

MUHAMMAD WASIM

INTERNATIONAL RESEARCH EXPERIENCE

Italy: Postdoctoral Researcher

Department of Chemistry "Ugo Schiff," **University of Florence**

September 2024 – January 2025

Conducted research on the preparation of micro and nanocarriers to enhance the biopharmaceutical properties of plant-based substances.

Collaborated on the project "*Studies on the solubility and antioxidant activity of a supplement based on Salvia miltiorrhiza, Citicoline, and Phosphatidylserine.*"

Project approved by the Department Council with resolution no. 161A5/2024.

PostDoctoral researcher (grant holder) August 2023 to July 2024 at the **University of Florence.**

Project title: "*Olive leaf multi-product cascade based biorefinery: from an underused biomass in the primary sector to tailor-made solutions for high added value international market applications*"

Project/ grant number: This project has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement no 101023256.

Role: Micro- and nanoencapsulation technologies to improve the bioavailability and technological performance of olive bioactive compounds. In vitro evaluation of the influence of optimized formulations on the solubility/ dissolution and permeability of olive bioactive compounds and olive leaf fractions. Test the bioavailability of the olive-derived bioproducts in an artificial membrane permeability (PAMPA, parallel artificial membrane permeability assay) and Caco-2 cells.

Belgium: Visiting research scholar for six months (15/02/2019 – 15/08/2019) at the "**Université Catholique de Louvain.**" Professor Dr. Tom Leyssens supervised my work there.

Sponsor: Scholarship awarded under "International Research Support Initiative Program" by Higher Education Commission of Pakistan.

Scholarship number: I-8/HEC/HRD/2018/8954

PIN: IRSIP 41 PSc 10

Role: In my role, I focused on optimizing the physicochemical properties of pharmaceutical compounds, particularly solubility and dissolution, through co-crystallization. I employed a range of characterization techniques, including XRPD, TGA, DSC, FT-IR, UV, DVS, Raman, ATR-FT-IR, and HPLC, to ensure thorough analysis. I prepared co-crystals using various methods and conducted detailed stability studies. Additionally, I used Crystal-16 to investigate crystal kinetics and polymorphism.

South Korea: Research scholar (22/02/2018 – 10/06/2018) "**Gyeongsang National University.**" Professor Dr. Myeong Ok Kim, a well-known neuroscientist, oversaw my work there. There, I honed my research abilities.

Scholarship: Brain Korea 21 (BK21)

Role: I gained experience in Western Blotting, Confocal Microscopy, and animal handling,

particularly with rabbits.

ACADEMIC EXPERIENCE-TEACHING

1st Sept 2022 – 10th July 2023: Assistant Professor (Abasyn University Islambad Campus) AUIC
Actively involved in teaching, research, and mentorship. In the Fall 2022 semester, I taught Medicinal Chemistry-II, Pharmaceutical Analysis-II, and Organic Chemistry-II. In the Spring 2023 semester, I taught Medicinal Chemistry-I and Pharmaceutical Analysis-I. Each subject was 3+1 credit hours.

March 2014 – August 2022: Lecturer (AUIC)

I taught undergraduate chemistry classes in the pharmacy department during the fall and spring semesters each year. The subjects included medicinal chemistry I and II, pharmaceutical analysis I and II, pharmacognosy I and II, pharmaceutical quality management, and organic chemistry I and II. Each subject was 3+1 credit hours.

ACADEMIC EXPERIENCE- SUPERVISING

| Name | Program | Batch | Status |
|-------------------|---------|------------|------------|
| Ms. Mahnoor Nadim | MS | 2019- 2021 | Completed |
| Mr. M. Kaleem | MS | 2019- 2021 | Completed |
| Ms. Afifa Munem | MS | 2021- 2023 | Completed |
| Mr. Shakeel Ahmed | MSc | 2015- 2017 | Incomplete |
| Ms. Shafaat | MS | 2021- 2023 | Completed |
| Mr. Shah Murad | MS | 2021- 2023 | Completed |
| Mr. Bin Amin | MSc | 2015- 2017 | Completed |
| Mr.Omer Farooq | MS | 2021-2024 | Completed |

ACADEMIC SERVICES: (AUIC)

