

## **DEPARTMENT OF PHARMACEUTICAL CHEMISTRY AND ANALYSIS**

The Pharmaceutical Chemistry department is propelled by an exceptional and committed faculty team. They possess sufficient competence in managing diverse subjects such as Computational Chemistry, Medicinal Chemistry, Pharmaceutical Organic Chemistry, Phytochemistry, Pharmaceutical Inorganic Chemistry, Advanced Organic Chemistry, Synthetic Chemistry, Biochemistry, and Pharmaceutical Analysis. Additionally, the faculty members are involved in numerous research programs for their Doctoral degrees.

The department is deeply engaged in the postgraduate program in Pharmaceutical Chemistry, encompassing the study of Advanced Organic Chemistry, including Process Chemistry, Advanced Medicinal Chemistry, Computer-Aided Drug Design, and Synthetic Chemistry.

### **Infrastructure**

The department is equipped with well-maintained laboratories for conducting D Pharm, B Pharm, M Pharm, and Pharm D courses. Additionally, there exists a specialized instrumentation room for contemporary pharmaceutical analytical instruments, overseen by the Department of Pharmaceutical Chemistry. The instrumentation room is the core of the research team, facilitating both departmental and interdepartmental collaborative research activities. The instrumentation room is equipped with advanced instruments such as Fourier Transform Infrared (FT-IR) Spectrophotometer, High-Performance Liquid Chromatography (HPLC), UV-Visible Spectrophotometer, Colorimeter, Digital Nephelometer, Fluorimeter, Flame Photometer, pH Meter, Refractometer, Conductivity Meter, Digital Potentiometer, Automatic Karl Fischer Titrator, Antibiotic Zone Reader, Digital Colony Counter, Microwave Oven, and Polarimeter, among others. Students from all disciplines engage in laboratory experiments and research, utilizing this instrumentation facility to analyse their samples with the equipment. The section offers practical experience with numerous free software for doing in silico drug design investigations.

### **Investigation**

The principal study areas include Analytical Chemistry, Computational Chemistry, Synthetic Chemistry, and Phytochemistry. The department is focusing on computational

chemistry, namely in drug design and discovery. A repository of essential nuclei and their innovative variants is established using Computer-Aided Drug Design (CADD), comprehensive literature review, and Structure-Activity Relationship (SAR) investigations aimed at certain pharmacological activity. The promising compounds will undergo in silico screening against target proteins for further development. Chemical synthesis is performed with various standard synthetic techniques or microwave-assisted organic synthesis. The produced compounds are undergoing evaluation for several pharmacological activities, including antidiabetic, anti-cancer, anti-Parkinsonian, anti-epileptic, and anti-inflammatory properties.

### **Current research**

This section concentrates on drug design, synthesis, and structural elucidation of molecules to enhance treatment efficacy and minimize side effects for various diseases. Consequently, engaged in insilico drug design targeting the tumor microenvironment for anticancer therapy.

Insilco drug design and synthesis of Isatin, Benzimidazole, Oxadiazole-substituted Benzoxazole, Thiadiazole-substituted Tetrahydro Beta Carboline, Dioxindoline, and Benzopyrene derivatives targeting diverse biological activities.

Design and synthesis of multi-targeted pharmaceuticals for tuberculosis, cancer, diabetes, Alzheimer's disease, anti-Parkinsonism, anti-epileptic, and anti-inflammatory activity.

### **Extent of the Program**

Pharmaceutical chemistry focuses on the design and production of physiologically active compounds. Possessing a robust foundation in medicinal chemistry and analytical chemistry enables one to get a competitive advantage. One can endeavour to synthesize novel chemical molecules that may facilitate the discovery of new pharmaceuticals or enhance existing drug structures, so broadening the portfolio of chemical therapeutics. The scope of pharmaceutical chemistry mostly encompasses the study and development of novel medications for pharmaceutical corporations or governmental entities. One may also engage in the field of educational services. Pharmaceutical Chemistry is a multifaceted field that integrates several scientific disciplines, facilitating collaborative research with biologists,

toxicologists, pharmacologists, theoretical chemists, microbiologists, and biopharmacists in the development of innovative drug candidates.

