan Membrane equilibraium. 08

LO : To know colloids – types – properties – stability considerations.

TEXT BOOKS

1. Patrick J. Sinko, Martin's Physical Pharmacy and Pharmaceutical Sciences 5 Edition.
2. CVS Subhramanyam, Physical Pharmacy, Vallabhprakashan.
3. DeelipRaoDerle&Sai hanuman SagarBoddu. Essentials of Physical Pharmacy.
4. B. S. Bahl, Arunbahl and G. D. Tuli. Essentials of Physical Chemistry.

REFERENCE

1. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences
2. M.E. Aulton, Pharmaceutics – The science of dosage form design, 2edition
3. Bentley's text book of Pharmaceutics. E. A. Rawlins.
4. E. Shotton and K. Ridgaway, Physical Pharmaceutics, Oxford University Press, London.
5. Pharmacopoiea (IP, BP, USP and European).

Pelcoat Formulations

DrugLic No: 31MD/TS2006/FG

Date: 06-06-2017

INDUSTRIAL TRAINING CERTIFICATE

This is to certify that Ms. ADAPA VIJAY MOUNIKA, bearing Roll No.143G1R0004, is a bonafide student of Aditya Pharmacy College has undergone the "Industrial Training" in our organization from 06-05-2017 to 06-06-2017, as a part of fulfillment of her B.Pharmacy course.

During the training, she had interacted with all the departments and acquired basic knowledge.

During this aforesaid period, we found her hard working, sincere and learning attitude.

For Pelcoat Formulations

PEL COAT FORMULATIONS

Authorized Signatory

ADITYA PHARMACY COLLEGE

PRINCIPAL
Aditya Pharmacy College

Sy. No. 13, Kucharam Village, Toopran Mandal, Medak Dist. - 502 336. (T.S.) INDIA
Phone : 08454 - 250183, Fax : 08454 - 250182.
E-mail : pelcoat@gmail.com www.pelcoatformulations.in

I Year – II SEMESTER

T	P	C
3+1	0	3

COMPUTER APPLICATIONS AND BIOSTATISTICS

Unit-I

Overview of computer with general applications: components of computers, computer languages, usage of computers, introduction of operative system.

Introduction to MS-Office: MS- word: Basics, working with files, working with text, formatting paragraphs, styles, lists, tables, graphics, spelling and grammar, page formatting macros and table of contents.

MS-Excel: Basics, spreadsheets, data types, formulas, formatting charts and graphs.

MS-Power Point: Basics, views, slide controls, applied design, page setup, templates, background control, colour screens, traditions and animations, working with texts and working with graphics.

MS-Access: Data base concepts, screens layouts, creating tables, data sheet record, table relationships, shorting and filtering, query forms, form controls, sub forms, reports, importing, exporting and linking.

LO : The student should be familiar with overview of the computers and MS-office

Unit-II

Information Technology Today: Internet and World Wide Web (www), structure and organization of www, browsers, information searching in www, search engines, pharmaceutical resources in www types of indexing tools and search strategies, Hyper Text Manuscripts Languages (HTML) and e-mail.

LO : Familiarity with internet, WWW, browsing, HTML & e-mails.

Unit-III

Database Management: Concepts and objectives of Database Management systems, advantages of database management systems and examples of DBMS packs (like DBASE III).

LO : Familiarity with Database management

Unit-IV

Data collection and treatment: Significant digits and rounding of numbers, data collection, random and non-random sampling methods, sample size, data

organization, diagrammatic representation of data, bar, pie, 2-D and 3-D diagrams.

Measures of central tendency and variations: Mean, median, mode, properties and applications, range, standard deviations and standard error of means, coefficient of variation, kurtosis, skewness and confidance (fiducial) limits for mean and proportions.

LO : Fundamentals of date / Sample collection and diagrammatic presentation.Measures of central tendency and dispersion.

Unit-V

Regression: Correlation and regression analysis, method of least squares and non-linear regression.

Statistical Quality control: Statistical Quality control charts like mean and range charts, p-chart, np-chart and c-chart. Applications of Statistical Quality control in pharmaceutical sciences.

LO : Correlation and regression quality control charts in pharmacy.

Unit-VI

Statistical inference: t-test, chi square test and their applications in pharmacy.

Elements of ANOVA: One-way and two-way with examples.

LO: Application of t-test, Chi square test and approve in the testing the significance of difference or similarity.

TEXTBOOKS

1. Computer Fundamentals, Anita Goel, Pearson.
2. Information Technology Workshop, 3e, G Praveen Babu, M V Narayana BS Publications.
3. Khan & Khan, "Fundamentals of Biostatistics".
4. Pranab Kumar Banerjee, "Introduction to Biostatistics".

REFERENCE BOOK:

1. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N.B. Venkateswarlu
2. Biostatistics for medical, nursing and pharmacy students by A.Indrayan, L Satyanarayana.
3. Introduction to Information Technology, ITL Education Solutions Ltd., 2nd Ed, PEARSON
4. Comdex Information Technology, Vikas Gupta, dreamtech

143G1R0076

Chandra Labs

AN ISO 9001 : 2015 CERTIFIED PHARMA ANALYTICAL TESTING LABORATORY
Approved by Drugs Control Administration
Govt. of Telangana

DATE: 20-05-2017

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **TOZAMMEL HOQUE ANSARI**, B.Pharmacy student of **ADITYA INSTITUTE OF PHARMACEUTICAL SCIENCES AND RESEARCH**, Surampalem (Kakinada), bearing **Registration No 143G1R0076** has undergone instrumentation training for HPLC, GC, FT-IR, UV-Visible Spectrophotometer and Chemical Analysis, Dissolution & Disintegration Apparatus, Punching Machine, Coating pan.

He also undergone training in analytical R&D department overall for a period from **19-04-2017 to 19-05-2017** in our organization. During this period his performance is satisfactory.

We wish him the very best in all his future endeavours.

Best Regards,
Chandra labs

CHANDRA LABS DC HYDERABAD

Authorized Signatory

Approved 20/5/17

ADITYA PHARMACY COLLEGE SURAMPALEM

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5-5-35/173, Plot No. 10, 1st Floor, Near Soni Complex, IDA Prashanthi Nagar, Kukatpally, Hyderabad - 500 072.
Ph : 040-4011 3413 Telefax : 040-2307 7913 E-mail : info2chandralabs@gmail.com Website : www.chandralabs.in

II Year – I SEMESTER	T	P	C
	3+1	0	3

PHARMACEUTICAL MICROBIOLOGY(50 Hrs)

UNIT – I 10

Introduction to Microbiology: Origin, scope and discovery of spontaneous generations theory, contributions of Antony Von Leuwenhock, Pasteur, Koch and Lister.

Diversity of Microorganisms: Prokaryotes versus eukaryotes – eukaryotic and Prokaryotic cell structure, three domains of life (bacteria, archea and eurkaryotics). Pharmaceutical significance of protozoa, algae, fungi, bacteria and viruses. Characterisation and identification of microorganisms.

LO : To understand diversity of microorganisms and their spontaneous generation and use and harmful nature.

UNIT – II 10

Nutrition and Growth of Microbes: Nutritional requirements, Types of Nutrient media and growth conditions and Nutritional types based on energy source.

Isolation, cultivation (aerobic & anaerobic) and preservation of microorganisms, physiology of growth, bacterial growth curve, methods for determing bacterial numbers, mass and cell constitutents. Exponential growth and generation time.Bacterial growth in batch and continuous culture (chemostat and turbidostat) synchronous growth.

Microorganisms and their Environment: Effects and microbial adaptations to environmental conditions – Temperature, oxygen desiccation, extreme cold ionic effect, electricity, osmotic pressure, radiant energy, hydrostatic pressure, mechanical impact, vibration.

LO : To understand that bacterial growth curve consist of rapid growth followed by stabilization and later decline due to exhaustion of nutrients and several parameters affects the above.

UNIT –III 08

Control of Microorganisms: General Concepts, Inhibition of growth and killing, sterilization and disinfection, antisepsis and sanitation, mode of action application & limitation of physical agents (moist and dry heat, radiation and filtration), chemical agents. Various types of disinfectants, factors affecting sterilization and disinfection, evaluation of antimicrobial

activity. Chemotherapeutic agents, mode of action and applications, drug resistance. Official methods of sterility testing of pharmaceuticals and biosafety measures.

LO : To understand that moist heat, dry heat,radiation,filtration,chemicals can be used for sterilization and disinfection to provide aseptic condition in the filling areas, operation theatres etc

UNIT –IV 10

Bacterial Genetics: Genetic recombination in bacteria, DNA replication, transcription and translation. Gene regulation (lac operon and tryptophan operon).Mutagenesis, chemical and physical mutagens.

LO : To understand the concept of bacterial resistance to antibiotics and other conditions.

UNIT – V 04

Epidemiology of Diseases: Study of etiology, diagnosis, source of infection, mode of transmission, immunization methods, prevention and control of the following diseases. Bacillary dysentery, diphtheria, tuberculosis, leprosy, cholera, typhoid, syphilis, gonorrhea, tetanus, food poisoning and infection hepatitis.

LO: To understand that microbes are responsible for causing certain diseases.

UNIT – VI 08

Application of Microbes in Pharmaceutical Industry

a. **Microbiological Assays:** Principles and Methods involved in Assay of Antibiotics,

   Vitamins, Amino acids & Bio-Sensors in Analysis.

b. **Microbial Source & applications of various pharma products** like Antibiotics,

   Vitamins, amino acids, solvents, enzymes & genetic engineered products etc.

LO : To understand that antibiotics/Vitamins can be standardized by microbial assays. And some useful products can be produced as a bacterial metabolites.

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Approved by Drugs Control Administration
Govt. of Telangana

DATE: 20-05-2017

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **SIBDANTHATU NAVEEN CHAND**, B.Pharmacy student of **ADITYA INSTITUTE OF PHARMACEUTICAL SCIENCES AND RESEARCH**, Surampalem (Kakinada), bearing **Registration No 143G1R0069** has undergone instrumentation training for HPLC, GC, FT-IR, UV-Visible Spectrophotometer and Chemical Analysis, Dissolution & Disintegration Apparatus. Punching Machine. Coating pan.

He also undergone training in analytical R&D department overall for a period from **19-04-2017 to 19-05-2017** in our organization. During this period his performance is satisfactory.

We wish him the very best in all his future endeavours.

Best Regards,
Chandra labs

CHANDRA LABS HYDERABAD

Authorized Signatory

Vijayarao 20/5/17

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II Year – II SEMESTER

T	P	C
3+1	0	3

PHARMACEUTICAL ANALYSIS –I

Unit-I

1. A general introduction to pharmaceutical analysis and general aspects of standardization of pharmaceutical chemicals and formulated products mentioned in Indian pharmacopoeia. Importance of proper sampling and general books for pharmaceutical standards like pharmacopoeias, National formularies.
2. Computation of analytical results, significant numbers, rejection of doubtful values with reference to volumetric and gravimetric analysis, sources of errors and calibration of analytical equipment used in volumetric and gravimetric analysis.

LO : To understand the concept of standardization by gravimetric and volumetric methods.

Unit-II

3. Acid-Base titrations: theoretical basis of neutralization reactions including electrolytic dissociation, application of law of mass action, relative strength of acids and bases, hydrolysis of salts and buffer solutions, theory of neutralization indicators and factors involved in the selection of indicators for different types of acid-base titrations. Procedures involved in different types of titrations using strong acid, week base, strong base, week base and back titration with blank determination. Assay of Boric acid Sodium bicarbonate, Borax, calcium hydroxide, zinc oxide, calcium carbonate, Acetyl salicylic acid, Formaldehyde, NaOH in presence of sodium carbonate.
4. Non-aqueous titrations: principles, advantages and pharmaceutical applications, solvents reagents and indicators used in Nonaqueous titrimetry, other methods of detecting end points. Examples of titrations of alkali metal and alkaline earth metal salts of organic acids, primary, secondary and tertiary amines, halogen acid salts of bases, titration of acidic substances. Assay of thiamine hydrochloride.

LO : To understand the concept of standardization by aqueous and non-aqueous titrations.

Unit-III

5. Oxidation-reduction titrations: theoretical considerations including standard potentials, calculation of redox potentials, redox indicators, principle and procedure involved in different types of redox titrations using potassium permanganate, iodine. Titrations of released iodine and back titration of excess iodine, potassium iodate, ammonium ceric sulphate and titanous chloride. Assay of ferrous sulphate, Hydrogen peroxide, Sodium nitrate, Estimation of ascorbic acid with 2,6-dichlorophenol indophenols, Assay of mercuric chloride, Assay of sodium metabisulphite, Assay of copper sulphate.

LO : To understand the concept of standardization by oxidation – reduction methods.

Unit-IV

6. Precipitation titrations: principles and procedures involved in argentimetry, use of silver nitrate and ammonium thiocyanate. Indicators used in precipitation titrations including adsorption indicators, Mohr's and Volhard's methods with examples. Assay of potassium chloride, Ammonium thiocyanate, Assay of mercuric oxide.

7. Complexometric titrations: basic principles of complexometric analysis including theories of complex ions, chelating agents, properties of metal complexes with particular reference to EDTA. Basic principles of complexometric analysis including theories of complex formation. Werener's coordination number and structure of complex ions, chelating agents, properties of metal complexes with particular reference to EDTA, various examples of titrations of metal ions using disodium acetate, indicators and end point detection using indicators and by physical methods, masking and demasking agents, pharmaceutical applications of complexometry with particular reference to I.P. Assay of calcium gluconate injection/tablets, Calcium lactate and Assay of Aluminium sulphate.

LO : To understand that standardization can be done for some compounds by precipitation titrations.

Unit-V

8. A detailed study of gravimetric analysis including principles involved, critical factors and typical methods involving precipitation, coagulation, digestion, filtration and incineration procedures with suitable examples. Advantages and disadvantages, sources of errors and their elimination in gravimetric analysis.

Determination of sulphate as barium sulphate, Estimation of magnesium as magnesium pyrophosphate, Determination of thiamine as silico tungstate.

LO : To understand that standardization can be done for some compounds by gravimetric method.

Unit-VI

9. Principles and procedures involved and application of nitrite titrations, titrations using 2, 6-dichlorophenol-indophenol. Aquametry including use of Karl-fisher reagent and moisture balances.
10. Gas analysis: principles of gas analysis use of hempel's gas burette and pipette, nitrometer, haldome's and orset's gas analysis apparatus and their operations. Examples of gas analytical methods of pharmaceutical significance.

LO : To understand that moisture in drugs can be determined by Karl-Fisher titration.

TEXT BOOKS:

1. Indian pharmacopoeia
2. Practical Pharmaceutical Chemistry by A.H. Becket and Stenlake.
3. Quantitative Inorganic Analysis by A.I. Vogel.

SVRK ANALYTICAL SERVICES PVT. LTD.

Analytical Services Pvt. Ltd.

Plot No 80,1st Floor,Rajiv Gandhi Nagar, Prashanth Nagar Ext., Kukatpally, Hyderabad - 500 072,Telangana.
Mobile :9848567321,8801570592, E-mail : svrkanalyticalservices@gmail.com

Date : 15-06-2017.

TO WHOMEVER IT MAY CONCERN

This is to certify that Ms.MUGADA TEJA SREE, student of B.pharmacy from ADITYA PHARMACY COLLEGE, bearing Registration NO : 143G1R0049 has undergone instrumentation training for HPLC, UV-Visible spectrophotometer, Polarimeter, Wet lab & Chemical titrations was carried in our Unit "SVRK ANALYTICAL SERVICES PVT LTD".

She has successfully completed the Training from 15-05- 2017 to 15-06-2017 in our organization. During this Training her performance is satisfactory.

I wish her all the very best for her future.

For SVRK Analytical services pvt ltd.

(Authorized signatory)

ADITYA PHARMACY COLLEGE * SURAMPALEM

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Aditya Pharmacy College
SURAMPALEM-533 437

I Year – II SEMESTER	T	P	C
	3+1	0	3

PHYSICAL PHARMACY – I (50 Hrs)

UNIT I

Intermolecular forces and states of matter: Binding forces between molecules, the states of matter, the gaseous state, the liquid state, solids and the crystalline state. Phase equilibria and the phase rule. 10

LO : To learn intermolecular forces and states of matter,Phase equilibria and Phase rule

UNIT - II

Thermodynamics: The first law of thermodynamics. Thermochemistry.The second law of thermodynamics.The third law of thermodynamics, Free energy functions and applications. 10

LO : To understand laws of Thermodynamics and their Applications

UNIT - III

Physical properties of Drug Molecules: Dielectric constant induced polarization, dipole moment, refractive index and molar refraction, optical rotatory dispersion.

LO : To understand the physical properties of drug molecules and their significance. 06

UNIT - IV

Solutions of Non electrolytes: Concentration expressions, ideal and real solutions, colligative properties, molecular weight determinations.

06

LO : To understand properties of Non electrolytes and their significance

UNIT - V

Solutions of Electrolytes: Properties of solutions of electrolytes. The Arrhenius theory of electrolyte dissociation.The modern theory of strong electrolytes and other coefficients for expressing colligative properties.

08

LO : To know theories of electrolytes and their dissolution and colligative properties

UNIT - VI

Buffers and buffered isotonic systems: The buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions, methods of adjusting tonicity and pH (relevant numerical problems).

10

LO : To know about buffers ,buffer isotonic solutions, Methods of adjusting isotonicity and their significance.

TEXT BOOKS

1. Patrick J. Sinko, Martin's Physical Pharmacy and Pharmaceutical Sciences Fifth Edition.
2. C.V.S.Subramanyam, Essentials of Physical Pharmacy, Vallabh Prakashan.
3. E. Shotton and K. Ridgaway, Physical Pharmaceutics, Oxford University Press, London.
4. S. J Carter, Cooper and Gunn's Tutorial pharmacy.

REFERENCES

1. Pharmacopoeia, (I.P., B.P., U.S.P. and European.)
2. Derle Deeliprao, Essentials of Physical Pharmacy
3. B.S Bahl, ArunBahl and G.D Tuli, Essentials of Physical Chemistry.
4. Pharmacopoeia (I.P, B.P, U.S.P and European)
5. Martindale, the Extra Pharmacopoeia; Latest Edition the Royal Pharmaceutical Society
6. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences
7. Robin J. Haiwan, Hand Book of Pharmacy and Health Care Edition, ThePharma Press, U.K.
8. Bentley's Text Book of Pharmaceutics by E.A. Rawlins

ADITYA PHARMACY COLLEGE * SURAMPALEM *

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

Chandra Labs

AN ISO 9001 : 2015 CERTIFIED PHARMA ANALYTICAL TESTING LABORATORY
Approved by Drugs Control Administration
Govt. of Telangana

DATE: 20-05-2017

TO WHOMSOEVER IT MAY CONCERN

This is to certify that PERUMALLA. GOWTHAM, B.Pharmacy student of ADITYA INSTITUTE OF PHARMACEUTICAL SCIENCES AND RESEARCH, Surampalem (Kakinada), bearing Registration No 163Y1A39069 has undergone instrumentation training for HPLC, GC, FT-IR, UV-Visible Spectrophotometer and Chemical Analysis, Dissolution & Disintegration Apparatus, Punching Machine, Coating pan.

He also undergone training in analytical R&D department overall for a period from 19-04-2017 to 19-05-2017 in our organization. During this period his performance is satisfactory.

We wish him the very best in all his future endeavours.

Best Regards,
Chandra labs

CHANDRA LABS HYDERABAD

Authorised Signatory

20/5/17

PRINCIPAL
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SURAMPALEM

II Year – I SEMESTER

T	P	C
0	3	2

PHARMACOGNOSY LAB – I

1. Collection of natural herbs and preparation of herbariam/laminated photos for five drugs.
2. Macroscopy& Microscopy of the following:
   a. Any five carbohydrates mentioned in theory.
   b. any five lipids mentioned in theory.
   c. any five volatile oils mentioned in theory.
3. Chemical tests for the following:
   a. Any five carbohydrates mentioned in theory.
   b. any five lipids mentioned in theory.
   c. any five volatile oils mentioned in theory.
4. Cultivation of medicinal plants: Maintenance of one plant in Medicinal garden.

REFERENCES

1. Kandhelwal, Practical Pharmocognosy.
2. C.K. Kokate et.al, Practical Pharmocognosy.
3. Iyengar, Practial Pharmocognosy.

ADITYA PHARMACY COLLEGE SURAMPALEM

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM

M-31

DR.REDDY'S

CERTIFICATE OF TRAINING

This is to certify that Guthula. Sivajyothirmayee

undergone training programme on

Instrumental & chemical Analysis

from May - 2nd - 2017 to May - 30

Organized by DR.Reddy's Laboratories Ltd, Hyderabad. During trainig programme, the candidate was imparted training

on HPLC, U.V & wet Analysis

The performance of the candidate durining the training period was found to be satisfactory.

Dr. Reddy's Laboratories Ltd. Bachupally, HYD. Dt: 2/6/17

ASST.MANAGER
Dr. REDDY'S LABORATORIES LTD.
BACHUPALLY
HYDERABAD - 500 072.