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|-------------|--|
| 2015 – 2017 | Pharmacy department coordinator |
| 2019 – 2022 | Convener of departmental academic advising committee |
| 2019 – 2022 | Member of university disciplinary committee |
| 2022 – 2023 | Convener of departmental disciplinary committee |

SEMINARS AND CONFERENCES:

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|--------------|---|
| June – 2019 | Seminar (volunteer) – How do crystals grow from solution (Université catholique de Louvain) (Belgium) |
| April – 2018 | Seminar (volunteer) – Recent advances in Biomarkers - cancer diagnostic tool Gyeongsang National University (GNU) (South Korea-Jinju) |
| March – 2015 | Poster presentation (presenter) in 1 st International Conference RIPS on “Recent Innovations in Pharmaceutical Sciences”, Islamabad Pakistan. Title: Phytochemical and Biological Evaluation of Active Constituents of <i>Cissampelos pareira</i> and <i>Lantana camara</i> |
| March – 2024 | Poster presentation (presenter) PBP 14- World Meeting Vienna- Austria 14th World Meeting on Pharmaceutics, Biopharmaceutics and Pharmaceutical Technology 2024. Title: Oleanolic acid microemulsions: Formulation and evaluation of the antioxidant activity in RAW 264.7 cells https://www.acv.at/en/visit/events/researchpharm-2024-2/ |

EDUCATION

Pharmaceutical Chemistry (Ph.D) (2015 – 2022)

COMSATS University Islamabad Abbottabad Campus

- Research Interest:
 - Pharmaceutical cocrystallization for optimization of physicochemical properties, bioavailability enhancement, and stability improvement of pharmaceuticals.
 - Analysis of samples using HPLC.
 - Animal models for P.K parameters studies
- Ph.D Thesis Title:
“Effect of spacer groups of cocrystal formers on the physicochemical and pharmacokinetic behavior of cocrystals”.

M.Phil Pharmaceutical Chemistry 2012 – 2014

Riphah Institute of Pharmaceutical Sciences, Riphah International University

- Research Interest:
 - Phytochemical investigation of natural products
 - Extraction techniques
 - Bioactivity guided isolation
 - GC-MS analysis of fractions
- M. Phil Thesis Title:
“Biological and Phytochemical Investigation of *Cissampelos pareira* and *Lantana camara*”
 - cGPA: 3.56/4.00

Pharm-D 2005 – 2010

University of Malakand, Lower Dir, KPK

PROFESSIONAL EXPERIENCE AND TRAINING:

Training course on health and safety in the laboratory, September 2023: University of Florence

April 2011- April 2012: QC analyst at Z-JAN Pharmaceutical. Perform QC tests for various dosage forms and raw materials. Maintain documentation and communicate with production departments.

TECHNIQUES IN HAND:

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|---|--|
| DLS | Particle size determination etc |
| HPLC-DAD | For chemical stability, concentration determination |
| PAMPA | Permeation study |
| Ball Mill (Green Chemistry) | For preparation of samples (Cocrystals, cogrounds) |
| <i>In-situ</i> ATR- FTIR: | Dissolution study |
| Basket Dissolution Apparatus | Dissolution study |
| Powder X-ray diffraction : | Characterization of materials |
| Dynamic vapor sorption : | Quick gravimetric technique for the measurement of solvent absorption and desorption |
| Crystal-16: | Cocrystal screening, solubility determination, Polymorph screening, metastable zone width determination. |
| DSC and TGA: | Thermal techniques for characterization of solid materials |
| FT-IR and Raman: | Characterization of materials |
| Western Blotting: | For the detection of specific protein in brain samples |
| Confocal Microscopy | To visualize the brain tissues |
| Chromatographic techniques: (Flash column chromatography, TLC) | Extraction of bio active plant materials |
| PK Solver | For pharmacokinetic data analysis |
| Animals handling | especially rabbits (for bioavailability) |
| Samples collection and prep | Collection and preparation of samples for HPLC |

Memberships and Editorial roles:

Member – *SITELF (Società Italiana di Tecnologia e Legislazione Farmaceutiche)*
2024 – Present

Associate Guest Editor – *Frontiers in Nanotechnology*
May 2024 – Present

Role: Overseeing the peer review process, managing submissions, and coordinating with reviewers for the topic "*Nano-Preparation in the Design of Drug Delivery Systems.*"