The department enable seamless access to high-quality UV, IR, and HPLC analytical services, as well as comprehensive docking studies with our expert outsourcing solutions. We provide precise and in-depth molecular docking insights with fast, accurate and reliable results. Thus, actively involved in

- **SYNTHESIS OF NATURAL AND SYNTHETIC DRUGS**
- **IN VITRO AND IN VIVO EVALUATION USING DOCKING STUDIES**
- **SPECTRAL ANALYSIS**
- **COMPUTER AIDED DRUG DESIGN**
- **DESIGN AND EXECUTION OF ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF NEWER COMBINATIONS USING, UV- VISIBLE SPECTROSCOPY AND HIGH PERFORMANCE LIQUID CHROMATOGRAPHY**

## ACHIEVEMENTS

### ACADEMIC EXCELLENCIES

#### PG TOPPERS

List of college toppers from Department of Pharmaceutical Chemistry

NAME	SPECIALITY	YEAR
Mrs. Sandhya M J Nair	Pharmaceutical Chemistry	2012-2014
Mrs. Nisha V T	Pharmaceutical Chemistry	2014-2016
Mrs. Rana Vahid	Pharmaceutical Chemistry	2016-2018
Mrs. Vismaya	Pharmaceutical Chemistry	2017-2019
Mrs. Reshma Hegden	Pharmaceutical Chemistry	2018-2020
Miss. Neethu Shaji	Pharmaceutical Chemistry	2020-2022

### GRANT DETAILS

#### GRANT RECEIVED FROM KERALA STATE COUNCIL FOR SCIENCE, TECHNOLOGY & ENVIRONMENT (KSCSTE)

Name of Principal Investigator	Title	Name of student	Total Grant-in-aid sanctioned
Prof. Janeera Beevi S	Insilico Design, Synthesis and Biological Evaluation of Pyridinyl-1,3,4-oxadiazole Derivatives	Mrs. Athira A S	Rs. 10000/-
Mr. Bravin D Emmanuel	Insilico Design, Synthesis and Biological Evaluation of 1-oxo-1,2,3,4-tetrahydrocarbazole derivatives	Mrs. Nisha V T	Rs. 10000/-

## **VISION AND MISSION**

### **Vision of the Department**

Our objective is to attain superiority in research, particularly in targeted drug design and pharmaceutical development. We concentrate on the synthesis of novel pharmaceuticals that exhibit enhanced therapeutic efficacy and reduced side effects for diverse conditions, including anticancer, antidiabetic, anti-parkinsonism, anti-epileptic, and anti-inflammatory properties. Our department fosters creative research concepts, publications, and patents to achieve national recognition as a premier program in Pharmaceutical Sciences. Consequently, we are committed to enhancing the welfare of society.

### **Mission of the Department**

The pharmaceutical chemistry department is striving to attain excellence in education and scientific research in drug design and the synthesis of novel drug molecules with enhanced therapeutic efficacy and reduced adverse effects. We enhance researcher's competencies through practical experience in computer-aided drug design (CADD). Consequently, students will attain sufficient competitiveness in the dynamic technology of drug discovery and the continuous advancement of drug development.

**DEPARTMENT OF PHARMACEUTICAL CHEMISTRY AND ANALYSIS**  
**PUBLICATION DETAILS**

<b>AUTHORS</b>	<b>TITLE</b>	<b>JOURNAL</b>	<b>VOLUME, ISSUE, PAGE NUMBER</b>	<b>YEAR</b>
Sandhya S M, Shiji kumar P S	Spectrofluorimetric Determination of Artesunate in Pharmaceutical Formulation after Condensation with Sulphuric Acid and Acetic Anhydride	International Journal of Pharmacy and Pharmaceutical Analysis	1(1); 18-24	2016
Sandhya S M, Shiji kumar P S	Validated Spectrofluorimetric Methods for the Determination of Telmisartan and Olmesartan Medoxomil in Tablet Dosage Form	International Journal of Pharmacy and Pharmaceutical Analysis	2(4); 13-23	2015
Sandhya S M, S Meena	A simplified liquid chromatography-mass spectrometry method for simultaneous determination of Pyrimethamine, Sulphadoxine and Artesunate in human Plasma	Journal of Applied Pharmaceutical Science	5 (6); 109-114	2015
Sandhya S M, S Meena	Application of HPTLC-densitometry by derivatization and stability indicating LC for simultaneous determination of Mefloquine hydrochloride and Artesunate in combined dosage form	American Chemical Science Journal	7(1); 26-37	2015
Sandhya S M, S Meena	A sensitive liquid chromatographic assay for the simultaneous determination of Lumefantrine and Artemether in human Plasma	Indo American Journal of Pharmaceutical Research	5(2); 720-726	2015
Sandhya S M, S Meena	Simple and Rapid Simultaneous RP-HPLC Method for Determination of glimepiride and Metformin in Tablet Dosage Form	Research Journal of Pharmacy and Technology	7 (8); 906-909	2014
Sandhya S M, Fathima Beevi, G. Babu	A sensitive dual-run HPTLC technique for simultaneous estimation of metformin hydrochloride, glimepiride and voglibose in combined dosage form	International Journal of Pharmacy	4 (3); 182-188	2014
Sandhya S M, Jyothi G, G. Babu	Analysis of gabapentin by HPTLC with densitometric measurement after derivatization	International Journal of Pharmacy and	6 (5); 707-710	2014