INSTRUCTOR

Aditya Pharmacy College

Dr. Reddys Laboratories Ltd. in Bachupally, Hyderabad-500072

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Aditya Pharmacy College
SURAMPALEM 533 437

IV Year –I SEMESTER

T	P	C
0	3	2

PHARMACEUTICAL ANALYSIS – II LAB

Experiments

1. Interpretation of IR Spectra.
2. Determination of λ- max of a drug.
3. Determination of concentration of glycerine by Abbe's refractometer.
4. Assay of ibuprofen - UV-spectro photometry.
5. Assay of paracetomol - UV-spectro photometry.
6. Assay of riboflavin - Colorimetric method.
7. Assay of rifampicin - Colorimetric method.
8. Ascending paper chromatography.
9. Radial paper chromatography.
10. Two dimension chromatography
11. Thin layer chromatography.
12. Column chromatography (***Demonstration Only***).
13. Paper electrophoresis of amino acids.
14. Gel electrophoresis (***Demonstration Only***).
15. HPLC ***(Demonstration Only)***.

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Aditya Pharmacy College
SURAMPALEM 533 43[illegible]

14-19

DR. REDDY'S

CERTIFICATE OF TRAINING

This is to certify that Chaganti. Rajarajeswari Parimala undergone training programme on Instrumental & chemical Analysis from May - 2nd - 2017 to May - 30 Organized by DR.Reddy's Laboratories Ltd, Hyderabad. During trainig programme, the candidate was imparted training on HPLC, U-V & wet Analysis The performance of the candidate durining the training period was found to be satisfactory.

ADITYA PHARMACY COLLEGE

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Aditya Pharmacy College
SURAMPALEM

ASST. MANAGER
Dr. REDDY'S LABORATORIES LTD.
BACHUPALLY
HYDERABAD - 500 072

Dr. Reddy's Laboratories Ltd. Bachupalli, HYD.

INSTRUCTOR

I Year – II SEMESTER

T	P	C
3+1	0	3

PHARMACEUTICAL INORGANIC CHEMISTRY

UNIT-I

1. Classification of inorganic pharmaceuticals based on their applications and therapeutic uses.
2. Sources of impurities, quality control and test for purity. Limit tests for chlorides, sulphates, iron, arsenic, lead and heavy metals and their pharmacopoeial standards.

LO : Pharmaceutical orientation to inorganic chemistry, definitions, principles, procedures, limits of detection, keeping the impurities in pharmaceutical substances to the minimal level.

UNIT-II

1. **Sodium, potassium and calcium replenishers:** sodium chloride, compound sodium chloride solution (Ringer solution), potassium chloride, ORS.
2. **Calcium replenishers:** Calcium chloride, calcium gluconate, dibasic calcium phosphate.
3. **Acid-base regulators:** sodium bicarbonate, sodium lactate, sodium citrate/potassium citrate, sodium acetate and ammonium chloride.
4. **Antacids:** Aluminium hydroxide gel, dried aluminium hydroxide gel, magnesium oxide, magnesium hydroxide mixture, magnesium trisilicate and calcium carbonate.
5. **Expectorants:** Ammonium chloride, potassium iodide.
6. **Emetics:** Potassium antimony tartrate and copper sulfate.
7. **Antidotes:** Sodium thiosulphate and sodium nitrite.

LO : Properties, classification, preparation, assay of ammonium chloride, sodium thiosulfate and sodium nitrite, uses.

UNIT-III

1. **Adsorbents:** Light kaolin, heavy kaolin and activated charcoal.
2. **Astringents:** Zinc oxide and Bismuth subcarbonate.
3. **Protectants:** Calamine, zinc oxide, zinc state, talc and titanium dioxide.
4. **Silicone polymers:** Activated Dimethicone.

5. **Anti-infectives:** Hydrogen peroxide solution, potassium permanganate, silver nitrate (Silver protein), iodine (Solutions of iodine, povidone-iodine) boric acid and yellow mercuric chloride.

LO: Properties, preparation wherever applicable, assay of hydrogen peroxide, potassium permanganate, boric acid, zinc oxide and uses.

UNIT-IV:

1. **Laxatives:** Magnesium sulphate and sodium phosphate.
2. **Haematinics:** Ferrous sulphate, Ferrous fumarate, Ferrous gluconate, Ferric ammonium citrate, Iron and dextrose injection.
3. **Suspending agents:** Bentonite and colloidal silica.
4. **Excipients:** Di and tricalcium phosphates, magnesium stearate, talc and calcium carbonate (precipitated chalk).
5. **Colorants:** Titanium oxide and ferric oxide.

LO : Properties, preparations wherever applicable, uses.

UNIT-V

Dental products:

1. **Fluorides:** Sodium fluoride and stannous fluoride.
2. **Oral antiseptics:** Hydrogen peroxide, Zinc peroxide and mouth washes.
3. **Dentifrices:** Dibasic calcium phosphate, strontium chloride and sodium metaphosphate.
4. **Cements and Fillers:** Zinc oxide.

LO : Properties, preparations wherever applicable, uses.

UNIT-VI

Miscellaneous medicinal agents of inorganic nature:

Cisplatin (Antineoplastic), lithium carbonate (Antipsychotic), barium sulfate (diagnostic agent), plaster of paris (surgical aid), sodium auorthiomalate (antirheumatic), sodium antimonygluconate (internal parasiticid) and potassium perchlorate (antithyroid).

LO : Structures, properties and uses.

TEXT BOOKS

1. A.H.Beckett and J.B.Stenlake, Practical pharmaceutical chemistry, Part-I. The Athtone press, University of London, London.
2. Advanced Inorganic Chemistry by Satya prakash, G.D.Tuli.

CYNERIC PHARMACEUTICALS

Date: 07-06-2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Miss. Odogbo Elizabeth is a bonafide student of *ADITYA PHARMACY COLLEGE, ADB Road, ADITYA Nagar, Surampalem, Peddapuram, East Godavari Dist, and Andhra Pradesh.* She has undergone industrial training in our organization from 06th May 2017 TO 06th June 2017, as part of partial fulfillment of her B. Pharmacy course bearing Hall Ticket No **143G1 R053.**

During the training period she had interacted with Quality control, Quality Assurance & Production Departments Incharges and acquired basic knowledge in these areas.

During this aforesaid period, we found her hardworking, sincere and learning attitude.

We Wish Them A Bright Future.

CYNERIC PHARMACEUTICALS PVT. LTD. HYD

ADITYA PHARMACY COLLEGE SURAMPALEM

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

Plot No.2, D.No. 24-37/A, Laxmi Narayana Nagar, IDA Uppal, Hyderabad, Telangana – 500 039
Contact No: +91 8498996378, Email: cynericpharmaceuticalhyd@gmail.com

I Year – I SEMESTER

T	P	C
3+1	0	3

PHARMACEUTICAL ORGANIC CHEMISTRY-I

UNIT-I

Structure and reactivity of organic molecules: Polarity of bonds, electronic effects: electromeric effect, inductive effect, mesomeric effect and Hyperconjugation and their influence on the properties of organic molecules; charged species: carbocations and carbanions, their generation, stabilities, rearrangement in the case of carbocations; Free radicals: formation and stability.

LO : Understanding the basic concepts influencing the reactivity of organic molecules, understanding the mechanisms wherever applicable, applications of the above in the interpretation of various properties of organic molecules.

UNIT-II

Alkanes and cycloalkanes: Nomenclature, general methods of preparation, chain and conformational isomerism in the case of alkenes and their relative stabilities, Bayer's strain theory and Sachse-Mohr theory in the case of cycloalkanes and their limitations.

Alkenes: Nomenclature, general methods of preparation, characteristic electrophilic and free radical addition reactions, orientation of product formation as interpreted by Markonikov's rule and peroxide effect (Anti-Markonikov's rule), ozonolysis and allylic substitution.

Alkadienes: Nomenclature, stability of conjugated dienes, 1,2- and 1,4-reactions and their relative stabilities.

Alkynes: Nomenclature, general methods of preparation, characteristic reactions with emphasis on acidity of one alkynes, formation of metal acetylides, stereospecific reduction of alkynes and addition of water involving keto-enol tautomerism

LO : Structures, equations involved in the preparations, mechanism of formation or the reaction, rearrangements if any, discussion on stabilities and applications of the characteristic reactions in synthesis.

UNIT-III

Alkylhalides: Nomenclature, general methods of preparation, significance of nucleophilic subsititution of alkylhalides in organic synthesis, mechanisms and salient features of S_N1 and S_N2 reactions with examples including the proof in favor of these reactions, a comparison of S_N1 and S_N2, elimination

reactions (E1 and E2): mechanisms, salient features and orientation of product formation in terms of Saytzeff's rule and Hoffmann orientation.

LO : Structures, equations involving the methods of preparations and reactions, stabilities and applications of the reactions.

UNIT-IV

Alcohols: Nomenclature, classification, methods of preparation, industrial synthesis of ethanol and methanol, reactions of alcohols involving the replacement of hydroxyl or replacement of the hydrogen of the hydroxyl, iodoform reaction and Lucas test.

Ethers: Nomenclature, Williamson's synthesis, action of hydroiodic acid on ethers.

LO : Structures, general properties, equations involving the methods of preparation and reactions, mechanisms, reactivities.

UNIT-V

Stereochemistry: Isomerism and its comparison to stereoisomerism, stereoisomers, optical isomers (enantiomers), characteristics of enantiomers (chirality), racemic mixtures, methods of separation of racemic mixtures, optical activity, optical rotation, specific rotation, plane of symmetry and centre of symmetry, diastereomers, their properties and required characteristics with examples as given by Fischer projection formulae; mesoform and its characteristics; Configuration: relative configuration (D and L), absolute configuration (R and S); Geometric isomerism: cis-trans isomerism and E and Z nomenclature.

LO : Stereochemical structures, importance of stereochemistry with respect to drugs as interpreted in terms of reactivity and the properties of chiral drugs.

UNIT-VI

Grignard reagent: Preparation, characteristic nucleophilic addition and substitution reactions, applications in organic synthesis and limitations.

LO : Structure, mechanism and usefulness in synthesis.

TEXT BOOKS

1. T.R. Morrison and R.N. Boyd, Organic chemistry, pentice hall of India private limited, New Delhi.
2. Arun Bahl & Bahl, Advanced Pharmaceutical Organic Chemistry.

REFERENCES

1. R.L Madan, Organic Chemistry.
2. Lloyd N. Ferguson, Text book of Organic Chemistry, 2nd edition.
3. Raj K Bansal, A textbook of Organic Chemistry, 5th edition.

CYNERIC PHARMACEUTICALS

Date: 07-06-2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Miss. KUPPALA SITA MAHA LAKSHMI is a bonafide student of *ADITYA PHARMACY COLLEGE, ADB Road, ADITYA Nagar, Surampalem, Peddapuram, East Godavari Dist, and Andhra Pradesh*. She has undergone industrial training in our organization from 06th May 2017 TO 06th June 2017, as part of partial fulfillment of her B. Pharmacy course bearing Hall Ticket No **143G1 R043.**

During the training period she had interacted with Quality control, Quality Assurance & Production Departments Incharges and acquired basic knowledge in these areas.

During this aforesaid period, we found her hardworking, sincere and learning attitude.

We Wish Them A Bright Future.

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Plot No.2, D.No. 24-37/A, Laxmi Narayana Nagar, IDA Uppal, Hyderabad, Telangana – 500 039
- Contact No: +91 8498996378, Email: cynericpharmaceuticalhyd@gmail.com

IV Year –I SEMESTER

T	P	C
3+1	0	4

HOSPITAL & COMMUNITY PHARMACY

UNIT-I

Hospital Pharmacy: Organization and structure, organization of a hospital and hospital pharmacy, responsibilities of a hospital pharmacist, pharmacy and therapeutic committee, Budget preparation and implementation hospital formulary, organization of drug store, purchase and inventory control, patient counseling, role of pharmacist in community health care and education.

LO : To understand Hospital Pharmacy – organisation structure - Budget preparation and implementation hospital formulary, organization of drug store, purchase and inventory control, patient COUNSELLING, role of pharmacist in community health care and education.

UNIT-II

The pharmacy procedural manual, drug distribution, dispensing to out-patients, in-patients and ambulatory Patient - dispensing of ancillary and controlled substances, drug information center.

LO : To understand The pharmacy procedural manual, drug distribution, dispensing to out-patients, in-patients and ambulatory

Patient - dispensing of ancillary and controlled substances, drug information center.

UNIT-III

Records and Reports: Prescription filling, drug profile, patient medication profile, cases on drug interaction and adverse reactions, idiosyncratic cases etc.

LO : To understand Prescription filling, drug profile, patient medication profile, cases on drug interaction and adverse reactions, idiosyncratic cases.

UNIT-IV

Introduction to community Pharmacy

- Community pharmacy Practice — definition.
- The role of the community pharmacy and its relationship to other local health care providers and services to nursing homes and clinics.

- Professional responsibilities of community pharmacist (FIP & WHO Model).
- Prescribed medication order - interpretation and legal requirements

LO: To understand Community pharmacy – role and relationship, professional responsibilities and prescribed medication order.

UNIT-V

Communication skills - communication with prescribers and patients

Over-the-counter (OTC) Drugs

- Rational use of common OTC medications (Vitamins and tonics, iron preparations, analgesics, NSAIDs, cough mixtures, anti-diarrhoeal preparations)

LO : To understand communication with prescribers and patients, Rational use of common OTC medications.

UNIT-VI

1. **Primary health care in community pharmacy**

   Family planning, First aid, Participation in primary health programs, Smoking cessation, Screening programs, Nutrition, Responding to common ailments

2. Community pharmacy management

   Financial, materials, staff, infrastructure requirements, drug information resources, in community pharmacies, computer applications in community pharmacy, Education and training

3. Home Medicines Review (HMR) program: introduction and guidelines

LO : To understand Family planning, First aid, Participation in primary health programs, Smoking cessation, Screening programs, Nutrition, Responding to common ailments and Community pharmacy management and Home Medicines Review (HMR).

Text Books

1. Hospital Pharmacy - Hassan WE. Lee and Febiger publication.
2. Textbook of hospital pharmacy - Aliwood MC and Blackwell. Reference books (Latest editions)
3. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
4. Remington Sciences and Practice of Pharmacy, 21st edition.

Karthikeya Drugs & Pharmaceuticals Pvt. Ltd.

(AN ISO 9001:2008 CERTIFIED COMPANY)

Date: 07-06-2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Miss. MAMIDALA RANI is a bonafide student of *ADITYA PHARMACY COLLEGE, ADB Road, Aditya Nagar, Surampalem, Peddapuram, East Godavari Dist, Andhra Pradesh* . She has undergone industrial training in our organization from 06 May 2017 To 06 June 2017, as part of partial fulfillment of her B. Pharmacy course bearing Hall Ticket No **143G1 R0047.**

During the training period she had interacted with Quality control, Quality Assurance & Production Departments Incharges and acquired basic knowledge in these areas.

During this aforesaid period, we found her hardworking, sincere and learning attitude.

We Wish Them A Bright Future.

Karthikeya Drugs & Pharmaceuticals Pvt. Ltd. KDPL Hyd.

ADITYA PHARMACY COLLEGE SURAMPALEM

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Aditya Pharmacy College
SURAMPALEM

H.No. 11.13-1427, 2nd Floor, Nirmal Sadan, Margadarshi Colony, Kothapet, Hyderabad-035.
Contact: 040-40117938, 8885111163, 7207111163, 8143611163, 8019111163 : kdplpharma@gmail.com
Website: www.kdplpharma.com, e-mail

III Year – I SEMESTER

T	P	C
3+1	0	3

PHARMACEUTICAL MANAGEMENT

UNIT - I

Features of Business Organisations & New Economic Environment:

Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-Liberalisation scenario.

LO : To understand business organization – types – functions.

UNIT - II

Manufacturing Management: Goals of Production Management and Organisation – Production, Planning and Control – Plant location - Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), New Product Development.

LO : To understand production management and organization – Planning and control – Layout – Product development.

UNIT - III

Work Study - Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: $\overline{X}$ chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

LO : To understand principles of work study – Methods – Control charts – Principles – Contribution – Quality concepts.

UNIT - IV

Organisation of Distribution and Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution – Factors influencing channels of distribution, sales organization and sales promotion.

LO : To understand concepts in organization – Distribution – Marketing – Functions – Strategies –Factors – Sales – Sales promotions.

UNIT - V

Pharma Industry: Growth of Pharma Industry in India – current status and its role in building national economy and national health – Structure of Pharma Industry in India – PSUs in Pharma Industry –Progress in the

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SURAMPALEM

manufacture of basic drugs, synthetic and drugs of vegetable origin. Export and import of drugs and pharmaceuticals – Export and import trade.

LO : To understand Pharma industry – Structure – Manufacturing of drugs and Pharmaceuticals – Exports and imports.

UNIT - VI

Insurance and Pharma: Various types of insurance including marine and health insurance.

Pharmaceutical associations and societies, statutory councils governing the profession. General Principles of medical detailing.

LO : To understand insurance – types – health insurance – association and society governing pharmacy profession.

TEXT BOOK

1. Aryasri and Subbarao, Pharmaceutical Administration, TMH.
2. Smarta, Strategic Pharma Marketing.
3. G.Vidya Sagar, Pharmaceutical Industrial Management.

REFERENCES

1. Subbarao Chaganti, Pharmaceutical Marketing in India – Concepts and Strategy Cases, BS Publications.
2. O.P.Khanna, Industrial Management, Dhanpatrai, New Delhi.

Karthikeya Drugs & Pharmaceuticals Pvt. Ltd.

(AN ISO 9001:2008 CERTIFIED COMPANY)

REF:KDPL/IT/ADP-KKD/37 Date: 27-06-2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Miss. RANGULA LAKSHMI PRIYA is a bonafide student of *ADITYA PHARMACY COLLEGE, ADB Road, Aditya Nagar, Surampalem, Peddapuram, East Godavari Dist, Andhra Pradesh* . She has undergone industrial training in our organization from 26th May, 2017 to 25th June, 2017 as part of partial fulfillment of her B. Pharmacy course bearing Hall Ticket No **143G1 R0064.**

During the training period she had interacted with Quality control, Quality Assurance & Production Departments Incharges and acquired basic knowledge in these areas.

During this aforesaid period, we found her hardworking, sincere and learning attitude.

We Wish Them A Bright Future.

Karthikeya Drugs & Pharmaceuticals Pvt. Ltd. KDPL Hyd.

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Contact: 040-40117938, 8885111163, 7207111163, 8143611163, 8019111163
Website: www.kdplpharma.com, e-mail : kdplpharma@gmail.com

II Year – II SEMESTER

T	P	C
3+1	0	3

PHARMACEUTICAL UNIT OPERATIONS – II

UNIT-I

Heat Transfer: Source of heat, heat transfer, steam and electricity as heating media, determination of requirement of amount of steam/electrical energy, steam pressure, boiler capacity, mathematical problems on heat transfer.

LO : To understand principles and theory of Heat flow/ Conductions, Convection, Radiation-Heat exchangers.

UNIT-II

Evaporation: Basic concept of phase equilibria, factors affecting the evaporation, evaporators, film evaporators, single effect and multiple effect evaporators.

LO : To understand evaporation, Phase equilibrium, Theory of evaporation-Evaporators.

UNIT-III

Distillation: Raoult's law, phase diagrams, volatility, simple steam and flash distillations, principles of rectification, Azeotropic and extractive distillation.

LO : Theory of distillation types of rectifiers, their application.

UNIT-IV

Drying: Moisture content and mechanism of drying, rate of drying and time of drying calculations, classification and types of dryers, dryers used in pharmaceutical industries tray dryer, Fluid bed dryer, spray dryer, vacuum oven and freeze-dryer.

LO : Drying, Moisture content, rate of evaporation, types of dryers construction working and Applications.

UNIT-V

Size Reduction: Definition, objectives of size reduction, factors affecting size reduction, laws governing energy and power requirements of a mill, types of mills including ball mill, hammer mill, fluid energy mill etc.

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LO : To understand theory of size reduction, factors involved in size reduction,equipments- Construction working and applications-selection of size reduction equipment.

UNIT-VI

Mixing: Theory of mixing, solid-solid, solid-liquid and liquid-liquid mixing equipment, double cone, twin-shell, silverson mixer, colloid mill, sigma blade mixer, planatery mixer, propeller mixer and turbine mixer.

LO : Theories of mixing solid-solid, solid-liquid & liquid-liquid mixing equipments.

TEXT BOOKS

1. S.J. Carter, Cooper and Gunn's Tutorial Pharmacy, 6th ed., CBS publisher, Delhi.
2. CVS Subhramanyam, Pharmaceutical Engineering.
3. K. Samba Murthy, Pharmaceutical Engineering.
4. Mc Cabe & Smidth.Unit Operations.

REFERENCE BOOKS

1. W.I. Macebe and J. C. Smith Macro, Unit Operations To Chemical Engineering, Hill Int. Book Co., London.
2. L. Lachman, H. Lieberman & J. L Kaniz, The Theory And Practice of Industrial Pharmacy, Lee & Febiger Philadelphia, USA.
3. Badzer & Banchoro, Introduction to Chemical Engineering.
4. Perry's Handbook of Chemical Engineering.
5. M.E.Aulton, Pharmaceutics - The science of dosage form design, 2nd ed.
6. E.A. Rawlin's, Bentley's Text Book of Pharmaceutics, 8th ed ELBS.