References:
1) Prof. Dr. Izhar Hussain

Shifa Tameer-i-Millat University, Islamabad, Pakistan
izhar_pharmacy@yahoo.com

2) Prof. Dr. Maria Camilla Bergonzi

University of Florence, Italy
mc.bergonzi@unifi.it

3) Prof. Dr. Tom Lyessens

Université Catholique de Louvain, Louvain la Neuve, Belgium
Tom.leyssens@uclouvain.be

4) Prof. Dr Akhlaq Ahmed

Head of Pharmacy Department

Publications:

- 1- **Wasim M**, Mannan A, Bin Asad MHH, Amirzada MI, Shafique M, Hussain I, "Fabrication of Carbamazepine Cocrystals: Characterization, In Vitro and Comparative In Vivo Evaluation", **BioMed Research International**, vol. 2021, Article ID 6685806, 9 pages, 2021. <https://doi.org/10.1155/2021/6685806>. (IF=3.44)
- 2- **Wasim M**, Mannan A, Ullah K. Effect of varying quantities of polymer on preparation and stability evaluation of carbamazepine cocrystals with dicarboxylic acid cofomers. **Pak. J. Pharm. Sci.**, Vol.33, No.4(Suppl), July 2020, pp.1755-1761. (IF=0.544)
- 3- **Wasim M***, Mannan A, Azim T, Khan RA, Alotaibi G, Amer M, Shafique M, Khan MA, Gul S, and Hussain I* "Physicochemical and Pharmacokinetic Evaluation of Praziquantel Co-crystals by Varying the Spacer Group of Co-crystal Formers", **Sains Malaysiana**. 51(10)(2022): 3271-3284. (IF=1.009) <http://doi.org/10.17576/jsm-2022-5110-13>
- 4- **Wasim, M**, Bergonzi, M.C. Unlocking the Potential of Oleanolic Acid: Integrating Pharmacological Insights and Advancements in Delivery Systems. **Pharmaceutics** 2024, 16, 692. (IF=5.4) <https://doi.org/10.3390/pharmaceutics16060692>
- 5- **Wasim M**, Rafey HA, Sarwar S, Nadeem H, Ross SA, Shaheen F. GC-MS profiling and biological investigations of *Cissampelos pareira* L. & *Lantana camara* L. **Nat Prod Res**. 2024 May 16:1-7. doi: 10.1080/14786419.2024.2348682.
- 6- Khan MA, Khan S, Kazi M, Alshehri SM, Shahid M, Khan SU, Hussain Z, Sohail M, Shafique M, Hamid HA, Kamran M, Elhissi A, **Wasim M**, Thu HE. Norfloxacin Loaded Lipid Polymer Hybrid Nanoparticles for Oral Administration: Fabrication, Characterization, In Silico Modelling and Toxicity Evaluation. **Pharmaceutics**. 2021 Oct 6;13(10):1632. doi: 10.3390/pharmaceutics13101632. PMID: 34683925; PMCID: PMC8540086. (IF=6.321)
- 7- Azim T, **Wasim M**, Akhtar MS, Akram I. An in vivo evaluation of anti-inflammatory, analgesic and anti-pyretic activities of newly synthesized 1, 2, 4 Triazole derivatives. **BMC Complement Med Ther**. 2021 Dec 31;21(1):304. doi: 10.1186/s12906-021-03485-x. PMID: 34972515; PMCID: PMC8720215. (IF=3.767)
- 8- Rizwan A, Khan QJ, Ullah A, **Wasim M**, Ramzan S, Hussain S, Naqvi A, Ahmad T. Iron deficiency anemia in reproductive age women: A survey study of district Bahawalpur, Punjab, Pakistan. **Pak J Pharm Sci**. 2019 May;32(3):1091-1095. PMID: 31278724. (IF=0.544)
- 9- Mukhtiar M, Jan SU, Ullah I, Hussain A, Ullah I, Gul R, Ali E, Jabbar A, Kuthu ZH, Wasim M, Khan MF. The role of Glutathione, Cysteine and D-Penicillamine in exchanging

Palladium and Vanadium metals from albumin metal complex. **Pak J Pharm Sci.** 2017 Nov;30(6(Supplementary)):2405-2410. PMID: 29188777. **(IF=0.544)**

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