		Pharmaceutical Sciences		
Sandhya S M, Jyothi G, G. Babu	Development of a validated RP-HPLC method for the analysis of citicoline sodium in pharmaceutical dosage form using internal standard method	International Journal of Pharma Research & Review	3 (5); 20-25	2014
Sandhya S M, Jyothi G, G. Babu	Application of ion pair extractive spectrophotometric methods for the determination of gabapentin in pharmaceutical formulation	Asian Journal of Pharmaceutical and Clinical Research	7 (1); 57-58	2014
Sandhya S M, S Meena	Analysis of active ingredients, lumefantrine and artemether in combined antimalarial tablet by HPTLC with densitometric measurement before and after derivatization	Journal of Liquid Chromatography and Related Technologies	37 (10); 1416-1426	2014
Sandhya S M, S Meena	Validated spectrophotometric methods for simultaneous analysis of pyrimethamine and sulphadoxine in pharmaceutical dosage forms	Asian Journal of Pharmaceutical and Clinical Research	6 (3); 121-123	2013
Sandhya S M, S Meena	Validated HPTLC method for simultaneous analysis of pyrimethamine and sulfadoxine in pharmaceutical dosage forms	Journal of Chemistry	10, 1155	2013
Sandhya S M, S Meena	Validated spectrophotometric methods for simultaneous analysis of glimepiride and metformin in pharmaceutical dosage forms	Journal of Chemical and Pharmaceutical Research	5 (11); 721-725	2013
Sandhya S M, S Meena	Development and validation of RP-HPLC method for the determination of mefloquine hydrochloride in bulk and tablet dosage form	Journal of Pharmacy Research	5(6); 3123-3125	2012
Sandhya S M, S Meena	A novel method for spectrophotometric determination of artesunate in pure form and tablets	International Journal of Pharmaceutical Sciences and Research	3 (12); 5111-5115	2012
Sandhya S M, S Meena	Development and validation of spectrophotometric methods for the estimation of mefloquine hydrochloride in bulk and tablet dosage form	Der Pharmacia Lettre	4 (1); 87-91	2012
Chitra C Nair, Sunitha Mahadevan, AsheetaA., Hima C S,	Assessment Of Knowledge, Attitude And Practices Among Community Pharmacist About Reporting Of Adverse Drug Reaction In South India: A Questionnaire Based Study	World journal of pharmaceutical sciences	9(31): 820-830	2020

Beena M I , Beevi F				
Chitra C Nair, Sunitha Mahadevan, Asheeta A. ,Hima C S, Beena M I , Najiya.N	A community based study of knowledge, attitude and practice on leptospirosis and its prevention in south India.	World journal of pharmaceutical sciences	9(12):113 7-1147	2020
Chitra C Nair ,Sunitha Mahadevan S , Asheeta A. , Hima C S, Beena M I, Ajitha J.	Knowledge, Attitude And Practices Related To Antibiotic Use Among Pharmacy Students In South India.	World journal of pharmaceutical sciences	9(13) 659- 668	2020
Chitra C Nair ,Sunitha Mahadevan S , Asheeta A. , Hima C S, Beena M I, Tom A	Knowledge, Attitude And Practices About Blood Donation Among Pharmacy Students: A Cross Sectional Study In South Kerala	World journal of pharmaceutical sciences	9(14): 1303-1315	2020
Hima CS, Haritha Krishnan, Asheeta A, Chitra C Nair, Beena MI.	Stapled peptide as Drug Target. Indian journal of Pharmaceutical research and analysis.	Indian journal of pharmaceutical research and analysis	5(1): 102- 113	2021
Gowri ParvathyS.R , Chitra C Nair , Asheeta A, Hima C S, Beena M I	Telemedicine in health care setting: A review	World journal of pharmaceutical sciences	8(12): 118-121	2019
Asheeta.A, Hima C S, Chitra C Nair, BeenaM I	Literature review on developing cardiac disorders- A risk due to anticancer drugs.	World journal of pharmaceutical research	9(13):391- 397	2020
Hima C S, Asheetha A, Chithra C Nair, Sandhya M J Nair, Fathima Beevi U	Brain wave therapy	World journal of pharmaceutical sciences	8(11):59- 66	2020