ASPHAR
RESEARCH LABS PVT LIMITED

ASPHAR RESEARCH LABS PRIVATE LIMITED

DATE: 19-05-2017

TO WHOM SOEVER IT MAY CONCERN

This is to certify that KARRI VINAY KUMAR **REDDY**, B. Pharmacy student of **Aditya Institute of Pharmaceutical Sciences and Research**, Kakinada, bearing Registration No. **143G1R0083** has undergone instrumentation training for HPLC, FT-IR, UV-Visible Spectrophotometer and Chemical Analysis, Dissolution & Disintegration Apparatus.

He also undergone training in overall Formulation R&D Department having exposure of equipment vide Rapid mixer granulator, Double cone blender, Double Rotary compression machine, Perforated coating pan, Fluid bed processor for a period from **19-04-2017** to **18-05-2017** in our organization. During this period his performance is satisfactory.

We wish him the very best in all his future endeavours.

Best Regards,

ASPHAR RESEARCH LABS PRIVATE LIMITED

M.N.Hyali Krishna 19/05/2017

Authorized Signatory

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Aditya Pharmacy College
SURAMPALEM 533 437

IV Year –II SEMESTER

T	P	C
3+1	0	4

BIOPHARMACEUTICS AND PHARMACOKINETICS

UNIT - I

Introduction to Biopharmaceutics and Pharmacokinetics and their role in formulation development and clinical setting

Biopharmaceutics: Passage of drugs across biological barrier (passive diffusion, active transport, facilitated diffusion and pinocytosis) factors influencing absorption – physiochemical, physiological and pharmaceutical.

LO : To understandBiopharmaceutics, Pharmacokinetics and their applications –absorption mechanisms, factors, their application with examples.

UNIT - II

Drug distribution in the body, Factors influencing distribution.

Plasma protein binding, binding sites, factors influencing protein binding

LO : To understand drug distribution, protein binding – factors.

UNIT - III

Pharmacokinetics

Significance of plasma drug concentration measurement.

Compartment model: Definition and scope.

Pharmacokinetics of drug absorption – Zero order and first order absorption rate constant using Wagner Nelson and Loo-riegelman method.

Volume of distribution and distribution coefficient.

LO : To understand the significance of plasma drug concentrations, compartment models - kinetics, parameters.

UNIT - IV

Comparative kinetics: One compartment and two compartment models. Determination of Pharmacokinetic parameters from plasma and urine data after drug administration by oral parenteral and other routes.

Curve fitting (Method of Residuals) Regression procedures.

Clearance concept, Mechanism of Renal clearance, clearance ratio, determination of renal clearance.

Non-linear pharmacokietics with special reference to one compartment model after I.V.Drug administration, MichalesMente Equation, detection of non-linearity (Saturation mechanism).

LO : To understand pharmacokinetic models, Linear and Non-Linear kinetics, mechanisms and method of assessments.

UNIT - V

Clinical pharmacokinetics

Definition and scope

Dosage adjustment in patients with and without renal and hepatic failure.

Pharmakokinetic drug interactions and its significance in combination therapy.

LO : To understand clinical pharmacokinetics and their significance, drug interactions – Adjustment of dose.

UNIT - VI

Bioavailability and Bioequivalance.

Measures of bioavailability, C-max, T-max and Area Under the Curve (AUC)

Design of single dose bioequivalance study and relevant statistics.

Overview of regulatory requirements for conduction of bio-equivalence studies.

Bio availability and bio equivalence including evaluation testing protocols.

a. In vitro dissolution studies for solid dosage forms methods, interpretation of dissolution data in vitro, in vivo correlations.
b. Bioavailability testing protocol and procedures.
c. In vivo methods of evaluation – statistical treatment.

LO : To understand bioavailability, bioequivalence, concepts, assessments, design, regulation, invitro dissolution methods, Invitro-invivo correlation.

TEXT BOOKS

1. Venkateshulu, Fundamentals of Biopharmaceutics and Pharmacokinetics, Pharma Book Syndicate.
2. Milo Gibaldi, Biopharmaceutics and clinical pharmacokinetics 4/Edn. Pharma Book Syndicate.
3. DM Brahmankar and SB Jaiswal, biophamaceutics and pharmacokinetics, a treatise, vallabhprakasham, Delhi.

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Approved by Drugs Control Administration
Govt. of Telangana

DATE: 20-05-2017

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **DEVA. LEKHYA**, B.Pharmacy student of **ADITYA INSTITUTE OF PHARMACEUTICAL SCIENCES AND RESEARCH**, Surampalem (Kakinada), bearing **Registration No 143G1R0024** has undergone instrumentation training for HPLC, GC, FT-IR, UV-Visible Spectrophotometer and Chemical Analysis, Dissolution & Disintegration Apparatus, Punching Machine, Coating pan.

She also undergone training in analytical R&D department overall for a period from **19-04-2017 to 19-05-2017** in our organization. During this period her performance is satisfactory.

We wish her the very best in all her future endeavours.

Best Regards,
Chandra labs

Authorized Signatory

CHANDRA LABS * HYDERABAD *

20/5/17

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Aditya Pharmacy College
SURAMPALEM 533 437

5-5-35/173, Plot No. 10, 1st Floor, Near Soni Complex, IDA Prashanthi Nagar, Kukatpally, Hyderabad - 500 072.
Ph : 040-4011 3413 Telefax : 040-2307 7913 E-mail : info2chandralabs@gmail.com Website : www.chandralabs.in

I Year – II SEMESTER

T	P	C
3+1	0	3

HUMAN ANATOMY & PHYSIOLOGY – II (50 Hrs)

UNIT –I 08

Central Nervous System: Anatomy and physiology of different parts of brain, spinal cord and cranial nerves.

LO : Brain involvement in sensory and motor functions including pain persumption, sleep wake cycle, cognitive skills, memory, behavior and governance.

UNIT – II

Neuron, axon conduction, Neurochemical transmission, reflex action, electroencephalogram, specialized functions of the brain, and their functions. 08

LO : Chemical Mediators like Acetyl choline, Serotinine, Dopamine, Noradrenaline, glutamic acid, gaba involvement in transmission of impulse and disorders due to their changes.

UNIT - III

Autonomic Nervous System: Physiology and functions of sympathetic and parasympathetic nervous system. Mechanism of neurohumoral transmission in the A.N.S. 08

LO : Cholinergic system is Essential for life process while adrenergic system is needed to meet emergency by flight or fight. ANS works without rest through life without rest unlike CNS.

UNIT - IV

Endocrine System: Basic anatomy and physiology of pituitary, thyroid, parathyroid, adrenals, testes, ovary and endocrine functions of hormones and functions. 08

LO : Growth, reproduction and metabolism depend on hormonal activity. Their imbalance leads to disorders and some of them cannot be rectified.

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UNIT-V

Reproductive System: Male and female reproductive systems and the functions of their hormones. Physiology of menstruation, Spermatogenesis and Oogenesis. 08

LO : Concept of male & female hormones, Characters, sex cell maturity, reproductive period, copulation and pregnancy, parturition, concept of pregnancy, menopause and their care.

UNIT-VI

Sense organs: basic anatomy and physiology of Eye, Ear, Nose, Tongue and skin. 10

LO : Sensations are the combined activities of sensory organs and specified areas of the brain.

TEXT BOOKS

1. Tortora, G.J and Anagnodokas, Principles of Anatomy and Physiology, N.P Harper & Row Publishers N.Y
2. Ross & Wilson – Anatomy & Physiology in health and illness – Anne Waugh, Allison Grant.
3. T.S. Ranganathan, A Text book of Human Anatomy.
4. Human Anatomy and Physiology. C.C Chatterjee.

REFERENCES

1. Donald.C Rizzo, Fundamental of Anatomy and Physiology.
2. Subrhamanyam and Others, A textbook of Physiology.
3. A.C.Guyton, Text Book of Medical PhysiologyKeele& Neil, Samson Wrights Applied Physiology.
4. Best & Taylor, The Living Body-A Text Book on Human Physiology.
5. M.N. Ghosh, Human Physiology Julia F. Gui, Learning Human Anatomy: A Laboratory Text.
6. B.D. Chaurasia, Human Anatomy, Regional and Applied, Part-I,II and III, CBS Publishers and Distributors, New Delhi.

DR.REDDY'S

CERTIFICATE OF TRAINING

This is to certify that Perumalla . jyothi

undergone training programme on

Instrumental & chemical Analysis

from April - 22 to May - 20 - 2017

Organized by DR.Reddy's Laboratories Ltd, Hyderabad. During trainig programme, the candidate was imparted training

on HPLC, U.V & wet Analysis

The performance of the candidate durining the training period was found to be satisfactory.

Dr. Reddy's Laboratories Ltd. Bachupally, HYD.

Ast. MANAGER

ASST. MANAGER
Dr. REDDY'S LABORATORIES LTD
BACHUPALLY
HYDERABAD - 500 072.

INSTRUCTOR

ADITYA PHARMACY COLLEGE SURAMPALEM

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II Year – II SEMESTER

T	P	C
0	3	2

PHARMACEUTICAL UNIT OPERATIONS - LAB

1. Measurement of flow of fluids and their pressure, determination of Reynolds's number and calculation of frictional losses.
2. Evaluation of filter media, determination of rate of filtration and study of factors affecting filtration including filter aids.
3. Experiments to demonstrate applications of centrifugation.
4. Determination of Humidity-use of Dry Bulb and Wet Bulb thermometers and Psychometric charts.
5. Determination of overall Heat Transfer Coefficient.
6. Determination of rate of evaporation.
7. Experiments based on steam. Extractive and Azeotropic distillations.
8. Determination of rate of drying, free moisture content and bound moisture content.
9. Experiments to illustrate the influence of various parameters on the time of drying.
10. Experiments to illustrate principles of size reduction, Laws governing energy and power requirements of a size reduction.
11. Experiments to illustrate solid-solid mixing, determination of mixing efficiency using different types of mixers.

Karthikeya Drugs & Pharmaceuticals Pvt. Ltd.
(AN ISO 9001:2008 CERTIFIED COMPANY)

REF:KDPL/IT/ADP-KKD/038 Date: 27-06-2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Mr. SATISH KUMAR MANGALAM is a bonafide student of *ADITYA PHARMACY COLLEGE, ADB Road, Aditya Nagar, Surampalem, Peddapuram, East Godavari Dist, Andhra Pradesh* . he has undergone industrial training in our organization from 26th May, 2017 to 25th June, 2017, as part of partial fulfillment of her B. Pharmacy course bearing Hall Ticket No **143G1R0068.**

During the training period he had interacted with Quality control, Quality Assurance & Production Departments Incharges and acquired basic knowledge in these areas.

During this aforesaid period, we found him hardworking, sincere and learning attitude.

We Wish Them A Bright Future.

Karthikeya Drugs & Pharmaceuticals Pvt. Ltd. KDPL Hyd.

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H.No. 11.13-1427, 2nd Floor, Nirmal Sadan, Margadarshi Colony, Kothapet, Hyderabad-035.
Contact: 040-40117938, 8885111163, 7207111163, 8143611163, 8019111163
Website: www.kdplpharma.com, e-mail : kdplpharma@gmail.com

II Year – II SEMESTER

T	P	C
0	3	2

PHARMACOGNOSY – II LAB

1. Study of Microscopy, Macroscopy and powder characters of any three to four crude drugs under each type.
2. a. Glycoside s b. Alkaloids c. Tannins d. Resins
3. Identification test for two enzymes papain and casein.
4. Chemical tests for Asafoetida, Benzoin, Tannic acid, Pale catechu, Black catechu, Aloes, Digitalis, Senna and Quinine.
5. Quantitative microscopy:
   a. Ratio values: Stomatal number and Stomatal Index.
   b. Determination of dimension of starch grains and fibre lengths using eye piece micrometer and camera lucida methods.
   c. Determination of purity of ginger powder using lycopodium spore method.
6. Determination of proximate values:
   a. Moisture content
   b. Ash value
   c. Extractive values
7. Identification of markers of different phytoconstituents like glycerrhiza, aloe and cinchona by chromatographic techniques.

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14-62

DR. REDDY'S

CERTIFICATE OF TRAINING

This is to certify that Pulagam . Lakshmi Sudha.

undergone training programme on

Instrumental & chemical Analysis

from May - 2nd - 2017 to May - 30

Organized by DR.Reddy's Laboratories Ltd, Hyderabad. During trainig programme, the candidate was imparted training

on HPLC, U·V & wet Analysis

The performance of the candidate durining the training period was found to be satisfactory.

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SURAMPALEM 533 437

Dr. Reddy's Laboratories Ltd. * Bachupally, HYD. *
DL:

ASST. MANAGER
Dr. REDDY'S LABORATORIES LTD.
BACHUPALLY
HYDERABAD - 500 072.

INSTRUCTOR

III Year –II SEMESTER

T	P	C
0	3	2

PHARMACEUTICAL TECHNOLOGY – II LAB

At least 25 Pharmaceutical preparations related to the topics are to be prepared

1. Experiments to illustrate preparation, stabilization, physical, chemical and biological evaluation of pharmaceutical products like capsules, tablets, parenterals, microcapsules etc.
2. Evaluation of materials used in pharmaceutical packaging.

DR. REDDY'S

CERTIFICATE OF TRAINING

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Ast. MANAGER
Dr. REDDY'S LABORATORIES LTD.
BACHUPALLY
HYDERABAD - 500 072.

Dr. Reddy's Laboratories Ltd. Bachupalli, HYD.

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INSTRUCTOR

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IV Year –I SEMESTER

T	P	C
3+1	0	3

PHARMACEUTICAL JURISPRUDENCE

UNIT-I

Introduction

a. Pharmaceutical Legislations - A brief review
b. Drugs & Pharmaceutical Industry - A brief review
c. Pharmaceutical Education - A brief review.
d. Pharmaceutical ethics & policy

LO : To understand Pharmaceutical Legislations, Drugs & Pharmaceutical Industry, Pharmaceutical Education and Pharmaceutical ethics & policy.

UNIT-II

Pharmacy Act 1948 and Drugs (Price control) order.

LO : To understand rules prescribed order, Pharmacy act, Drugs (Price control) order.

UNIT-III

Drugs and Cosmetics Act 1940 and Rules 1945

LO : To understand rules, schedules of Drugs and Cosmetics Act in detail.

UNIT-IV

Medicinal & Toilet Preparations (Excise Duties) Act 1955

Narcotic Drugs & Psychotropic Substances Act 1985 &A.P. N. D. P.S Rules 1986

LO : To understand and procedures under medicinal and toilet preparations act and Narcotic Drugs & Psychotropic Substances Act.

UNIT-V

Drugs and Magic Remedies (Objectionable Advertisements) Act 1954 and Rules 1955.

LO : To understand the rules and procedures under drugs and magic remidies.

UNIT-VI

A study of the salient features of the following.

a. Prevention of Cruelty to Animals Act 1960.

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b. AP State Shops & Establishments Act 1988 & Rules 1990.
c. Factories Act 1948.
d. WTO, GATT and The Indian Patents Act 1970
e. Pharmaceutical Policy 2002.

LO : To understand the salient features of the above.

TEXT BOOKS

1. B.M.Mithal, Text book of Forensic Pharmacy, publ by Vallabh Prakashan.
2. Prof. Suresh Kumar J.N, Text book of Forensic Pharmacy by Frontline publications.
3. C.K.Kokate & S.B.Gokhale, Textbook of Forensic Pharmacy.

REFERENCE BOOK

1. Bare Acts and Rules Publ by Govt of India/state Govt from time to time.
2. AIR – reported judgments of Supreme Court of India and other High Courts.
3. Pharmaceutical policy of India
4. Notification from NPPA
5. Vijay Malik, Drugs & Cosmetics act 1940 and Rules, Eastern Law House Co. Delhi, Kolkata.
6. K.Sampath, Pharmaceutical Jurisprudence (Forensic Pharmacy).

Karthikeya Drugs & Pharmaceuticals Pvt. Ltd.

(AN ISO 9001:2008 CERTIFIED COMPANY)

Date: 07-06-2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Miss. OLALEYE MODINAT ADERONKE is a bonafide student of *ADITYA PHARMACY COLLEGE, ADB Road, Aditya Nagar, Surampalem, Peddapuram, East Godavari Dist, Andhra Pradesh* . She has undergone industrial training in our organization from 06 May 2017 To 06 June 2017, as part of partial fulfillment of her B. Pharmacy course bearing Hall Ticket No **143G1 R0054.**

During the training period she had interacted with Quality control, Quality Assurance & Production Departments Incharges and acquired basic knowledge in these areas.

During this aforesaid period, we found her hardworking, sincere and learning attitude.

We Wish Them A Bright Future.

S. V.

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Contact: 040-40117938, 8885111163, 7207111163, 8143611163, 8019111163
Website: www.kdplpharma.com, e-mail : kdplpharma@gmail.com

II Year – I SEMESTER

T	P	C
0	3	2

PHARMACEUTICAL MICROBIOLOGY LAB

1. Study of apparatus used in experimental microbiology.
2. Sterilization techniques and their validations.
3. Preparation of various culture media.
4. Sterilization of glass ware and culture media.
5. Aseptic transfer of culture into different types of medias.
6. Staining methods - Simple staining, Gram's staining, Acid fast and negative staining.
7. Motility testing by hanging drop method.
8. Enumeration of bacteria by pour plate/spread plate technique.
9. Enumeration of bacteria by direct microscopic count.
10. Isolation of pure cultures by streak plate, spread plate, pour plate.
11. Evaluation of antiseptics and disinfectants, sterility of pharmaceutical products as per IP requirements.
12. Observation of colony characteristics.
13. Bio chemical reactions:
    - i) Indole test.
    - ii) Methyl red test.
    - iii) Vogesproskauer test.
    - iv) Starch hydrolysis test.
    - v) Fermentation of carbohydrates.
14. Morphology of molds, yeasts.
15. Preseravation of microrganisms (slant and stab cultures).

14-2

DR. REDDY'S

CERTIFICATE OF TRAINING

This is to certify that Achuturni. Divya bharathi.

undergone training programme on

Instrumental & Chemical Analysis

from May - 2nd - 2017 to May - 30

Organized by DR.Reddy's Laboratories Ltd, Hyderabad. During trainig programme, the candidate was imparted training on HPLC, UV & wet Analysis

The performance of the candidate durining the training period was found to be satisfactory.

ADITYA PHARMACY COLLEGE

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Dr. Reddy's Laboratories Ltd. Bachupalli, HYD. Dt: 2/6/17

ASST. MANAGER
Dr. REDDY'S LABORATORIES LTD.
BACHUPALLY
HYDERABAD - 500 072.

INSTRUCTOR

II Year – II SEMESTER

T	P	C
3+1	0	3

HEALTH EDUCATION & PATHOPHYSIOLOGY(50 Hrs)

UNIT-I

Concepts of health & disease: Disease causing agents and prevention of disease. 05

Classification of food requirements, balanced diet, nutritional deficiency disorders, their treatment and prevention, specifications for drinking water.

First aid: Emergency treatment of shock, snake bites, burns, poisoning, fractures and resuscitation methods.

LO : To understand that disorder is a physiological change while disease is caused by infecting organisms. Prevention is better than cure concept. First aid for emergency conditions before the patient is moved for medical treatment.

UNIT – II 05

Demography and family planning: Demography cycle, family planning and various contraceptive methods. Medical termination of pregnancy.

LO : Problems of over population in providing basic amenities and measures to be adopted for control.

UNIT-III

Basic Principles of cell injury and adaptation: 10

i) Causes, pathogenesis and morphology of cell injury.
ii) Abnormalities in lipoproteinemia, glycogen infiltration and glycogen storage disease.
iii) Cellular adaptations, atrophy, hypertrophy.
iv) Disturbances of growth of cells
v) General biology of tumors
vi) Differences between benign and malignant tumors
vii) Classification of tumors
viii) Etiology and pathogenesis of cancer
ix) Patterns of spread of cancer.

LO : Different phases of cell growth and disorders, to understand normal and tumor cells.

UNIT-IV

Inflammation& Repair : 08

A) i. Pathogenesis of acute inflammation
ii. Chemical mediators in inflammation
iii. Pathogenesis of chronic inflammation

B) i. Wound healing mechanisms and
ii. Factors affecting wound healing.

C) Pain and its types.

LO : To understand that several substances are involved in producing inflammation and to understand different reasons for causing pain.

UNIT-V

Diseases of Immunity: 03

i) Introduction to T and B cells
ii) MHC proteins or transplantation antigens
iii) Immune Tolerance

A) Hypersensitivity 04

i. Hypersensitivity type I, II, III, IV.
ii. Biological significance of hypersensitivity.
iii. Allergy due to food, chemicals and drugs

B) Auto-Immunity 05

i. Mechanism of autoimmunity.
ii. Classification of autoimmune diseases in man.
iii. Transplantation and allograft reactions, mechanism of rejection of allograft.
iv. Acquired Immuno Deficiency Syndrome (AIDS).

LO : To understand about allergy and body's resistance against diseases (Natural and adoptive immunity).

UNIT-VI

Pathophysiology of Cardiac disorders: 03

Shock, stroke, hypertension, Angina, Myocardial infarction, Congestive

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Dr. Reddy's Laboratories Ltd. * Bachupally, HYD. *

Asst. MANAGER
Dr. REDDY'S LABORATORIES LTD.
BACHUPALLY
HYDERABAD - 500 072.

INSTRUCTOR

PHARMACEUTICAL ANALYSIS PRACTICALS - II
(MPA 105P)

1. Analysis of Pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. Assay of official compounds by different titrations
8. Assay of official compounds by instrumental techniques.
9. Quantitative determination of hydroxyl group.
10. Quantitative determination of amino group
11. Colorimetric determination of drugs by using different reagents
12. Imupurity profiling of drugs
13. Calibration of glasswares
14. Calibration of pH meter
15. Calibration of UV-Visible spectrophotometer
16. Calibration of FTIR spectrophotometer
17. Calibration of GC instrument
18. Calibration of HPLC instrument
19. Cleaning validation of any one equipment
20. Determination of total reducing sugar
21. Determination of proteins
22. Determination of saponification value, Iodine value, Peroxide value, Acid value in food products
23. Determination of fat content and rancidity in food products
24. Analysis of natural and synthetic colors in food
25. Determination of preservatives in food
26. Determination of pesticide residue in food products
27. Analysis of vitamin content in food products
28. Determination of density and specific gravity of foods
29. Determination of food additives

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ADITYA PHARMACY COLLEGE * SURAMPALEM

METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF SOFOSBUVIR AND VELPATASVIR IN BULK AND TABLET DOSAGE FORM BY USING RP- HPLC

DISSERTATION SUBMITTED TO

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
योगः कर्मसु कौशलम्
KAKINADA

In partial fulfillment of requirement for the award of the degree of

MASTER OF PHARMACY

IN

PHARMACEUTICAL ANALYSIS AND QUALITY ASSURANCE

Submitted by

Nallamilli Radhika. B.Pharm.

(Regd. No. 163G1S0401)

Under the Guidance of

Mr. Y. SURENDRANATH REDDY M.Pharm., F.A.G.E., (Ph.D.,)

Associate Professor

Dept.of Pharmaceutical Analysis and Quality Assurance

ADITYA

Aditya Pharmacy College,Aditya nagar,ADB road

Surampalem, East Godavari, Kakinada-533437 .

ADITYA PHARMACY COLLEGE

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

ADITYA PHARMACY COLLEGE

(Approved by PCI&AICTE and affiliated to JNTUK)

AdityaNagar,ADBRoad,Surampalem,E.G.dist.,A.P.533437.

EVALUATION CERTIFICATE

This is to certify that the thesis entitled "**METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF SOFOSBUVIR AND VELPATASVIR IN BULK AND TABLET DOSAGE FORM BY USING HPLC**" is submitted to JNTUK University, in partial fulfillment of the requirement for the award of the **Master of Pharmacy** in Pharmaceutical Analysis and Quality Assurance. This is a Bonafied research work carried out by NALLAMILLI RADHIKA bearing the Reg.no 163G1S0401 under the supervision and guidanceof**Mr.Y.SURENDRANATHREDDY**,AssociatProfessor,DepartmentofPharmaceutical AnalysisandQualityAssurance,AdityaPharmacyCollege.

Place:

Date:

Signature of evaluators

1:

2:

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

I hereby declare that the research work embodied in this thesis entitled "**METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF SOFOSBUVIR AND VELPATASVIR IN BULK AND TABLETDOSAGE FORM BY USING HPLC**" has been carried out by me in the **PHARMA TRAIN research laboratory , Hyderabad** and **Aditya Pharmacy College, Surampalem,** during the year 2017-2018 under the joint supervision of **Mr. Y. Surendranath Reddy,** Associate Professor, Aditya Pharmacy College and **Mr. SK madeesh(industrial guide) .** The work is original and has not been submitted in part or full for any Diploma or Degree of this or any other University.

The particulars given in this thesis are true to the best of my knowledge.

Place:

N.Radhika
N.RADHIKA

Date:

Regd.No. 163G1S0401

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Aditya Pharmacy College
SURAMPALEM 533 437

conclusion

The study was focussed to develop and validate HPLC methods for the estimation of sofosbuvir and velpatasvir in bulk and dosage form. This method shows good re-producibility and good recovery. From the specific studies, it was found that the developed methods were specific for sofosbuvir and velpatasvir.

Finally it concludes that all the parameters are within the limits and meet the acceptance criteria of ICH guidelines for method validation. The proposed method was simple, accurate, specific, precise, robust, rugged and economical. Hence this method is validated and can be used for routine and stability sample analysis.

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QUALITY CONTROL AND QUALITY ASSURANCE
(MPA 203T)

Scope

This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It covers the important aspects like cGMP, QC tests, documentation, quality certifications, GLP and regulatory affairs.

Objectives

At the completion of this subject it is expected that the student shall be able to know

- the cGMP aspects in a pharmaceutical industry
- to appreciate the importance of documentation
- to understand the scope of quality certifications applicable to Pharmaceutical industries
- to understand the responsibilities of QA & QC departments

THEORY — 60 hrs

1. Concept and Evolution of Quality Control and Quality Assurance — 12 Hrs

   Good Laboratory Practice, GMP, Overview of ICH Guidelines - QSEM, with special emphasis on Q-series guidelines.

   Good Laboratory Practices: Scope of GLP, Definitions, Quality assurance unit, protocol for conduct of non clinical testing, control on animal house, report preparation and documentation.

2. cGMP guidelines according to schedule M, USFDA (inclusive of CDER and CBER) Pharmaceutical Inspection Convention (PIC), WHO and EMEA covering: Organization and personnel responsibilities, training, hygiene and personal records, drug industry location, design, construction and plant lay out, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination and Good Warehousing Practice. CPCSEA guidelines. — 12 Hrs

3. Analysis of raw materials, finished products, packaging materials, in process quality control (IPQC). Developing specification (ICH Q6 and Q3) — 12 Hrs

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Purchase specifications and maintenance of stores for raw materials. In process quality control and finished products quality control for following formulation in Pharma industry according to Indian, US and British pharmacopoeias: tablets, capsules, ointments, suppositories, creams, parenterals, ophthalmic and surgical products (How to refer pharmacopoeias), Quality control test for containers, closures and secondary packing materials.

4. Documentation in pharmaceutical industry: Three tier documentation, Policy, Procedures and Work instructions, and records (Formats), Basic principles- How to maintain, retention and retrieval etc. Standard operating procedures (How to write), Master Formula Record, Batch Formula Record, Quality audit plan and reports. Specification and test procedures, Protocols and reports. Distribution records. Electronic data. 12 Hrs

5. Manufacturing operations and controls: Sanitation of manufacturing premises, mix-ups and cross contamination, processing of intermediates and bulk products, packaging operations, IPQC, release of finished product, process deviations, charge-in of components, time limitations on production, drug product inspection, expiry date calculation, calculation of yields, production record review, change control, sterile products, aseptic process control, packaging. 12 Hrs

REFERENCES

1. Quality Assurance Guide by organization of Pharmaceutical Procedures of India, 3rd revised edition, Volume I & II, Mumbai, 1996.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69, Marcel Dekker Series, 1995.
3. Quality Assurance of Pharmaceuticals- A compedium of Guide lines and Related materials Vol I & II, 2nd edition, WHO Publications, 1999.
4. How to Practice GMP's – P P Sharma, Vandana Publications, Agra, 1991.
5. The International Pharmacopoeia – vol I, II, III, IV & V - General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excepients and Dosage forms, 3rd edition, WHO, Geneva, 2005.
6. Good laboratory Practice Regulations – Allen F. Hirsch, Volume 38, Marcel Dekker Series, 1989.
7. ICH guidelines
8. ISO 9000 and total quality management

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

ANALYTICAL METHOD DEVELOPMENT & METHOD VALIDATION OF STABILITY INDICATING RELATED SUBSTANCES BY RP-HPLC FOR TILORONE TABLETS

DISSERTATION SUBMITTED TO

In partial fulfillment of requirement for the award of the degree of

MASTER OF PHARMACY

IN

PHARMACEUTICAL ANALYSIS AND QUALITY ASSURANCE

Submitted by

K. SRI HARI GOVIND B.Pharm.

(Regd. No. 163G1S0402)

Under the Guidance of

Mr. Y. SURENDRANATH REDDY
M.Pharm., F.A.G.E., (Ph.D.,)
Associate Professor, Institutional Guide

Mr. JOY BABU PALANATI
Manager
Industrial Guide

Aditya Pharmacy College,Aditya nagar,ADB road

Surampalem, East Godavari (Dist), Kakinada-533437.

2016-2018

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Aditya Pharmacy College
SURAMPALEM 533 437

ADITYA PHARMACY COLLEGE

(Approved by PCI&AICTE and affiliated to JNTUK)

AdityaNagar,ADBRoad,Surampalem,E.G.dist.,A.P.533437.

EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled **"ANALYTICAL METHOD DEVELOPMENT & METHOD VALIDATION OF STABILITY INDICATING RELATED SUBSTANCES BY RP-HPLC FOR TILORONE TABLETS"** is submitted to Jawaharlal Nehru Technology University, Kakinada in partial fulfilment for the award of the degree of **Master of Pharmacy** in **Pharmacuetical Analysis and Quality Assurance.** This is a bonafied work carried out by **K. SRI HARI GOVIND** bearing Regd. No. **163G1S0402** under the guidance and supervision of **Mr. Y. SURENDRANATH REDDY,** Associate Professor, Department of Pharmacuetical Analysis and Quality Assurance, Aditya Pharmacy College, Surampalem.

Place: Surampalem

Date:

Signature of Evaluators

1:

2:

PRINCIPAL
Aditya Pharmacy College
SURAMPALEM 533 437

DECLARATION

I hereby declare that the research work embodied in this thesis entitled **ANALYTICAL METHOD DEVELOPMENT & METHOD VALIDATION OF STABILITY INDICATING RELATED SUBSTANCES BY RP-HPLC FOR TILORONE TABLETS** has been carried out by me in the **HETERO LABS LIMITED (UNIT-III), Hyderabad** and **Aditya Pharmacy College, Surampalem,** during the year 2017-2018 under the joint supervision of **Mr. Y. Surendranath Reddy,** Associate Professor, Aditya Pharmacy College and **Mr. Joy Babu P (Manager)** and **Mr. Katari Srinivas (DGM),** HETERO LABS LIMITED (Unit-III) . The work is original and has not been submitted in part or full for any Diploma or Degree of this or any other University.

The particulars given in this thesis are true to the best of my knowledge.

Place: Surampalem

Date:

ADITYA PHARMACY COLLEGE * SURAMPALEM - 533 437

K.SRI HARI GOVIND

Regd.No. 163G1S0402

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SURAMPALEM-533 437

CONCLUSION

Simple, precise, accurate and reproducible RP-HPLC method was developed for the stability indicating study of related substances of Tilorone di hydrochloride. The mobile phase used was simple and the validation parameters gave good results and within the limits. The developed method can be used for the routine analysis of related substances of Tilorone di hydrochloride. As there was no specific analytical method was developed on Tilorone di hydrochloride, we had finalised an optimized analytical method for the estimation of related substances in Tilorone di hydrochloride.

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PHARMACEUTICALANALYSIS(MPA)

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(MPA 101T)

Scope

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

Objectives

After completion of course student is able to know about chemicals and excipients

- The analysis of various drugs in single and combination dosage forms
- Theoretical and practical skills of the instruments

THEORY 60 Hrs

1. a. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy, Difference/ Derivative spectroscopy. 10 Hrs

   b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy, Data Interpretation.

   c. Spectroflourimetry: Theory of Fluorescence, Factors affecting fluorescence (Characterestics of drugs that can be analysed by flourimetry), Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.

   d. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications.

2 NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance. Brief outline of principles of FT-NMR and 13C NMR. Applications of NMR spectroscopy. 10 Hrs

3 Mass Spectroscopy: Principle, Theory, Instrumentation of Mass 10

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	Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy.	Hrs
4	Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution, isolation of drug from excipients, data interpretation and applications of the following: a. Thin Layer chromatography b. High Performance Thin Layer Chromatography c. Ion exchange chromatography d. Column chromatography e. Gas chromatography f. High Performance Liquid chromatography g. Ultra High Performance Liquid chromatography h. Affinity chromatography i. Gel Chromatography	10 Hrs
5	a. Electrophoresis: Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following: a) Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Iso electric focusing b. X ray Crystallography: Production of X rays, Different X ray methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X-ray diffraction	10 Hrs
6	Potentiometry: Principle, working, Ion selective Electrodes and Application of potentiometry. Thermal Techniques: Principle, thermal transitions and Instrumentation (Heat flux and power-compensation and designs), Modulated DSC, Hyper DSC, experimental parameters (sample preparation, experimental conditions, calibration, heating and cooling rates, resolution, source of errors) and their influence, advantage and disadvantages, pharmaceutical applications. Differential Thermal Analysis (DTA): Principle, instrumentation	10 Hrs

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ESTIMATION OF DEVELOPMENT PROCESS OF ACETIC ACID AND N, N-DIMETHYLFORMAMIDE CONTENT FOR GATIFLOXACIN ANHYDROUS BY RP HPLC

Dissertation Submitted to

JNT University, Kakinada

In Partial Fulfillment of the Requirements for the Award of the Degree of
Master of Pharmacy
In
Pharmaceutical Analysis and Quality Assurance

By

P. BALA SUDHA
(Regd. No. 163G1SO4O3)

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Mr. K.GOVINDARAO, M.Pharm, (Ph.D)
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2016- 2018

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled "ESTIMATION OF DEVELOPMENT PROCESS OF ACETIC ACID AND N, N-DIMETHYLFORMAMIDE CONTENT FOR GATIFLOXACIN ANHYDROUS BY RP HPLC" is submitted to the JNT University, Kakinada in Partial fulfillment for the award of the Degree of Masters of Pharmacy in Pharmaceutical Analysis and Quality Assurance. This is a bonafied work carried out by P. BALA SUDHA (Reg.No: 163G1S0403) under the guidance of supervision of K. GOVINDARAO, M. Pharm.,(Ph.D), Associate Professor, Department of Pharmaceutical Chemistry, Aditya Pharmacy College, Surampalem, Andhra Pradesh.

SIGNATURE OF EVALUATOR 1

SIGNATURE OF EVALUATOR 2

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7. CONCLUSION

- For routine analytical purpose it is desirable to establish methods capable of analyzing huge number of samples in a short time period with good robustness, accuracy and precision without any prior separation step. HPLC method generates large amount of quality data, which serve as highly powerful and convenient analytical tool. The method was validated for system suitability, linearity, precision, accuracy, specificity, ruggedness robustness, LOD and LOQ. The system suitability parameters were within limit, hence it was concluded that the system was suitable to perform the assay.
- The study is focused to develop and validate HPLC methods for the estimation of development process of acetic acid and DMF for gatifloxacin anhydrous. This method shows good re-producibility and good recovery. From the specific studies, it was found that the developed methods were specific for acetic acid and DMF in Gatifloxacin.
- Finally, it concludes that all the parameters are within the limits and meet the acceptance criteria of ICH guidelines for method validation. The proposed method was simple, accurate, specific, precise, robust, rugged and economical. Hence this method is validated and can be used for routine and stability sample analysis.

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PHARMACEUTICAL VALIDATION
(MPA 103T)

Scope

The main purpose of the subject is to understand about validation and how it can be applied to industry and thus to improve the quality of the products. The subject covers the complete information about validation, types, methodology and application.

Objectives

Upon completion of the subject student shall be able to

- Explain the aspect of validation
- Carryout validation of manufacturing processes
- Apply the knowledge of validation to instruments and equipments
- Validate the manufacturing facilities

THEORY		60 Hrs
1.	Introduction: Definition of Qualification and Validation, Advantage of Validation, Streamlining of Qualification & Validation process and Validation Master Plan. Qualification: User Requirement Specification, Design Qualification, Factory Acceptance Test (FAT)/ Site Acceptance Test (SAT), Installation Qualification, Operational Qualification, Performance Qualification, Re- Qualification (Maintaining status- Calibration Preventive Maintenance, Change management), Qualification of Manufacturing Equipments, Qualification of Analytical Instruments and Laboratory equipments.	12 Hrs
2	Qualification of analytical instruments: Electronic balance, pH meter, UV-Visible spectrophotometer, FTIR, GC, HPLC, HPTLC Qualification of Glassware: Volumetric flask, pipette, Measuring cylinder, beakers and burette.	12 Hrs
3	Validation of Utility systems: Pharmaceutical Water System & pure steam, HVAC system, Compressed air and nitrogen. Cleaning Validation: Cleaning Validation - Cleaning Method development, Validation and validation of analytical method used in cleaning. Cleaning of Equipment, Cleaning of Facilities. Cleaning in place (CIP).	12 Hrs
4	Analytical method validation: General principles, Validation of analytical method as per ICH guidelines and USP.	12 Hrs

Computerized system validation: Electronic records and digital significance-21 CFR part 11 and GAMP 5.

5	General Principles of Intellectual Property: Concepts of Intellectual Property (IP), Intellectual Property Protection (IPP), Intellectual Property Rights (IPR); Economic importance, mechanism for protection of Intellectual Property –patents, Copyright, Trademark; Factors affecting choice of IP protection; Penalties for violation; Role of IP in pharmaceutical industry; Global ramification and financial implications. Filing a patent applications; patent application forms and guidelines. Types patent applications-provisional and non-provisional, PCT and convention patent applications; International patenting requirement procedures and costs; Rights and responsibilities of a patentee; Practical aspects regarding maintaining of a Patent file; Patent infringement meaning and scope. Significance of transfer technology (TOT), IP and ethics-positive and negative aspects of IPP; Societal responsibility, avoiding unethical practices.	12 Hrs

REFERENCES

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2. The Theory & Practice of Industrial Pharmacy, 3rd edition, Leon Lachman, Herbert A. Lieberman, Joseph. L. Karig, Varghese Publishing House, Bombay.
3. Validation Master plan by Terveeks or Deeks, Davis Harwood International publishing.
4. Validation of Aseptic Pharmaceutical Processes, 2nd Edition, by Carleton & Agalloco, (Marcel Dekker).
5. Michael Levin, Pharmaceutical Process Scale-Up‖, Drugs and Pharm. Sci. Series, Vol. 157,2nd Ed., Marcel Dekker Inc., N.Y.
6. Validation Standard Operating Procedures: A Step by Step Guide for Achieving Compliance in the Pharmaceutical, Medical Device, and Biotech Industries, Syed Imtiaz Haider
7. Pharmaceutical Equipment Validation: The Ultimate Qualification Handbook, Phillip A. Cloud, Interpharm Press
8. Validation of Pharmaceutical Processes: Sterile Products, Frederick J. Carlton (Ed.) and James Agalloco (Ed.), Marcel Dekker, 2nd Ed.
9. Analytical Method validation and Instrument Performance Verification by Churg Chan, Heiman Lam, Y.C. Lee, Yue. Zhang, Wiley Inter Science

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APPLICATION OF DOE (DESIGN OF EXPERIMENTS) IN DYNAMIC METHOD DEVELOPMENT FOR CHROMATOGRAPHY OPTIMIZATION AND CONCEPTS OF DOE MODEL VALIDATION IN ETORICOXIB ASSAY AND RS METHOD DEVELOPMENT BY RP-HPLC

A DISSERTATION SUBMITTED TO

JNT UNIVERSITY
Kakinada

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF PHARMACY

IN

PHARMACEUTICAL ANALYSIS AND QUALITY ASSURANCE

By

Ravanam Kusuma
(Reg. No. 163G1S0404)

Under the Supervision of

Dr. D. SATHIS KUMAR, M.Pharm., Ph.D.,
Associate Professor, Institutional Guide

K. Sudheer Babu, M.Pharm, (Ph.D.,)
Scientist, Industrial Guide

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled "**Application of DOE (design of experiments) in dynamic method development for chromatography optimization and concepts of DOE model validation in Etoricoxib Assay and RS method development by RP-HPLC**" is submitted to the JNT University, Kakinada in partial fulfilment for the award of the degree of **Masters of Pharmacy in Pharmaceutical analysis and Quality Assurance**. This is a bonafide work carried out by **Ravanam Kusuma** bearing **Reg.No. 163G1S0404** under the guidance and supervision of **Dr. D. Sathis Kumar**, Associate Professor, Department of Pharmaceutical Analysis and Quality Assurance, Aditya Pharmacy College, Surampalem.

Place: Surampalem

Date:

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Signature of Evaluators

1.

2.

ABSTRACT

A Precise, Accurate and Economical RP-HPLC method was developed for the Assay and RS of Etoricoxib in bulk and pharmaceutical dosage forms using DOE software. DOE combined mixture split plot method was used in this study. Unlike OFAT studies, DOE allows to interpret the results with better outcome and enhaneed scientific understanding. In this we have achieved shorter run time and as well as studied multiple factors which were influencing the related substance profile crucial for drug product development. Ternary mobile phase and solid core technology were used. Both were having significant effect on all the responses and run time of analysis. Chromatographic studies were done using Ascentis express C18 (250mm×4.6mm, 5µm). Mobile phase was containing Buffer, Acetonitrile and IPA.0.1% OPA solution was used as buffer. Optimized wavelength for Etoricoxib was 275nm. DOE as an effective tool for related substance method development with multiple impurities that was having less runtime with efficacy of UPLC methods at the techniques of RP-HPLC was proven and can used for both assay and RS methods. The development method was executed for practical results and validated to prove its efficacy and can be further utilised routine quality control of product to evaluate potency.