Hima C S, S SSubin, Chithra C Nair, Asheetha A, Fathima Beevi U	Organ on a chip as microfluid cell culture techniques	World journal of Pharmacy and pharmaceutical sciences	10(2):739-53	2021
Chithra C Nair, C S Hima and A Asheeta	In-vitro Antioxidant and free radical scavenging activity of Whole Plant extract of Biophytum species	International journal of Pharmaceutical Sciences and research	1828-1837 14(4):	2022
Hima C S, Chithra C Nair, Asheetha A	In vitro Antioxidant activities of Garcinia gummigutta	Journal of Pharmaceutical sciences and Research	15(8) 1198-1205	2022
V C Rincy , K N Namitha, Aswathy J, Binuja S S	An In Silico Study of Novel Morpholine Derivatives for Lung Cancer, Non-Hodgkin's Lymphoma and Metastasis Melanoma.	Journal of Pharmaceutical science and research	11(7):247 9-84	2019
Namitha K N, V Velmurugan	Review of bioinformatic tools used in Computer Aided Drug Design (CADD).	World journal of advanced research and reviews	14(2):453-65	2022
Silpa Saji.S , Namitha K N,Dr.Shaiju S Dharan	Ferrocenyl Benzimidazole A promising moiety	International Journal of research and review	9(12)	2022
Nisha V T, Chippy S Kumar.	Sorting receptor SORLA: New strategy for various Disease – A Review.	Journal of Pharmaceutical science and research	2021;13(1):70-78	2021
Sandhya M J Nair, Hima C S, Nisha V T, Aswany U R, Bismi S	Review on boron neutron capture therapy	WJPPS	10(3):356-72.	2021
Nisha V T, Sree Janardhanan, Mathan S	A concise review on tetrahydrocarbazole and its biological activities	World journal of pharmacy and pharmaceutical sciences	13(1): 642-649	2023
Nisha V T, V. SreeJanardhanan, Mathan S,Dr. K Ilango, Dr. Ganna Anitha	A review on tetrahydrocarbazole derivatives as potential hypoglycemic agents	Journal for basic sciences	6(24): 577-584	2023

Sandhya M J Nair, Hima C S, Nisha V T, Aswany U R, Bismi S	Review on boron neutron capture therapy	WJPPS	10(3):356-72.	2021
Hima C S, Asheetha A, Chithra C Nair, Sandhya M J Nair, Fathima Beevi U	Brain wave therapy	World journal of pharmaceutical sciences	8(11):59-66	2020
Hima C S, S SSubin, Chithra C Nair, Asheetha A, Fathima Beevi U, Sandhya M J Nair	Organonachip as microfluid cell culture techniques	World journal of Pharmacy and pharmaceutical sciences	10(2):739-53	2021
Neethu Shaji, Sandhya M J Nair, Shaiju S Dharan	Coumarin hydrazide: Chemistry, Synthesis and Pharmacological activities – A Review.	International journal of research and review	12(9):16-26	2022
Sandhya M J Nair, Janeera Beevi, Merlin N J, Bravin D Emmanuel, Shaiju S Dharan	Insilico design synthesis and invitro antidiabetic and anti inflammatory activities of 1,3,4- thiadiazole substituted 2- methyl benzimidazole derivatives	Journal of pharmaceutical research and clinical practice	6(1): 27-36	2016
M J Neethu, Shakkeela Yusuf	In-silico Design, Synthesis, Anti-inflammatory and Anticancer evaluation of Pyrazoline Analogues of Vanillin.	Journal of Pharmaceutical Sciences and drug research	6(2):128-131	2014
Akhila S, Hima C S, Shaiju S Dharan	Chemistry and Pharmacological exploration of Benzoxazole derivatives	International journal of research and review	9(12) : 334- 341	2022
Elham Nazeer, Silpa Saji, Devi Nidana, Akhila S, Neethu Shaji, Bravin D Emmanuel, Hima C S, Shaiju S Dharan	Alpha4Beta1 integrin as therapeutic target	International journal of research and review	11 (7) : 453-468	2022

Devi Nidana, Silpa saji, Elham Nazeer, Akhila S, Neethu Shaji, Bravin D Emmanuel, Prabha B	Peptide drug conjugates in cancer therapy	International journal of research and review	11(3) 553-573	2022
Aswathy J, Binuja S S, Bravin D Immanuel and Janeera Beevi S	Insilico drug design and molecular docking studies of novel phthalazine derivatives for anticancer activity	World journal of pharmaceutical research	8(8) : 794-805	2019
Binuja S S , Aswathy J,	Insilico design and molecular docking studies of novel cinnoline derivatives for antitubercular activity	Journal of Pharmaceutical science and research	11(7) : 2679-2683	2019
V C Rincy , K N Namitha, Aswathy J, Binuja S S	An In Silico Study of Novel Morpholine Derivatives for Lung Cancer, Non-Hodgkin's Lymphoma and Metastasis Melanoma	Journal of Pharmaceutical science and research	11(7) : 2479-2484	2019
Aswathy J, Prasobh G R, Prof. Sheeja Rekha A G, Athira A.S	A concise review on cinnoline Scaffold	World journal of pharmaceutical research	9(9) : 243-249	2019