Key Words: DOE, RPHPLC, OFAT, Ternary mobile phase, IPA (Iso propyl Alcohol), OPA (Ortho Phosphoric acid)

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9. SUMMARY AND CONCLUSIONS

Related substance method was essential in pharmaceutical drug product development. To develop a related substance method for critical products with multiple impurities by OFAT, it requires to conducts multiple experiments to screen all the factors that influence the related substance profile.

DOE (Design of Experiments) concept allows application of statistical modelling of few experiments to establish a relation between the individual factors and the predicted responses. Unlike OFAT studies, DOE allows to interpret the results with better outcome and enhanced scientific understanding.

In the present scope of study, Etoricoxib tablets are selected as suitable drug product candidate to evaluate the application of DOE in Related substance method development. Related substance profile studies are crucial for the drug product development to compare stability of drug product and to prove stability indicating nature of applied test method.

Etoricoxib was a poorly soluble molecule in all the aqueous buffers across the pH range of the physiological systems and is having multiple impurities. Hence to achieve a related substance method, it requires to study multiple factors that influence the related substance profiles.

To make the method development more effective DOE model of experimentation was selected for the study.

Different experiments with OFAT approach by varying different method conditions like mobile phase composition, pH of mobile phase were conducted but did not get any suitable method which has resolution for all the analytes. Moreover it was observed that the impurity profile was changing drastically with change in pH and organic phase composition (IPA). Hence to keep a tract of all the impurities and

respective resolution between impurities approximately 12 responses were to be monitored. It was practically not possible for a human brain to evaluate and correlate the experimental results from multiple trials as in this case where 12 responses are to be monitored.

Hence a DOE experimentation table with possible combination different variables of all selected factors was obtained. The experimentation table was executed in lab to arrive at different related substance profiles and the data was fed to the software.

The data was then evaluated for model efficacy and to build a statistical design model for predictions of the suitable options that will yield desired related substance method. The model was evaluated for ANOVA and for adequacy of the built design with the help of different tools like ANOVA, diagnostic graphs etc.

Once the model was confirmed for accuracy, all the responses are evaluated for subsequent effect of different selected factors. Each response was evaluated for positive and negative effect of each factors.

It was observed that pH of mobile phase, buffer composition, IPA concentration were having significant positive effect on all of the responses.

As a next step the model was applied to predicted possible related substance methods that will yield necessary results of related substance method. For this purpose the software was given certain constraints for each of the factor and response as target ranges and desired outcome of the results.

The model has given predicted solutions of 10 different combinations of selected factors along with the predicted results. Out of the predicted solution, solution-1 was selected and experimented to derive practical results with the given combination of factors. The practical results of related substance profile were closely matching with that of the predicted solutions.

With the current scope of study DOE as an effective tool for related substance method development with multiple impurities that was having less runtime with efficacy of UPLC methods at the techniques of RP-HPLC is proven and can used for both assay and RS methods. The development method was executed for practical results and validated to prove its efficacy and can be further utilised routine quality control of product to evaluate potency.

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ADVANCED INSTRUMENTAL ANALYSIS
(MPA 201T)

Scope

This subject deals with various hyphenated analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are LC-MS, GC-MS, and hyphenated techniques.

Objectives

After completion of course student is able to know,

- interpretation of the NMR, Mass and IR spectra of various organic compounds
- theoretical and practical skills of the hyphenated instruments
- identification of organic compounds

THEORY 60 Hrs

1. HPLC: Principle, instrumentation, pharmaceutical applications, peak shapes, capacity factor, selectivity, plate number, plate height, resolution, band broadening, pumps, injector, detectors, columns, column problems, gradient HPLC, HPLC solvents, trouble shooting, sample preparation, method development, New developments in HPLC-role and principles of ultra, nano liquid chromatography in pharmaceutical analysis. Immobilized polysaccharide CSP's: Advancement in enantiomeric separations, revised phase Chiral method development and HILIC approaches. HPLC in Chiral analysis of pharmaceuticals. Preparative HPLC, practical aspects of preparative HPLC. — 12 Hrs

2 Biochromatography: Size exclusion chromatography, ion exchange chromatography, ion pair chromatography, affinity chromatography general principles, stationary phases and mobile phases. — 12 Hrs

Gas chromatography: Principles, instrumentation, derivatization, head space sampling, columns for GC, detectors, quantification.

High performance Thin Layer chromatography: Principles, instrumentation, pharmaceutical applications.

3 Super critical fluid chromatography: Principles, instrumentation, pharmaceutical applications. — 12 Hrs

Capillary electrophoresis: Overview of CE in pharmaceutical analysis, basic configuration, CE characteristics, principles of CE, methods and modes of CE. General considerations and method

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development in CE, Crown ethers as buffer additives in capillary electrophoresis. CE-MS hyphenation.

4 Mass spectrometry: Principle, theory, instrumentation of mass spectrometry, different types of ionization like electron impact, chemical, field, FAB and MALD, APCI, ESI, APPI mass fragmentation and its rules, meta stable ions, isotopic peaks and applications of mass spectrometry. LC-MS hyphenation and DART MS analysis. Mass analysers (Quadrpole, Time of flight, FT-ICR, ion trap and Orbitrap) instruments. MS/MS systems (Tandem: QqQ, TOF-TOF;Q-IT, Q-TOF, LTQ-FT, LTQ-Orbitrap. 12 Hrs

5 NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR with reference to 13CNMR: Spin spin and spin lattice relaxation phenomenon. 13C NMR, 1-D and 2-D NMR, NOESY and COSY techniques, Interpretation and Applications of NMR spectroscopy. LC-NMR hyphenations. 12 Hrs

REFERENCES

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3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
4. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
5. Quantitative analysis of Pharmaceutical formulations by HPTLC - P D Sethi, CBS Publishers, New Delhi.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.
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Method development and validation for theSimultaneous estimation of Tolcapone andQuinapril in bulk and tablet dosage form by using HPLC

Is a Dissertation Submitted to the

JNT University, Kakinada

In Partial Fulfillment of the Requirements for the Award of the Degree of

MASTER OF PHARMACY

IN

PHARMACEUTICAL ANALYSIS AND QUALITY ASSURANCE

BY

A.UMA SOWMYA

(Regd. No. 163G1S0405)

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Associate Professor, Institutional guide

Mr.N.V.CHANDRASHEKARREDDY
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Department of Pharmaceutical Analysis & Quality Assurance,
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2016-2018

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled"Method development and validation for theSimultaneous estimation of Tolcapone and Quinapril in bulk and tablet dosage form by using HPLC"is submitted to the Jawaharlal Nehru Technological University, Kakinada in partial fulfillment for the award of the degree of **Master of Pharmacy in Pharmaceutical Analysis and Quality Assurance .** This is a bonafied work carried out by A.UmaSowmya(Regd No:163G1S0405)under the guidance of supervision of Dr.D.Sathis Kumar, Associate Professor, Aditya Pharmacy College, Surampalem.

Date:

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Place:

SIGNATURE OF EVALUATOR 2

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ABSTRACT

A simple. Accurate and precise method was developed for the simultaneous estimation of the Tolcapone and Quinapril in bulk and tablet dosage form. Chromatogram was run through discovery 250mm x 4.6mm,5µ. Mobile phase containing buffer and acetonitrile taken in the ratio 50:50 was pumped through columnat a flow rate of 1ml/min. Buffer used in this method is 0.1%OPA solution. Temperaturewas maintained at 30°c. Optimised wave length for Tolcapone and Quinapril was 246nm. %RSD of the Tolcapone and Quinapril were found to be 0.6 and 0.4respectively. %Assay was obtainedas 100.16% and 99.86% for Tolcapone and Quinapril respectively. LOD and LOQ valueswhich were obtained from regression equations of Tolcapone and Quinapril, were 0.03ppm, 0.029ppm and 0.099ppm, 0.10ppm respectively. Regression equations for Tolcapone and Quinapril were found to beY=1785.2x+1030.3,and Y=722.75x-1154respectively.

Key words: Tolcapone, Quinapril, HPLC

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9. CONCLUSTION

A simple, Accurate and Precise method was developed for the simultaneous estimation of the Tolcapone and Quinapril in tablet dosage form. Our method was developed withless retentiontime for estimation of Tolcapone and Quinapril, So it may consume less mobile phase with short running time. Our method was satisfied with all the validated parameters. Finally, we concluded that our developed method was simple and economical that can be adopted in regular quality control test in industries.

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DRUG DELIVERY SYSTEMS

(MPH 102T)

SCOPE

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

OBJECTIVES

Upon completion of the course, student shall be able to understand

The various approaches for development of novel drug delivery systems.

The criteria for selection of drugs and polymers for the development of delivering system

The formulation and evaluation of Novel drug delivery systems..

THEORY 60 Hrs

1.	Sustained Release(SR) and Controlled Release (CR) formulations: Introduction & basic concepts, advantages/ disadvantages, factors influencing, Physicochemical & biological approaches for SR/CR formulation, Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application Dosage Forms for Personalized Medicine: Introduction, Definition, Pharmacogenetics, Categories of Patients for Personalized Medicines: Customized drug delivery systems, Bioelectronic Medicines, 3D printing of pharmaceuticals, Telepharmacy.	10 Hrs
2	Rate Controlled Drug Delivery Systems: Principles & Fundamentals, Types, Activation; Modulated Drug Delivery Systems;Mechanically activated, pH activated, Enzyme activated, and Osmotic activated Drug Delivery Systems Feedback regulated Drug Delivery Systems; Principles & Fundamentals.	10 Hrs
3	Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal Drug Delivery Systems: Principle of muco adhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations.	10 Hrs
4	Occular Drug Delivery Systems: Barriers of drug permeation, Methods to overcome barriers.	06 Hrs

5	Transdermal Drug Delivery Systems: Structure of skin and barriers, Penetration enhancers, Transdermal Drug Delivery Systems, Formulation and evaluation.	10 Hrs
6	Protein and Peptide Delivery: Barriers for protein delivery. Formulation and Evaluation of delivery systems of proteins and other macromolecules.	08 Hrs
7	Vaccine delivery systems: Vaccines, uptake of antigens, single shot vaccines, mucosal and transdermal delivery of vaccines.	06 Hrs

REFERENCES

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded,
Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker,Inc., New York, 1992.
3. Encyclopedia of controlled delivery, Editor- Edith Mathiowitz, Published by WileyInterscience Publication, John Wiley and Sons, Inc, New York! Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002

JOURNALS

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian drugs (IDMA)
3. Journal of controlled release (Elsevier Sciences) desirable
4. Drug Development and Industrial Pharmacy (Marcel & Decker) desirable

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DESIGN, DEVELOPMENT AND EVALUATION OF RITONAVIR LIPOSOMAL GEL FORMULATIONS TO TREAT THE TOPICAL INFECTIONS ASSOCIATED WITH HIV/AIDS

Is a Dissertation Submitted to

JNT University, Kakinada

In Partial Fulfilment of the Requirements for the Award of the Degree of

Master of Pharmacy

In

Pharmaceutics

BY

AVADHANULA ANJANI DEVI

(Regd. No. 163G1S0301)

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled " DESIGN DEVELOPMENT AND EVALUATION OF LIPOSOMAL RITONAVIR GEL FORMULATIONS TO TREAT THE TOPICAL INFECTIONS ASSOCIATED WITH HIV/AIDS " is submitted to the Jawaharlal Nehru Technological University, Kakinada in partial fulfillment for the award of the degree of Master of Pharmacy in Pharmaceutics. This is a bonafied work carried out by Avadhanula Anjani Devi (Regd No:163G1S0301) under the guidance and supervision of Mr.S.P.N.Kumar, Assistant Professor, Aditya Pharmacy College, Surampalem and under the guidance of Mr.K.Someswarao, KP laboratories.

Date:

Place

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SIGNATURE OF EVALUATOR 2

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Abstract

Liposomes are vesicles made of phospholipid bilayers. These phospholipid bilayers surround an aqueous core. Liposomal size is directly related to the method of preparation and can range from 50 nm to several microns. They form spontaneously when these lipids are dispersed in aqueous media. Adhesiveness, stability and release of incorporated ritonavir are the main features that influence the applicability of hydrogels for topical treatment. Adjustment of the textural properties of hydrogel should be conducted routinely. The texture analyzer measurements can provide deeper insight on gel adhesivness. The gel properties are dependent on the polymer concentration and the pH. Carbopol hydrogels can take up to 15% (w/w) of liposomal dispersions, however, the stability of the liposomal gels need to be evaluated as well. Carbopol hydrogels can be used as advanced drug delivery systems. And the optimized formulation was selected by the basis of invitro drug release of the all the formulations.

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SUMMARY AND CONCLUSION

The standard curve was prepared in the concentration range of 2–20 µg/ml. Different volumes of standard stock solutions, containing 2-20 µg/mL^{-1} of drug were transferred to 10ml volumetric flasks and volume was made up with methanol. The absorbance was measured at 304 nm against the corresponding reagent blank. The drug concentrations of ritonavir were analyzed by UV-Spectrophotometer at 270 nm .

The FTIR was performed for both pure drug and formulation, and the results clearly indicated that there is no incompatibility between pure drug and formulation.

Drug and carrier interactions in the liposomal gels prepared were evaluated by FTIR spectral study. The FTIR spectra of ritonavir and its liposomal gels, which gave highest enhancement in the dissolution rate of ritonavir i.e. ritonavir(F7), The FTIR spectra of ritonavir indicated characteristic peaks at 3307 cm−1 (N–H stretching amide group), 2,918 cm−1 (hydrogen-bonded acid within the molecule), 1,654 cm−1 (ester linkage), 1,645, 1,622, and 1,522 cm−1 (–C=C– stretching aromatic carbons). The spectra of ritonavir liposomal gels tested also showed the above characteristic peaks. These spectral observations indicated no interaction between ritonavir and the liposomal gels.

The determination of shape and surface morphology was done by scanning electron microscope JEOL-5400, Japan. SEM analysis of the samples revealed that all liposome prepared were spherical in shape.

The results of % ritonavir entrapment efficiency are shown in Table 4.1. The formulation F-1 shows the least entrapment about 46.02% and higher ritonavir entrapment was shown by F-8 formulation. Figure 4.3 shows the comparison of % entrapment efficiency of formulations F-1 to F-9.

The clear difference in the values in regard to the changed speed of the measurement is observed. Although is the texture analyzer widely used in pharmaceutical applications, particularly pharmaceutical industry, not much scientific information is available on the effect of measurement set up on the measurement values.

Most of the literature available is on use of texture analyser to optimise adhesiveness and cohesiveness of water-in-oil emulsions evaluate mucoadhesive properties of various polymers test tablet disintegration from fast-dissolving preparations and correlation between ritonavir dissolution and polymer hydration

Moreover, texture analyzer has been used widely in food industry as well

The main advantage of using this instrument in pharmaceutical applications is the possibility that by changing probes or measurement parameters, this instrument can be used for multiple pharmaceutical ritonavir dosage forms, from solid to liquid-like (Li and Gu, 2007).

Since use of texture analyzer to measure gels texture was not reported before, finding a reproducible method to measure the viscosity of gels with texture analyzer was important.

The decision was to measure the viscosity with 1mm/s speed. This condition resulted in a faster method.

During the process of separation of liposomally entrapped ritonavir and free ritonavir (ultracentrifugation), we observed that the supernatant, which would normally not contain liposomes as we prepared MLVs by the film method, also contained very small particles. This was further confirmed by the PCS measurements, where clear distinctions could be seen between very small and much larger vesicles, resulting in higher PI values as well. Due to this fact, for preparation of liposomal hydrogles we used liposomal dispersion containing both liposomal and unentrapped (free) ritonavir as entrapment was found to be rather high

The cohesiveness of hydrogels was not affected by the incorporation of liposomal dispersions, even at higher concentrations, which was in a way unexpected . Carbopol hydrogels appear to be stable formulations that can incorporate liposomes in their network without changing their original texture properties. One possible explanation can be that liposomes accommodate themselves in the empty spaces inside the gel's three dimensional structure. Some of the earlier reports on the stability of liposomal creams indicate that the creams are not stable formulations, thereof, incorporating liposomes into gels is a good solution for administration of ritonavir s in topical form.[31]Moreover, gels are patient and skin-friendly formulations.[61]

After storage of liposomal hydrogels at 40 °C, it was observed that liposomal hydrogels are not stable at higher temperature. The liposomal dispersion within gels precipitated down and on the top of the gel we could observe the gel "sweating" .

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The cumulative percent ritonavir release for formulation batch F-7 was found to be higher i.e. 75.35% and formulation batch shows smaller %CDR i.e. 45.38 after 24 hours. Form the particle size measurement, percent ritonavir entrapment study and in vitro ritonavir released study i.e., %CDR, it was concluded that formulation batch F-7 having particle size 5.40 µm, percent ritonavir entrapment 61.70 and in vitro ritonavir released study i.e., %CDR 75.35% after 24 hours shows good result as compared to other batches.

Though the F-7 batch having ritonavir content was low compared to F-8 batch but the particle size and % CDR was found to be higher. Hence the F-7 batch was considered for the further evaluation study.

Adhesiveness, stability and release of incorporated ritonavir are the main features that influence the applicability of hydrogels for topical treatment. Adjustment of the textural properties of hydrogel should be conducted routineosly. The texture analyzer measurements can provide deeper insight on gel adhesivness. The gel properties are dependent on the polymer concentration and the pH. Carbopol hydrogels can take up to 15% (w/w) of liposomal dispersions, however, the stability of the liposomal gels need to be evaluated as well. Carbopol hydrogels can be used as advanced drug delivery systems. And the optimized formulation was selected by the basis of invitro drug release of the all the formulations. From the dissolution data F7 is selected as the best formulation.

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PHARMACEUTICS PRACTICALS - II
(MPH 205P)

1. To study the effect of temperature change , non solvent addition, incompatible polymer addition in microcapsules preparation
2. Preparation and evaluation of Alginate beads
3. Formulation and evaluation of gelatin /albumin microspheres
4. Formulation and evaluation of liposomes/niosomes
5. Formulation and evaluation of spherules
6. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.
7. Comparison of dissolution of two different marketed products /brands
8. Protein binding studies of a highly protein bound drug & poorly protein bound drug
9. Bioavailability studies of Paracetamol in animals.
10. Pharmacokinetic and IVIVC data analysis by Winnoline^{R} software
11. In vitro cell studies for permeability and metabolism
12. DoE Using Design Expert® Software
13. Formulation data analysis Using Design Expert® Software
14. Quality-by-Design in Pharmaceutical Development
15. Computer Simulations in Pharmacokinetics and Pharmacodynamics
16. Computational Modeling Of Drug Disposition
17. To develop Clinical Data Collection manual
18. To carry out Sensitivity Analysis, and Population Modeling.
19. Development and evaluation of Creams
20. Development and evaluation of Shampoo and Toothpaste base
21. To incorporate herbal and chemical actives to develop products
22. To address Dry skin, acne, blemish, Wrinkles, bleeding gums and dandruff

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FORMULATION DEVELOPMENT OF NIOSOMAL GELS OF OXCARBAZEPINE AND INVITRO EVALUATION FOR VARIOUS PHYSIOCHEMICAL PARAMETERS AND STABILITY

Is a Dissertation Submitted to

JNT University, Kakinada

In Partial Fulfilment of the Requirements for the Award of the Degree of

Master of Pharmacy

In

Pharmaceutics

By

A. HIMAJA

(Regd. No. 163G1S0302)

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled "FORMULATION DEVELOPMENT OF NIOSOMAL GELS OF OXCARBAZEPINE AND INVITRO EVALUATION FOR VARIOUS PHYSIOCHEMICAL PARAMETERS AND STABILITY" is submitted to the Jawaharlal Nehru Technological University, Kakinada in partial fulfillment for the award of the degree of Master of Pharmacy in Pharmaceutics. This is a bonafied work carried out by Annamaraju Himaja (Regd No:163G1S0302) under the guidance and supervision of Mr. S.P.N.Kumar, Assistant Professor, Aditya Pharmacy College, Surampalem and under the guidance of Mr.K.Srncawara Rao,KP laboratories.

Date:

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Abstract

Niosomes or non-ionic surfactant vesicles are microscopic lamellar structures formed on admixture of non-ionic surfactant of the alkyl or dialkylpolyglycerol ether class and cholesterol with subsequent hydration in aqueous media. They are vesicular systems similar to liposomes that can be used as carriers of amphiphilic and lipophilic drugs. The method of preparation of niosome is based on liposome technology. Aim of the presant work is to prepare neosomal formulations of oxcarbazepine. The in-vitro release from optimized batch of niosomal gel was found to be 37.59% in 8hrs. From this study it can be concluded that Spans show more drug release when compared to tweens. As concentration of the surfactant is increased, % drug release was increased. The particle size of the niosomes is increased upon storage due to less physical stability of conventional niosomes. While entrapment efficiency was decreased on increasing the temperature. Proniosomes can be prepared to increase the stability of niosomes.

Key words: Niosomes, niosomal gel, surfactant, oxcarbazepine etc.

CONCLUSION:

- Niosomal Gel containing Oxcarbazepine are successfully prepared using Span 60. There are no drug excipient incompatibilities.
- All the formulations had shown acceptable results in the evaluation tests.
- The in-vitro release from optimized batch NG10 of niosomal gel was found to be 37.59% in 8hrs hence considered the best formulation prepared.
- From the study, it can be concluded that, formulations prepared with Spans showed more drug release when compared to those preparations formulated with tweens.
- As concentration of surfactant increased, % drug release is also increased.
- Upon storage due to less physical stability of conventional niosomes particle size increased while entrapment efficiency was decreased on increasing the temperature.
- For further studies Pro-niosomes can be prepared to overcome the stability problems of niosomes.

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PHARMACEUTICS PRACTICALS - I
(MPH 105P)

1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. To perform In-vitro dissolution profile of CR/ SR marketed formulation
8. Formulation and evaluation of sustained release matrix tablets
9. Formulation and evaluation osmotically controlled DDS
10. Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS
11. Formulation and evaluation of Muco adhesive tablets.
12. Formulation and evaluation of trans dermal patches.
13. To carry out preformulation studies of tablets.
14. To study the effect of compressional force on tablets disintegration time.
15. To study Micromeritic properties of powders and granulation.
16. To study the effect of particle size on dissolution of a tablet.
17. To study the effect of binders on dissolution of a tablet.
18. To plot Heckal plot, Higuchi and peppas plot and determine similarity factors.

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FORMULATION AND INVITRO EVALUATION OF DESOXIMETASONE GEL FOR TRANSDERMAL DRUG DELIVERY SYSTEM

Is a Dissertation Submitted to

JNT University, Kakinada

In Partial Fulfilment of the Requirements for the Award of the Degree of

Master of Pharmacy

In

Pharmaceutics

By

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled "FORMULATION AND INVITRO EVALUATION OF DESOXIMETASONE GEL FOR TRANSDERMAL DRUG DELIVERY SYSTEM" is submitted to the Jawaharlal Nehru Technological University, Kakinada in partial fulfillment for the award of the degree of Master of Pharmacy in Pharmaceutics.This is a bonafied work carried out by G.Sony Chaitanya(Regd No:163G1S0303)under the guidance and supervision of Mrs.S.Madhavi Latha Assistant Professor, Aditya Pharmacy College, Surampalem and under the guidance of Mr.K.Someswara Rao, KP laboratories.

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ABSTARCT

Transdermal route offers several potential advantages over conventional routes. These advantages includes avoidance of first pass metabolism, predictable and extended duration of action, minimizing undesirable side effects, utility of short half-life drugs, improving physiological and pharmacological response, avoiding the fluctuation in the blood levels, and most important it provides patient convenience. Desoximetasone is a medication belonging to the family of medications known as topical corticosteroids. It is used for the relief of various skin conditions, including rashes. It helps to reduce redness, itching, and irritation.

Desoximetasone is a synthetic corticosteroid, a class of primarily synthetic steroids used as anti-inflammatory and anti-pruritic agents. In the present work an attempt was being made to formulate and evaluate transdermal gel containing anti inflammatory drug Desoximetasone. Carbopol 971, Sodium CMC and carbopol 934 were selected as polymers. The drug and excipient compatibility was studied by using FTIR. Nine formulations of gels were prepared by taking different quantities of polymers. The prepared gel was subjected to various evaluation tests like pH, spreadability, viscosity, content uniformity and diffusion studies conducted up to 12hrs.

All the results were within the limits. By diffusion studies it was observed that formulation F7 shown maximum drug release of 95.49% which was considered as optimized formulation.

Key words: Desoximetasone, Transdermal gel, Carbopol 971, Sodium CMC and carbopol 934

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SUMMARY AND CONCLUSION

In the present work an attempt was being made to formulate and evaluate topical gel containing anti inflammatory drug Desoximetasone. Carbopol 971, Sodium CMC and carbopol 934 were selected as polymers.The drug and excipient compatability was studied by using FTIR Nine formulations of gels were prepared by taking different quantities of polymers

.The prepared gel was subjected to various evaluation tests like pH, spreadability, viscosity, content uniformity and diffusion studies conducted upto 12hrs.All the results were with in the limits ,

By diffusion studies it was observed that formulation F7 shown maximum drug release of 95.49% which was considered as optimized formulation.

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MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS) (NTDS)
(MPH 201T)

Scope

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

Objectives

Upon completion of the course student shall be able to understand

- The various approaches for development of novel drug delivery systems.
- The criteria for selection of drugs and polymers for the development of NTDS
- The formulation and evaluation of novel drug delivery systems.

THEORY		60 Hrs
1.	Targeted Drug Delivery Systems: Concepts, Events and biological process involved in drug targeting. Tumor targeting and Brain specific delivery.	12 Hrs
2	Targeting Methods: introduction preparation and evaluation. Nano Particles & Liposomes: Types, preparation and evaluation.	12 Hrs
3	Micro Capsules / Micro Spheres: Types, preparation and evaluation , Monoclonal Antibodies ; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes.	12 Hrs
4	Pulmonary Drug Delivery Systems : Aerosols, propellents, ContainersTypes, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation.	12 Hrs
5	Nucleic acid based therapeutic delivery system : Gene therapy, introduction (ex-vivo & in-vivo gene therapy). Potential target diseases for gene therapy (inherited disorder and cancer). Gene expression systems (viral and nonviral gene transfer). Liposomal gene delivery systems. Biodistribution and Pharmacokinetics. knowledge of therapeutic antisense molecules and aptamers as drugs of future.	12 Hrs

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REFERENCES

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded,Marcel Dekker, Inc., New York, 1992.
2. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, VallabhPrakashan, New Delhi, First edition 2002.
3. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, NewDelhi, First edition 1997 (reprint in 2001).

PREPARATION AND EVALUATION OF NIOSOMAL FORMULATIONS OF ACYCLOVIR FOR THE TREATMENT OF CHICKENPOX AND VIRAL INFECTIONS

Is a Dissertation Submitted to

JNT University, Kakinada

In Partial Fulfilment of the Requirements for the Award of the Degree of

Master of Pharmacy

In

Pharmaceutics

BY

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled "PREPARATION AND EVALUATION OF NIOSOMAL FORMULATIONS OF ACYCLOVIR FOR THE TREATMENT OF CHICKENPOX AND VIRAL INFECTIONS" is submitted to the Jawaharlal Nehru Technological University, Kakinada in partial fulfillment for the award of the degree of Master of Pharmacy in Pharmaceutics. This is a bonafied work carried out by Kuchi Katyayani Bhanu(Regd No:163G1S0305) under the guidance and supervision of Mrs. S.Madhavi Latha Assistant Professor, Aditya Pharmacy College, Surampalem and under the guidance of Mr.K.Someswara Rao, KP laboratories.

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ABSTRACT

Over the past several years, treatment of infectious diseases and immunisation has undergone a revolutionary shift. With the advancement of biotechnology and genetic engineering, not only a large number of disease-specific biological have been developed, but also emphasis has been made to effectively deliver these biologicals.

Niosomes are vesicles composed of non-ionic surfactants, which are biodegradable, relatively nontoxic, more stable and inexpensive, an alternative to liposomes.

In the present research work an attempt was being made to formulate and evaluate Niosomal formulation containing Antiviral drug Acyclovir. Carbopol was used as a polymer. Five formulations were prepared by taking different quantities of polymers. The prepared gel was subjected to various evaluation tests.

The above work focuses on formulating niosomes of acyclovir and characterization and positive results were observed from the prepared niosomal gels.

Keywords: drug entrapment, lamellar, niosomes, surfactants

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CONCLUSION

- Studies were conducted with various levels of amount of cholesterol and span 60 to optimize proniosomal. All formulations were evaluated for the different Physico-chemical characteristics.
- Formulated niosomes gave satisfactory results for entrapment efficiency.
- *In Vitro* drug release behavior was improved.
- There is no significant difference between the FTIR patterns of the optimized formulation of proniosomal gel and to that of the pure drug.

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ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS
(MPH 202T)

Scope

This course is designed to impart knowledge and skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of biopharmaceutics and pharmacokinetics are provided to help the students' to clarify the concepts.

Objectives

Upon completion of this course it is expected that students will be able understand,

- The basic concepts in biopharmaceutics and pharmacokinetics.
- The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.
- The critical evaluation of biopharmaceutic studies involving drug product equivalency.
- The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
- The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

THEORY — 60 Hrs

1. Drug Absorption from the Gastrointestinal Tract: 12 Hrs

Gastrointestinal tract, Mechanism of drug absorption, Factors affecting drug absorption, pH-partition theory of drug absorption. Formuulation and physicochemical factors: Dissolution rate, Dissolution process, Noyes-Whitney equation and drug dissolution, Factors affecting the dissolution rate. Gastrointestinal absorption: role of the dosage form: Solution (elixir, syrup and solution) as a dosage form ,Suspension as a dosage form, Capsule as a dosage form, Tablet as a dosage form ,Dissolution methods ,Formulation and processing factors, Correlation of in vivo data with in vitro dissolution data.Transport model: Permeability-Solubility-Charge State and the pH Partition Hypothesis, Properties of the Gastrointestinal Tract (GIT) - pH, Microclimate Intracellular pH Environment, Tight-Junction Complex.

FORMULATION AND EVALUATION OF CAPTOPRIL BIOADHESIVE MICROSPHERES

Is a Dissertation Submitted to

JNT University, Kakinada

In Partial Fulfilment of the Requirements for the Award of the Degree of

Master of Pharmacy

In

Pharmaceutics

By

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EVALUATION CERTIFICATE

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DECLARATION

I, Nallamilli Anusha (Regd No:163G1S0306), do hereby declare that the dissertation entitled "FORMULATION AND EVALUATION OF CAPTOPRIL BIOADHESIVE MICROSPHERES"is a record of genuine research work carried out by me under the supervision of Mrs.G.Sridevi, Assistant Professor, Aditya Pharmacy College, Surampalem. The work reported herein has not been previously submitted by other persons for qualifications at any other University or academic institutions unless otherwise referenced or acknowledged.

Place:

Date:

(Nallamilli Anusha)

Regd no: 163G1S0306

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SUMMARY AND CONCLUSION

In the present work, bioadhesive microspheres of Captopril using sodium alginate along with Carbopol 934, HPMC K15M, HPMC K100M as copolymers were formulated to deliver Captopril via oral route.

From the study following conclusions could be drawn:-

- The results of this investigation indicate that ionic cross linking technique Ionotropic gelation method can be successfully employed to fabricate Captopril microspheres.
- The technique provides characteristic advantage over conventional microsphere method, which involves an "all-aqueous" system, avoids residual solvents in microspheres. Other methods utilize larger volume of organic solvents, which are costly and hazardous because of the possible explosion, air pollution, toxicity and difficult to remove traces of organic solvent completely.
- FT-IR spectra reveals the absence of interaction between drug and polymer and coplymer used (T_4).
- Micromeritic studies revealed that the mean particle size of the prepared microspheres was in the size range of 512-903µm and are suitable for bioadhesive microspheres for oral administration.
- Increase in the polymer concentration led to increase in % Yield, % Drug entrapment efficiency, Particle size, % swelling and % Mucoadhesion.
- The *in-vitro* mucoadhesive study demonstrated that microspheres of Captopril using sodium alginate along with Carbopol 934 as copolymer (T_4) adhered to the mucus to a greater extent than the microspheres of Captopril using sodium alginate along with HPMC K15M and HPMC K100M as copolymers.
- The invitro drug release decreased with increase in the polymer and copolymer concentration.
- Analysis of drug release mechanism showed that the drug release from the formulations (n=0.84) followed non-Fickian diffusion and the best fit model was found to be Korsmeyer-Peppas.

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- Based on the results of evaluation tests formulation coded T_4 was concluded as best formulation.

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Second year

2.1 PATHOPHYSIOLOGY (THEORY)

Theory : 3 Hrs. /Week

1. **Scope of the Subject:** This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic Pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge of its application in other subject of pharmacy.

2. **Objectives of the Subject :** Upon completion of the subject student shall be able to –
   a. describe the etiology and pathogenesis of the selected disease states;
   b. name the signs and symptoms of the diseases; and
   c. mention the complications of the diseases.

   Text books (Theory)
   a. Pathologic basis of disease by- Cotran, Kumar, Robbins
   b. Text book of Pathology- Harsh Mohan
   c. Text book of Pathology- Y.M. Bhinde

   Reference books (Theory)
   a. Clinical Pharmacy and Therapeutics; Second edition; Roger Walker; Churchill Livingstone publication

3. **Detailed syllabus and lecture wise schedule :**

   Chapter

   1 **Basic principles of cell injury and Adaptation**
   a) Causes, Pathogenesis and morphology of cell injury
   b) Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen infiltration and glycogen infiltration and glycogen storage diseases

   2 **Inflammation**
   a) Pathogenesis of acute inflammation, Chemical mediators in inflammation, Types of chronic inflammation
   b) Repairs of wounds in the skin, factors influencing healing of wounds

   3 **Diseases of Immunity**
   a) Introduction to Tand B cells
   b) MHC proteins or transplantation antigens
   c) Immune tolerance
   - Hypersensitivity
     Hypersensitivity type I, II, III, IV, Biological significance, Allergy due to food, chemicals and drugs
   - Autoimmunity
     Criteria for autoimmunity, Classifications of autoimmune diseases in man, mechanism of autoimmunity, Transplantation and immunologic tolerance, allograft rejections, transplantation antigens, mechanism of rejection of allograft.
   - Acquired immune deficiency syndrome (AIDS)

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- Amylodosis

4 **Cancer:** differences between benign and malignant tumors, Histological diagnosis of malignancy, invasions and metastasis, patterns of spread, disturbances of growth of cells, classification of tumors, general biology of tumors, spread of malignant tumors, etiology and pathogenesis of cancer.

5 Types of shock, mechanisms, stages and management

6 Biological effects of radiation

7 Environmental and nutritional diseases
   i) Air pollution and smoking- SO2,NO, NO2, and CO
   ii) Protein calorie malnutrition, vitamins, obesity, pathogenesis of starvation.

8 Pathophysiology of common diseases
   a. Parkinsonism
   b. Schizophrenia
   c. Depression and mania
   d. Hypertension,
   e. Stroke (ischaemic and hemorrhage)
   f. Angina, CCF, Atherosclerosis, Myocardial infarction
   g. Diabetes Mellitus
   h. Peptic ulcer and inflammatory bowel diseases
   i. Cirrhosis and Alcoholic liver diseases
   j. Acute and chronic renal failure
   k. Asthma and chronic obstructive airway diseases

9 Infectious diseases :
   Sexually transmitted diseases (HIV,Syphilis,Gonorrhea), Urinary tract infections, Pneumonia, Typhoid, Tuberculosis, Leprosy, Malaria Dysentery (bacterial and amoebic), Hepatitis- infective hepatitis.

4. Assignments :

Title of the Experiment

1 Chemical Mediators of inflammation
2 Drug Hypersensitivity
3 Cigarette smoking & its ill effects
4 Biological Effects of Radiation
5 Etiology and hazards of obesity
6 Complications of diabetes
7 Diagnosis of cancer
8 Disorders of vitamins
9 Methods in Pathology-Laboratory values of clinical significance
10 Pathophysiology of Dengue Hemorrhagic Fever (DHF)

Format of the assignment

1 Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy.
5. Name and signature of the student
6. Time allocated for presentation may be 8+2 Min.

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EVALUATION OF QUALITY OF LIFE OF HEAD AND NECK CANCER PATIENTS UNDERGOING TREATMENT

V year Pharm.D (Doctor of Pharmacy) Dissertation submitted to the

JNTUK

By

K.SRAVANI	(Reg. No.133G1T0012)
MD.FAIZUL IKRAM	(Reg.No. 133G1T0015)
K.TEJA SREE	(Reg. No.133G1T0023)

Under the Guidance of

M. VINODKUMAR M.Pharm (Ph.D)
Assistant Professor,
Department of Pharmacy Practice,
Aditya Pharmacy College, Surampalem

Dr. C.S.K PRAKASH MD (RT)
Associate Professor & HOD,
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DEPARTMENT OF PHARMACY PRACTICE & PHARM D
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2017-2018

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Dr. K. Divakar *M. Pharm., Ph.D.*
Principal & Professor

CERTIFICATE

This is to certify that the dissertation work entitled **"EVALUATION OF QUALITY OF LIFE IN HEAD AND NECK CANCER PATIENTS UNDERGOING TREATMENT."** is submitted to the JNTUK University in partial fulfillment for the award of degree of **Doctor of Pharmacy**. This is a bonafide work carried out by K. Sravani (Reg. No.133G1T0012), MD. Faizul Ikram (Reg. No.133G1T0015), K. Teja Sree (Reg. No. 133G1T0023), under the guidance and supervision of **M. Vinod Kumar**, Assistant Professor, Aditya Pharmacy College, Surampalem.

Date: 09/03/18
Place: Surampalem

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ABSTRACT

Aim:

To evaluate the Quality of Life of Head and Neck cancer patients undergoing different modalities of treatment.

Materials and Methods:

This prospective cross sectional study was carried out in chemotherapy ward, department of radiotherapy, Government General Hospital, Kakinada for duration of 6 months. This was designed to implement the quality of life of patients with head and neck cancer. Patient socio-demographics, clinical variables are noted down from the case sheets of patients undergoing treatment. The most validated QOL tool in oncology is the European Organization for Research of Life Questionnaire Core 30 Items (EORTC QLQ-C30) including the H&N-35 module for assessing QOL is used. Comparison between specific socio-demographics with domains of EORTC QLQ-C30 questionnaire and EORTC QLQ H&N35 questionnaire was calculated using Kruskal Wallis test and Mann Whitney U test. Comparison between specific clinical characteristics with domains of EORTC QLQ-C30 Questionnaire and EORTC QLQ H&N35 questionnaire was calculated using Kruskal Wallis test. Correlation between type of treatment and quality of life domains and between domains of the scales was calculated using Spearman's Rho test. The level of significance was taken at $p<0.05$.

Results:

There is an statistically significant association between gender and PF (p:0.008), EF (p:0.035), between tumor location and GHS (p:0.011), between tumor stage and RF (p:0.024), FI (p:0.043) of EORTC QLQ-C30 scale, between age and HNCO (p:0.019), between gender and HNSC (p:0.032) as well as between tumor location and HNPA (p:0.002), HNSP (p:0.036), HNOM (p:0.000), HNCO (p:0.044) of EORTC QLQ H&N35. There is statistical correlation between RT and HNSX (p:0.028), SF (p:0.000), between CT and HNCO (p:0.004), HNFI (p:<0.000), HNWG (p:0.017), DY (p:0.000), AP (p:0.024), between CRT and HNSX (p:0.008), HNDR (p:0.018), PA (p:0.046), CO (p:0.035), between Post RT and DY (p:0.000) AP (p:0.000), FI (p:0.000) and also between the domains of the QOL scores.

Conclusion:

The treatment showed moderate significant affect on quality of life in patients with head and neck cancer.

Keywords: Quality of life, head and neck cancer, EORTC QLQ-C30, EORTC QLQ H&N35.

Department Of Pharmacy Practice

CONCLUSION

The effect of treatment on the quality of life was moderate. Female patients showed significant association with physical functioning and emotional functioning. Tumor size and tumor location has statistically significant association with role functioning, financial difficulties, domains of EORTC QLQ-H&N35 like pain, speech problems, coughing and opening mouth.

Type of treatment has a negative impact on some domain of quality of life. Radiotherapy and chemo radiation therapy showed a negative impact on less sexuality; chemotherapy on felt ill and appetite loss; post radiotherapy on appetite loss and financial difficulties; post chemo radiation therapy on less sexuality, nutritional supplements, feeding tube and financial difficulties. Evaluation of QOL of cancer patients is an essential tool to support and recommend changes to attain more effective therapeutic results.

2.4 PHARMACOLOGY – I (THEORY)

Theory : 3 Hrs. /Week

1. **Scope of the Subject:** This subject will provide an opportunity for the student to learn about the drug with regard to classification, pharmacodynamic and pharmacokinetic aspects, adverse effects, uses, dose, route of administration, precautions, contraindications and interaction with other drugs. In this subject, apart from general pharmacology, drugs acting on autonomic nervous system, cardiovascular system, central nervous system, blood and blood forming agents and renal system will be taught. In addition to theoretical knowledge, the basic practical knowledge relevant to therapeutics will be imparted.

2. **Objectives of the Subject :** Upon completion of the subject student shall be able to (Know, do, appreciate) –
   a. understand the pharmacological aspects of drugs falling under the above mentioned chapters;
   b. handle and carry out the animal experiments;
   c. appreciate the importance of pharmacology subject as a basis of therapeutics; and
   d. correlate and apply the knowledge therapeutically.

Text books (Theory) (Author, Title, Edition, Publication Place, Publisher, Year of Publication)

a. Tripathi, K. D. Essentials of medical pharmacology. 4th Ed, 1999. Publisher: Jaypee, Delhi.
b. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics. 16th edition (single volume), 1999. Publisher: Popular, Dubai.
c. Rang, H.P. & Dale, M.M. Pharmacology. 4th edition, 1999. Publisher: Churchill Living stone.

Reference books (Theory)(Author, Title, Edition, Publication Place, Publisher, Publication Year)

a. Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. Goodman and Gilman's The pharmacological Basis of therapeutics. 9th Ed, 1996. Publisher Mc Graw Hill, Pergamon press.
b. Craig, C.R.&Stitzel, R.E. Modern Pharmacology. Latest edition. Publisher: Little Brown.Co
c. Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, Int.
d. Shargel and Leon. Applied Biopharmaceutics and pharmacokinetics. Latest edition. Publisher: Prentice Hall, London.

Text books (Practical) :

Kulkarni, S. K. and Dandia, P. C. Hand book of experimental pharmacology. Latest edition, Publisher: Vallab, Delhi.

Reference books (Practical)

a. Macleod, L.J. Pharmacological experiments on intact preparations. Latest edition, Publisher: Churchill livingstone.

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b. Macleod, L.J. Pharmacological experiments on isolated preparations. Latest edition, Publisher: Churchill livingstone.
c. Ghosh, M.N. Fundamentals of experimental pharmacology. Latest edition, Publisher: Scientific book agency, Kolkata.
d. Ian Kitchen. Textbook of in vitro practical pharmacology. Latest edition, Publisher: Black well Scientific.

3. Detailed syllabus and lecture wise schedule :

Title of the topic

1. **General Pharmacology**
   a) Introduction, definitions and scope of pharmacology
   b) Routes of administration of drugs
   c) Pharmacokinetics (absorption, distribution, metabolism and excretion)
   d) Pharmacodynamics
   e) Factors modifying drug effects
   f) Drug toxicity - Acute, sub- acute and chronic toxicity.
   g) Pre-clinical evaluations
   h) Drug interactions

   Note: The term Pharmacology used here refers to the classification, mechanism of action, pharmacokinetics, pharmacodynamics, adverse effects, contraindications, Therapeutic uses, interactions and dose and route of administration.

2. **Pharmacology of drugs acting on ANS**
   a) Adrenergic and antiadrenergic drugs
   b) Cholinergic and anticholinergic drugs
   c) Neuromuscular blockers
   d) Mydriactics and miotics
   e) Drugs used in myasthenia gravis
   f) Drugs used in Parkinsonism

3. **Pharmacology of drugs acting on cardiovascular system**
   a) Antihypertensives
   b) Anti-anginal drugs
   c) Anti-arrhythmic drugs
   d) Drugs used for therapy of Congestive Heart Failure
   e) Drugs used for hyperlipidaemias

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4. **Pharmacology of drugs acting on Central Nervous System**
   a) General anesthetics
   b) Sedatives and hypnotics
   c) Anticonvulsants
   d) Analgesic and anti-inflammatory agents
   e) *Psychotropic drugs*
   f) Alcohol and methyl alcohol
   g) CNS stimulants and cognition enhancers
   h) Pharmacology of local anaesthetics

5. **Pharmacology of Drugs acting on Respiratory tract**
   a) Bronchodilators
   b) Mucolytics
   c) Expectorants
   d) Antitussives
   e) NasalDecongestants

6. **Pharmacology of Hormones and Hormone antagonists**
   a) Thyroid and Antithyroid drugs
   b) Insulin, Insulin analogues and oral hypoglycemic agents
   c) Sex hormones and oral contraceptives
   d) Oxytocin and other stimulants and relaxants

7. **Pharmacology of autocoids and their antagonists**
   a) Histamines and Antihistaminics
   b) 5-Hydroxytryptamine and its antagonists
   c) Lipid derived autocoids and platelet activating factor

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EFFECTIVENESS OF BUPIVACAINE AS SPINAL ANAESTHETIC AND FENTANYL/DICLOFENAC AS POST ANALGESIC IN PATIENTS UNDERGOING MICROENDOSCOPIC DISCECTOMY

V year Pharm.D (Doctor of Pharmacy) Dissertation submitted to the

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By

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SUBHAM WATS	(Reg.No. 133G1T0029)
SWEET MEMORY SUTNGA	(Reg. No.133G1T0030)

Under the Guidance of

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Principal & Professor

CERTIFICATE

This is to certify that the dissertation work entitled **"EFFECTIVENESS OF BUPIVACAINE AS SPINAL ANAESTHETIC AND FENTANYL/DICLOFENAC AS POST ANALGESIC IN PATIENTS UNDERGOING MICROSCOPIC DISCECTOMY"** is submitted to the JNTUK in partial fulfillment for the award of the degree of **Doctor of Pharmacy**. This is a bonafide work carried out by G.Satya Sravani (Reg. No. 133G1T0008), Subham Wats (Reg. No. 133G1T0029), Sweet Memory Sutnga (Reg. No. 133G1T0030), under the guidance and supervision of **Mr.M.Vinod Kumar**, Associate Professor, Aditya Pharmacy College, Surampalem.

Date: 7/3/18
Place: Surampalem

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ABSTRACT

Aim: To evaluate the effectiveness of 0.5% hyperbaric Bupivacaine in spinal anesthesia and Fentanyl/ Diclofenac in post analgesia in patients undergoing Micro endoscopic Discectomy.

Material and Methods: The present study was conducted on 148 patients for six months. Mixed non-probability sampling technique was employed in our study. The subjects are recruited based on their accessibility, easiness to recruit (convenience sampling) and the patients should suffer from Lumbar disc prolapse (purposive sampling). The scale used for pain is visual analogue scale. Wilcoxon signed rank test was employed to find association between pre- and post-operative clinical parameters of spinal anesthesia and analgesia. Mann Whitney U test was employed to know association of post analgesia between Fentanyl and Diclofenac group. If p-value <0.05, then it was considered as significant, p-value<0.01 then it is considered as statistically highly significant.

Results: Of all 148 patients, 83 patients (56.08%) are in between the age group 41-60 years and 87 patients (58.78%) were male. Spinal anesthesia is given in sitting position for 106 patients (71.62%) and lateral position for 42 patients (28.38%). The mean onset of motor blockade was found to be 11.28 ± 2.12 minutes and the mean onset time of sensory blockade was found to be 8.79 ± 1.93 minutes. The mean systolic blood pressure was found to be 106.15 ±13.53 and mean heart rate was found to be 71.63±10.74. The mean respiratory rate during the surgery was found to be 17.13±3.47. In our study the mean pre-operative systolic blood pressure was 122.84±11.78, mean post-operative systolic pressure was 119.32±9.08, mean pre-operative diastolic blood pressure was 79.72±8.49, mean post-operative diastolic pressure was 78.5±9.67, mean pre-operative pulse rate was 86.26±10.21, mean post-operative pulse rate was 87.58±9.38, mean pre-operative respiratory rate was 19.11±1.74, mean post-operative respiratory rate was 18.32±2.004.

Conclusion: 0.5% Hyperbaric Bupivacaine as spinal anaesthetic and Fentanyl (1 μg kg^{-1} h^{-1})/ Diclofenac (IM- 50mg, rectal suppository- 50mg) as post analgesic was effective in patients undergoing Micro endoscopic discectomy.

Keywords: Bupivacaine, fentanyl, diclofenac, anaesthetia, analgesia.

Department of Pharmacy Practice, APC

CONCLUSION

- ✓ The peri-operative parameters of bupivacaine were good. There was a very highly significant difference in the clinical parameters pre- and post-anesthetic administration for systolic blood pressure ($p < 0.0001$), diastolic blood pressure ($p<0.0001$), Pulse rate (<0.03) and Respiratory rate ($p= 0.0003$).
- ✓ The pain scores were significantly improved with fentanyl/ diclofenac. There was a very highly significant difference in the pain scores of analgesia pre- and post- analgesic administration for both Fentanyl ($p <0.0001$) and Diclofenac ($p <0.0001$).
- ✓ 0.5% Hyperbaric Bupivacaine as spinal anaesthetic and Fentanyl (1 $\mu g\ kg^{-1}\ h^{-1}$)/ Diclofenac (IM- 50mg, rectal suppository- 50mg) as post analgesic was effective in patients undergoing Micro endoscopic discectomy.

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5.3 CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING (THEORY)

Theory : 2 Hrs. /Week

1. **Introduction to Clinical pharmacokinetics.**

2. **Design of dosage regimens:**
   Nomograms and Tabulations in designing dosage regimen, Conversion from intravenous to oral dosing, Determination of dose and dosing intervals, Drug dosing in the elderly and pediatrics and obese patients.

3. **Pharmacokinetics of Drug Interaction:**
   a. Pharmacokinetic drug interactions
   b. Inhibition and Induction of Drug metabolism
   c. Inhibition of Biliary Excretion.

4. **Therapeutic Drug monitoring:**
   a. Introduction
   b. Individualization of drug dosage regimen (Variability – Genetic, Age and Weight , disease, Interacting drugs).
   c. Indications for TDM. Protocol for TDM.
   d. Pharmacokinetic/Pharmacodynamic Correlation in drug therapy.
   e. TDM of drugs used in the following disease conditions: cardiovascular disease, Seizure disorders, Psychiatric conditions, and Organ transplantations.

5. **Dosage adjustment in Renal and hepatic Disease.**
   a. Renal impairment
   b. Pharmacokinetic considerations
   c. General approach for dosage adjustment in Renal disease.
   d. Measurement of Glomerular Filtration rate and creatinine clearance.
   e. Dosage adjustment for uremic patients.
   f. Extracorporeal removal of drugs.
   g. Effect of Hepatic disease on pharmacokinetics.

6. **Population Pharmacokinetics.**
   a. Introduction to Bayesian Theory.
   b. Adaptive method or Dosing with feed back.
   c. Analysis of Population pharmacokinetic Data.

7. **Pharmacogenetics**
   a. Genetic polymorphism in Drug metabolism: Cytochrome P-450 Isoenzymes.
   b. Genetic Polymorphism in Drug Transport and Drug Targets.
   c. Pharmacogenetics and Pharmacokinetics/Pharmacodynamic considerations

A STUDY ON PRESCRIBING PATTERNS OF ANTIEPILEPTIC DRUGS IN PATIENTS AMONG THE AGE GROUP OF 3 MONTHS TO 10 YEARS IN PEDIATRICS ICU/WARD IN A TERTIARY CARE HOSPITAL, KAKINADA, ANDHRA PRADESH

V year Pharm.D (Doctor of Pharmacy) Dissertation submitted to the

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By

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V.LAKSHMI PRASANNA	(Reg.No. 133G1T0024)
K.S.MEGHANA	(Reg. No.133G1T0028)
K.DURGA MOUNIKA	(Reg No. 13431T0007)

Under the Guidance of

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Date:

Place: Surampalem

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DECLARATION BY THE CANDIDATES

We, K.Pavan Kumar Reddy (Reg.No.133G1T0010), V.Lakshmi Prasanna (Reg.No.133G1T0024), K.S.Meghana (Reg. No. 133G1T0028) and K.Durga Mounika (Reg. No. 13431T0007), hereby declare that the investigations, findings in the dissertation entitled **"A STUDY ON PRESCRIBING PATTERNS OF ANTIEPILEPTIC DRUGS IN PATIENTS AMONG THE AGE GROUP OF 3 MONTHS TO 10 YEARS IN PEDIATRICS ICU/WARD IN A TERTIARY CARE HOSPITAL, KAKINADA, ANDHRA PRADESH"** is a bonafide research work done under the guidance of **A.Tirupati Rao,M.Phurm,(Ph.D)**, Associate Professor, in partial fulfillment of the requirement of Vth year, Doctor of Pharmacy(Pharm.D).

K.Pavan Kumar Reddy (Reg. No. 133G1T0010)

V.LakshmiPrasanna (Reg. No. 133G1T0024)

K.S.Meghana (Reg. No. 133G1T0028)

K.Durga Mounika (Reg. No. 13431T0007)

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CONCLUSION

- We found that seizure effected patients were more among the age group of 7 -10 years and males were more effected when compared to females.
- The number of patients with seizures came more from rural areas than urban sectors.
- Generalized seizures were more common among children.
- The treatment strategy was followed by using mono therapy and combination therapies.
- In mono therapy Sodium valproate was most widely used drug followed by phenytoin and clobazam and phenobarbitone.
- Combination therapy included dual , triple and quaternary or more. In combination therapy most widely used combination was sodium valprate with carbamazepine and sodium valproate with pheyntoin was used.
- Overall we found that with the proper diagnosis at the first seizure episode itself helps in reducing the recurrent seizure episodes. We also concluded that diagnosing at the first episode also helps in reducing the seizures by using mono therapy than dual or triple therapies.

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3.4 PHARMACEUTICAL JURISPRUDENCE (THEORY)

Theory : 2 Hrs. /Week

1. **Scope of the Subject:** (4-6 lines): This course exposes the student to several important legislations related to the profession of pharmacy in India. The Drugs and Cosmetics Act, along with its amendments are the core of this course. Other acts, which are covered, include the Pharmacy Act, dangerous drugs, medicinal and toilet preparation Act etc. Besides this the new drug policy, professional ethics, DPCO, patent and design Act will be discussed.

2. **Objectives of the Subject:** Upon completion of the subject student shall be able to (Know, do, and appreciate) –
   a. practice the Professional ethics;
   b. understand the various concepts of the pharmaceutical legislation in India;
   c. know the various parameters in the Drug and Cosmetic Act and rules;
   d. know the Drug policy, DPCO, Patent and design act;
   e. understand the labeling requirements and packaging guidelines for drugs and cosmetics;
   f. be able to understand the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act; and
   g. other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.

   Text books (Theory)

   Mithal , B M. Textbook of Forensic Pharmacy. Calcutta :National; 1988.

   Reference books (Theory)

   a. Singh, K.K, editor. Beotra's the Laws of Drugs, Medicines & cosmetics. Allahabad: Law Book House; 1984.
   b. Jain, NK. A Textbook of forensic pharmacy. Delhi: Vallabh prakashan ; 1995.
   c. Reports of the Pharmaceutical enquiry Committee
   d. I.D.M.A., Mumbai. DPCO 1995
   e. Various reports of Amendments.
   f. Deshapande, S.W. The drugs and magic remedies act 1954 and rules 1955. Mumbai: Susmit Publications; 1998.
   g. Eastern Book Company .The narcotic and psychotropic substances act 1985, Lucknow: Eastern; 1987.

3. **Detailed syllabus and lecture wise schedule:**

   Title of the topic

   1. **Pharmaceutical Legislations** – A brief review.
   2. Principle and Significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by PCI.
   3. **Drugs and Cosmetics Act, 1940,and its rules 1945.**
      Objectives, Legal definition, Study of Schedule's with reference to Schedule B, C&C1, D, E1, F&F1, F2, F3, FF, G, H, J, K, M, N, P, R, V, W, X, Y.
      Sales, Import, labeling and packaging of Drugs And Cosmetics
      Provisions Relating to Indigenous Systems.
      Constitution and Functions of DTAB,DCC,CDL.
      Qualification and duties –Govt. analyst and Drugs Inspector.

4. **Pharmacy Act –1948.**
   Objectives Legal Definitions, General Study, Constitution and Functions of State & Central Council, Registration & Procedure, ER.
5. **Medicinal and Toilet Preparation Act –1955.**
   Objectives, Legal Definitions, Licensing, Bonded and Non Bonded Laboratory, Ware Housing, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietory Preparations.
6. **Narcotic Drugs and Psychotropic substances Act-1985 and Rules**. Objectives, Legal Definitions, General Study, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and regulations, Schedules to the Act.
7. **Study of Salient Features of Drugs and magic remedies Act and its rules.**
8. **Study of essential Commodities Act Relevant to drugs price control Order.**
9. **Drug Price control Order & National Drug Policy (Current).**
10. **Prevention Of Cruelty to animals Act-1960.**
11. **Patents & design Act-1970.**
12. **Brief study of prescription and Non-prescription Products.**

4. **Assignments:**

Format of the assignment

1. Minimum & Maximum number of pages
2. It shall be a computer draft copy
3. Reference(s) shall be included at the end.
4. Name and signature of the student
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min

Case studies relating to

1. Drugs and Cosmetics Act and rules along with its amendments, Dangerous Drugs Act, Medicinal and Toilet preparation Act, New Drug Policy, Professional Ethics, Drugs (Price control) Order, Patent and Design Act.
2. Various prescription and non-prescription products.
3. Medical and surgical accessories.
4. Diagnostic aids and appliances available in the market.

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CROSS SECTIONAL STUDY OF NEUROLEPTIC INDUCED MOVEMENT DISORDERS IN PATIENTS ATTENDING THE PSYCHIATRIC OUT PATIENT DEPARTMENT OF GOVERNMENT GENERAL HOSPITAL

V year Pharm.D (Doctor of Pharmacy) Dissertation submitted to the Jawaharlal Nehru Technological University, Kakinada

BY

CH.VASU DEVA RAO (Reg. No. 133G1T0004)

G.DHANA RAMA SRI (Reg. No. 133G1T0005)

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Under the Guidance of

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Principal & Professor

CERTIFICATE

This is to certify that the dissertation work entitled **"CROSS SECTIONAL STUDY OF NEUROLEPTIC INDUCED MOVEMENT DISORDERS IN PATIENTS ATTENDING PSYCHIATRIC OUTPATIENT DEPARTMENT OF GOVERNMENT GENERAL HOSPITAL "** is submitted to the JNTUK in partial fulfillment for the award of the degree of **Doctor of Pharmacy**. This is a bonafide work carried out by CH. Vasu Deva Rao (Reg. No. 133G1T0004), G. Dhana Rama Sri (Reg. No. 133G1T0005), K. Manga lakshmi (Reg.No.133G1T0013) and P.Sowjanya Priya Deepthi (Reg.No. 133G1T0017) under the guidance and supervision of Mr. **D.Ravi Prakash**, Assistant Professor, Aditya Pharmacy College, Surampalem and Dr.**V.Niveditha**,M.D.Psychiatry, Assistant professor, Department of Psychiatry,RMC/G.G.H,Kakinada.

Date: 7/3/18

Place: Surampalem

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(Dr.K. Divakar)

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Pin: 533437, Ph: 08852 200005

DECLARATION BY THE CANDIDATES

We **CH. Vasu Deva Rao, G. Dhana Rama Sri, K. Manga Lakshmi and P.Sowjanya Priya Deepthi** hereby declare that the investigations, findings in the dissertation entitled **"CROSS SECTIONAL STUDY OF NEUROLEPTIC INDUCED MOVEMENT DISORDERS IN PATIENTS ATTENDING PSYCHIATRIC OUTPATIENT DEPARTMENT OF GOVERNMENT GENERAL HOSPITAL"** is a bonafide research work done under the guidance of **D. Ravi prakash,** Assistant Professor and Dr.**V.Niveditha**,M.D.Psychiatry, Assistant professor, Department of Psychiatry,RMC/G.G.H,Kakinada, in partial fulfillment of the requirement of V year Doctor of Pharmacy (Pharm.D)

Ch. Vasu Deva Rao
CH. VASU DEVA RAO (Reg. No. 133G1T0004)

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CONCLUSION

- In conclusion, many patients with psychotic disorders suffered from antipsychotic - induced movement disorders which were seen as burdening and stigmatizing phenomena.
- NIMD was seen in 11.03% of our subjects.
- Among the NIMD observed in the sample, the most common was found to be NIP followed by Akathisia andTD.
- The results of our study show that there is no significant association between NIMD and age, gender,marital status,alcohol abuse and nicotine abuse, and polytherapy.
- It was seen that illiterates and unemployed subjects had more incidence of NIMD.
- It was also observed that those who had a duration of 3months to 1 year of treatment had more incidence of TD.
- NIMD has a great influence on the compliance of the patients towards the antipsychotic medications leading to failure of the treatment. It is hence essential that clinicians regularly evaluatepatients for these conditions to prevent their emergence and progression.
- Designing treatment guidelines, increasing availability of drugs with minimal side effects and psycho-education on associated factors (e.g. tobacco use, alcohol consumption) is essential.
- Clinicians should remain mindful for the possible development of NIMD when choosing an antipsychotic, and to ensure that patients are systematically monitored, preferably with the use of one of the recognised rating scales developed for this purpose.Thus, the recognition of these side effects and their management can lead to strategies which ensure compliance to treatment eventually leading to remission.

4.1 PHARMACOTHERAPEUTICS – III (PRACTICAL)

Practical : 3 Hrs./Week

Practicals:

Hospital postings for a period of at least 50 hours is required to understand the principles and practice involved in ward round participation and clinical discussion on selection of drug therapy. Students are required to maintain a record of 15 cases observed in the ward and the same should be submitted at the end of the course for evaluation. Each student should present at least two medical cases they have observed and followed in the wards.

Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases:

Title of the topic

1 **Gastrointestinal system:** Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders.
2 **Haematological system:** Anaemias, Venous thromboembolism, Drug induced blood disorders.
3 **Nervous system:** Epilepsy, Parkinsonism, Stroke, Alzheimer's disease,
4 **Psychiatry disorders:** Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, Obsessive Compulsive disorders
5 Pain management including Pain pathways, neuralgias, headaches.
6 Evidence Based Medicine

Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

Format of the assignment:

1. Minimum & Maximum number of pages
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy
5. Name and signature of the student
6. Time allocated for presentation may be 8+2 Min.

Scheme of Practical Examination :

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	**20**	**70**
Duration	**03hrs**	**04hrs**

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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EVALUATION OF SEVERITY AND MORPHOLOGICAL TYPES OF ANAEMIA IN CHILDREN UNDER 10 YEARS, IN A TERTIARY CARE HOSPITAL

V year Pharm.D (Doctor of Pharmacy) Dissertation submitted to the

JNTUK

By

A. BHANU KUMARI	(Reg. No.133G1T0001)
G. BHARGAV CHOWDARY	(Reg.No. 133G1T0006)
MD. JAMEELA BHANU	(Reg.No. 133G1T0009)
K. HARI KRISHNA	(Reg.No. 133G1T0011)

Under the Guidance of

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Department of Pharmacology,
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Department of Pharmacy Practice

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2018

INTERNAL EXAMINER

EXTERNAL EXAMINER

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Dr. K. Divakar *M. Pharm., Ph. D.*
Principal & Professor

CERTIFICATE

This is to certify that the dissertation work entitled **"EVALUATION OF SEVERITY AND MORPHOLOGICAL TYPES OF ANAEMIA, IN CHILDREN UNDER 10 YEARS, IN A TERTIARY CARE HOSPITAL"** is submitted to the JNTUK in partial fulfillment for the award of the degree of **Doctor of Pharmacy.** This is a bonafide work carried out by A. Bhanu Kumari (Reg. No. 133G1T0001), G. Bhargav Chowdary (Reg. No. 133G1T0006), MD. Jameela Bhanu (Reg. No. 133G1T0009) and K. Hari Krishna (Reg. No. 133G1T0011) under the guidance and supervision of **Mr.A.Thirupathi rao,** Associate Professor, Aditya Pharmacy College, Surampalem.

Date:

Place: Surampalem

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DECLARATION BY THE CANDIDATES

We, **A.Bhanu Kumari, G.Bhargav Chowdary, MD.Jameela Bhanu and K.Hari Krishna,** hereby declare that the investigations, findings in the dissertation entitled **"EVALUATION OF SEVERITY AND MORPHOLOGICAL TYPES OF ANAEMIA, IN CHILDREN UNDER 10 YEARS, IN A TERTIARY CARE HOSPITAL"** is a bonafide research work done under the guidance of **A. Thirupathi Rao,** Associate Professor, in partial fulfillment of the requirement of V year Doctor of Pharmacy (Pharm.D)

A.Bhanu Kumari (Reg. No. 133G1T0001)

G.Bhargav Chowdary (Reg. No. 133G1T0006)

MD.Jameela Bhanu (Reg. No. 133G1T0009)

K.Hari Krishna (Reg. No. 133G1T0011)

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CONCLUSION:

The current study showed a greater incidence of moderate anaemia followed by severe type, directly implicating that there was a greater deficiency of Hb concentrations of hospitalized population. Considering morphological types, the dimorphic condition being the most prevalent followed by Microcytic-hypochromic, which implies a greater range of iron deficiency in the study population.

Children of the age group of less than 5 years, has a greater prevalence of this anaemia condition which indicates a greater requirement of iron and nutrition supplements in them as the primary source of may not be enough for providing all the required quantity, in these years where rapid growth is seen.

Males had a greater incidence than in females, as females have a greater requirement of nutrition during the menarche period, during when their physical and mental growth is very rapid. And hence the present study suggests of providing a greater quantity and quality of nutrition to the male population in the particular age period.

Population with less weight was more prone to the condition of anaemia, which directly implicates a necessity of maintaining a healthy weight with least negligence towards nutrition.

The populations, other than those who were diagnosed with anaemia as their primary diagnosis have shown a worth notifying results, which were significant for that particular type of condition. Some diagnostic conditions resulting in Normocytic-normochromic to a greater extent, while other diagnosis resulting in Microcytic-hyperchromic or dimorphic types [Table 5].

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3.3 PHARMACOTHERAPEUTICS – II (THEORY)

Theory : 3 Hrs. /Week

1. **Scope of the Subject:** This course is designed to impart knowledge and skills necessary for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology and mostly therapeutics of various diseases. This will enable the student to understand the pathophysiology of common diseases and their management.

2. **Objectives of the Subject Upon completion of the subject student shall be able to –**
   a. know the pathophysiology of selected disease states and the rationale for drug therapy
   b. know the therapeutic approach to management of these diseases;
   c. know the controversies in drug therapy;
   d. know the importance of preparation of individualised therapeutic plans based on diagnosis; and
   e. appreciate the needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

   Text books (Theory)
   Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication

   Reference books (Theory)
   a. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange
   b. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
   c. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA]

3. **Detailed syllabus and lecture wise schedule :**
   Etiopathogenesis and pharmacotherapy of diseases associated with following systems / diseases –

   Title of the topic

   1. **Infectious disease:** Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infection- Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonarrhoea and Syphillis
   2 **Musculoskeletal disorders**
   Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus.
   3 **Renal system**
   Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders

4 **Oncology:** Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis

5 **Dermatology:** Psoriasis, Scabies, Eczema, Impetigo

3.3 PHARMACOTHERAPEUTICS – II (PRACTICAL)

Practical : 3 Hrs./Week

Practicals :

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation.

The student shall be trained to understand the principle and practice involved in selection of drug therapy including clinical discussion.

A minimum of 20 cases should be presented and recorded covering most common diseases.

Assignments :

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

Format of the assignment :

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

Scheme of Practical Examination :

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Max Marks	**20**	**70**
Duration	**03hrs**	**04hrs**

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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EFFECT OF BODY MASS INDEX ON ESTROGEN AND PROGESTERONE RECEPTOR STATUS IN PRE-MENOPAUSAL AND POST-MENOPAUSAL WOMEN SUFFERING FROM BREAST CANCER

V year Pharm.D (Doctor of Pharmacy) Dissertation submitted to the

JNTUK

By

B. Bala Deekshith	**(Reg. No.133G1T0002)**
Ch. Sai Kiran Varma	**(Reg. No.133G1T0003)**
K. Prathyusha	**(Reg. No.133G1T0014)**
P. Sai Pravallika	**(Reg. No.133G1T0018)**

Under the Guidance of

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DEPARTMENT OF PHARMACY PRACTICE & PHARM D
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2017-2018

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CERTIFICATE

This is to certify that the dissertation work entitled **"EFFECT OF BODY MASS INDEX ON ESTROGEN AND PROGESTERONE RECEPTOR STATUS IN PRE-MENOPAUSAL AND POST-MENOPAUSAL WOMEN SUFFERING FROM BREAST CANCER"** is submitted to the JNTUK University in partial fulfillment for the award of degree of **Doctor of Pharmacy**. This is a bonafide work carried out by B. Bala Deekshith (Reg. No.133G1T0002), Ch. Sai Kiran Varma (Reg. No.133G1T0003), K. Prathyusha (Reg. No.133G1T0014), P. Sai Pravallika (Reg. No.133G1T0018) under the guidance and supervision of **M. Vinod Kumar**, Assistant Professor, Aditya Pharmacy College, Surampalem.

Date:

Place: Surampalem

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ABSTRACT

Aim:

To evaluate the effect of body mass index on estrogen and progesterone receptor status in pre-menopausal and post-menopausal women suffering from breast cancer.

Material & Methods:

200 subjects visiting the Oncology OPD of Government General Hospital, Kakinada and meeting the inclusion criteria were recruited for the study. A detailed history was taken and clinical examination was carried out by the clinician. Details were collected in the Self Prepared Semi-structured Socio demographic Proforma after cross-verifying with a reliable and adequate informant. Association between categorical variables will be calculated by using Chi-Square test. Spearman's Rank correlation analysis will be carried out to find out the degree of relationship between BMI and hormone receptor status. The p-value <0.05 was considered as statistically significant.

Results:

Two Hundred cases with BMI data were included. No statistically significant differences in demographic characteristics were found between the cases with BMI data except for menopausal status (P=0.0007) and oral-contraceptive use(P=0.0004). There was an association shown between BMI and Age at Menopause (P=0.005), ER status (P=0.001), PR status(P=0.003) in post-menopausal women. There was no significant association shown in Rank correlation analysis with increasing BMI among post-menopausal women.

Conclusion:

Our study showed an association between BMI and menopausal status and according to our study post-menopausal women were more affected by breast cancer when compared to pre-menopausal women. We also found an association between BMI and hormone receptor status i.e.; both ER Status and PR status in post-menopausal women.

Key Words: Body mass index (BMI); Menopausal Status; ER/PR Status; Breast Cancer

CONCLUSION

In summary the results of our study shows an association between BMI and menopausal status and according to our study post-menopausal women were more effected by breast cancer when compared to pre- menopausal women.

We also found an association between BMI and hormone receptor status i.e.; both ER Status and PR status in post-menopausal women.

However, there was no significant association found between BMI and socio-demographic, pathologic characteristics like age, education status, physical activity, smoking, alcohol consumption, family history, marital status and pathological characteristics like tumor size, tumor grade, LNM Status, TNM Status etc. except age at menopause and oral contraceptive use. Statistically significant association was found between BMI and age at menopause, oral contraceptive use in post-menopausal women.

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4.2 HOSPITAL PHARMACY (THEORY)

Theory : 2 Hrs. /Week

1. **Scope**: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug dispensing, manufacturing of parenteral preparations, drug information, patient counselling, and therapeutic drug monitoring for improved patient care.

2. **Objectives:** Upon completion of the course, the student shall be able to –
   a. know various drug distribution methods;
   b. know the professional practice management skills in hospital pharmacies;
   c. provide unbiased drug information to the doctors;
   d. know the manufacturing practices of various formulations in hospital set up;
   e. appreciate the practice based research methods; and
   f. appreciate the stores management and inventory control.

   Text books: (latest editions)
   a. Hospital pharmacy by William .E. Hassan
   b. A text book of Hospital Pharmacyby S.H.Merchant & Dr. J.S. Qadry. Revised by R.K.Goyal & R.K. Parikh

   References:
   a. WHO consultative group report.
   b. R.P.S. Vol.2. Part –B; Pharmacy Practice section.
   c. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical press.

3. **Lecture wise programme :**

   Topics

   1 **Hospital - its Organisation and functions**
   2 **Hospital pharmacy-Organisation and management**
   a) Organizational structure-Staff, Infrastructure & work load statistics
   b) Management of materials and finance
   c) Roles & responsibilities of hospital pharmacist
   3 **The Budget – Preparation and implementation**
   4 **Hospital drug policy**
   a) Pharmacy and Therapeutic committee (PTC)
   b) Hospital formulary
   c) Hospital committees
   - Infection committee
   - Research and ethical committee

   d) developing therapeutic guidelines
   e) Hospital pharmacy communication - Newsletter

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5 Hospital pharmacy services

a) Procurement & warehousing of drugs and Pharmaceuticals
b) Inventory control
   Definition, various methods of Inventory Control
   ABC, VED, EOQ, Lead time, safety stock
c) Drug distribution in the hospital
   i) Individual prescription method
   ii) Floor stock method
   iii) Unit dose drug distribution method
d) Distribution of Narcotic and other controlled substances
e) Central sterile supply services – Role of pharmacist

6 Manufacture of Pharmaceutical preparations

a) Sterile formulations – large and small volume parenterals
b) Manufacture of Ointments, Liquids, and creams
c) Manufacturing of Tablets, granules, capsules, and powders
d) Total parenteral nutrition

7 Continuing professional development programs

Education and training

8 Radio Pharmaceuticals – Handling and packaging

9 Professional Relations and practices of hospital pharmacist

4.2 HOSPITAL PHARMACY (PRACTICAL)

Practical : 3 Hrs./Week

1. Assessment of drug interactions in the given prescriptions
2. Manufacture of parenteral formulations, powders.
3. Drug information queries.
4. Inventory control

List of Assignments:

1. Design and Management of Hospital pharmacy department for a 300 bedded hospital.
2. Pharmacy and Therapeutics committee – Organization, functions, and limitations.
3. Development of a hospital formulary for 300 bedded teaching hospital
4. Preparation of ABC analysis of drugs sold in one month from the pharmacy.
5. Different phases of clinical trials with elements to be evaluated.
6. Various sources of drug information and systematic approach to provide unbiased drug information.
7. Evaluation of prescriptions generated in hospital for drug interactions and find out the suitable management.

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STUDY OF DRUG COMPLIANCE AND ITS INFLUENCING FACTORS IN SCHIZOPHRENIC PATIENTS

V year Pharm.D (Doctor of Pharmacy) Dissertation submitted to the

JNTUK

By

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R.THIRUMALA DEEPTHI	(Reg.No. 133G1T0020)
S.BALASUBRAHMANYAM	(Reg. No.133G1T0022)
V.KEERTHI CHANDANA	(Reg No. 133G1T0025)

Under the Guidance of

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Associate Professor,
Department of Pharmacology,
Aditya Pharmacy College, Surampalem.

Dr.V. Niveditha M.D,
Assistant Professor ,
Department of Psychiatry,
R.M.C/ G.G.H, Kakinada

Department of Pharmacy Practice

Aditya Pharmacy College

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2018

INTERNAL EXAMINER

EXTERNAL EXAMINER

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EVALUATION CERTIFICATE

This is to certify that the dissertation work entitled **"STUDY OF DRUG COMPLIANCE AND ITS INFLUENCING FACTORS IN SCHIZOPHRENIC PATIENTS"** is submitted to the JNTUK in partial fulfillment for the award of the degree of **Doctor of Pharmacy**. This is a bonafide work carried out by P.Jaya Divya (Reg. No. 133G1T0016), R.ThirumalaDeepthi (Reg. No. 133G1T0020), S.Balasubrahmanyam (Reg. No. 133G1T0022) and V.Keerthi Chandana (Reg. No. 133G1T0025) under the guidance and supervision of Mr.**S. Nageswara rao**, Associate Professor, Aditya Pharmacy College, Surampalem.

Date: 17/5/18

Place: Surampalem

SIGNATURE OF EVALUATOR

ADITYA PHARMACY COLLEGE SURAMPALEM

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DECLARATION BY THE CANDIDATES

We, **P.Jaya Divya, R.Thirumala Deepthi, S.Balasubrahmanyam and V.Keerthi Chandana,** hereby declare that the investigations, findings in the dissertation entitled **"STUDY OF DRUG COMPLIANCE AND ITS INFLUENCING FACTORS IN SCHIZOPHRENIC PATIENTS"** is a bonafide research work done under the guidance of **S.Nageswara Rao**, Associate Professor, in partial fulfillment of the requirement of V year Doctor of Pharmacy (Pharm.D)

P. Jaya Divya
P.Jaya Divya (Reg. No. 133G1T0016)

R.T.Deepthi
R.Thirumala Deepthi (Reg. No. 133G1T0020)

S.Balasubrahmanyam
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V.keerthi chandana
V.Keerthi Chandana (Reg. No. 133G1T0025)

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CONCLUSION

- Majority of the subjects were adherent (56%) in our study. Results showed that severity of illness is directly proportional to the non adherence in the sample and it was found to be highly significant.

- Significant proportion of the subjects aged 26-50 years were more complaint (56.4%) in our study. Majority of subjects in both compliant and non-compliant group belonged to the female gender.

- However, no significant association was found between compliant and non-compliant groups as per their socio demographic characteristics like age, gender, level of education, employment status, family support and marital status except for substance abuse in our study. Statistically, significant association was found between substance abuse and compliance.

- In current study, by using ROMI-compliance scale, Strong influencing factors were perceived daily benefit & positive family belief, moderate influencing factor was a positive relationship with psychiatrist and a least influencing factor was a pressure or force to take medication.

- Whereas by using ROMI-noncompliance scale, Strong influencing factors were practitioner opposed to medication and denial of illness, moderate influencing factors were negative relationship with psychiatrist, no perceived daily benefit and a least influencing factor was family/friends opposed to take medications.

- Highly statistical significant association was found in both Reasons for compliance & Reasons for non-compliance using ROMI scale.

- Knowledge of factors affecting drug compliance in schizophrenia is very vital & clinicians should maintain a positive relationship with patients so as to reduce events such as relapse of schizophrenia and re-hospitalization & they can be better prepared to counsel the patients to improve the drug compliance & to reduce the burden and chronicity of schizophrenia.

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4.3 CLINICAL PHARMACY (THEORY)

Theory : 3 Hrs. /Week

1. Objectives of the Subject :

Upon completion of the subject student shall be able to (Know, do, appreciate) –

a. monitor drug therapy of patient through medication chart review and clinical review;
b. obtain medication history interview and counsel the patients;
c. identify and resolve drug related problems;
d. detect, assess and monitor adverse drug reaction;
e. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and
f. retrieve, analyse, interpret and formulate drug or medicine information.

Text books (Theory)

a. Practice Standards and Definitions - The Society of Hospital Pharmacists of Australia.
b. Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc.
c. Biopharmaceutics and Applied Pharmacokinetics - Leon Shargel, Prentice Hall publication.
d. A text book of Clinical Pharmacy Practice; Essential concepts and skills, Dr.G.Parthasarathi etal, Orient Orient Langram Pvt.Ltd. ISSBN8125026

References

a. Australian drug information -Procedure manual. The Society of Hospital Pharmacists of Australia.
b. Clinical Pharmacokinetics - Rowland and Tozer, Williams and Wilkins Publication.
c. Pharmaceutical statistics. Practical and clinical applications. Sanford Bolton, Marcel Dekker, Inc.

2. Detailed syllabus and lecture wise schedule:

Title of the topic

1. **Definitions, development and scope of clinical pharmacy**
2. **Introduction to daily activities of a clinical pharmacist**
   a. Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions)
   b. Ward round participation
   c. Adverse drug reaction management
   d. Drug information and poisons information
   e. Medication history
   f. Patient counseling
   g. Drug utilisation evaluation (DUE) and review (DUR)
   h. Quality assurance of clinical pharmacy services

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3. **Patient data analysis**
   The patient's case history, its structure and use in evaluation of drug therapy & Understanding common medical abbreviations and terminologies used in clinical practices.
4. **Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results**
   a. Haematological, Liver function, Renal function, thyroid function tests
   b. Tests associated with cardiac disorders
   c. Fluid and electrolyte balance
   d. Microbiological culture sensitivity tests
   e. Pulmonary Function Tests
5. **Drug & Poison information**
   a. Introduction to drug information resources available
   b. Systematic approach in answering DI queries
   c. Critical evaluation of drug information and literature
   d. Preparation of written and verbal reports
   e. Establishing a Drug Information Centre
   f. Poisons information- organization & information resources
6. **Pharmacovigilance**
   a. Scope, definition and aims of pharmacovigilance
   b. Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used]
   c. Reporting, evaluation, monitoring, preventing & management of ADRs
   d. Role of pharmacist in management of ADR.
7. Communication skills, including patient counselling techniques, medication history interview, presentation of cases.
8. Pharmaceutical care concepts
9. Critical evaluation of biomedical literature
10. Medication errors

4.3 CLINICAL PHARMACY (PRACTICAL)

Practical : 3 Hrs./Week

Students are expected to perform 15 practicals in the following areas covering the topics dealt in theory class.

a. Answering drug information questions (4 Nos)
b. Patient medication counselling (4 Nos)
c. Case studies related to laboratory investigations (4 Nos)
d. Patient medication history interview (3 Nos)

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ASSESSMENT OF QUALITY OF LIFE IN CHRONIC LIVER DISEASE PATIENTS

V year Pharm.D (Post Baccalaureate) (Doctor of Pharmacy) Dissertation

submitted to the

JNTUK

By

P.Rammurthy (163G1T0101)

Under the Guidance of

Dr.D. Ravi Prakash, Pharm.D
Assistant Professor,
Department of Pharmacy Practice,
Aditya Pharmacy College, Surampalem.

Department of Pharmacy Practice

Aditya Pharmacy College

Surampalem- 533437

2018

INTERNAL EXAMINER

EXTERNAL EXAMINER

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Dr. K. Divakar *M. Pharm., Ph.D.*

Principal & Professor

CERTIFICATE

This is to certify that the dissertation work entitled **"ASSESSMENT OF QUALITY OF LIFE IN CHRONIC LIVER DISEASE PATIENTS"** is submitted to the JNTUK in partial fulfillment for the award of the degree of **Doctor of Pharmacy**. This is a bonafide work carried out by P.Rammurthy (1631T0101) under the guidance and supervision of Mr. **Dr.D. Ravi Prakash**, Assistant Professor, Aditya Pharmacy College, Surampalem.

Date: 8-3-2018

Place: Surampalem

PRINCIPAL

(Dr.K. Divakar)

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DECLARATION BY THE CANDIDATES

I P.Rammurthy (1631T0101) hereby declare that the investigations, findings in the dissertation entitled "ASSESSMENT OF QUALITY OF LIFE IN CHRONIC LIVER DISEASE PATIENTS" is a bonafide research work done under the guidance Dr.D. Ravi Prakash, Assistant Professor, in partial fulfillment of the requirement of V year Doctor of Pharmacy (PB).

P.Rammurthy

P.Rammurthy (1631T0101)

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CONCLUSION

Age, Smoking, Diagnosis of disease, SGOT, Serum Creatinine, Blood urea had negative impact on the overall quality of life. Gender, Education and Occupation had positive impact on the overall quality of life. The mean average scores of the CLDQ domains was low. It indicates good quality of life. The overall mean CLDQ score indicates average quality of life.