

Dr. Salma Batool

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Objectives

I want to excel as a researcher to make productive contributions to the scientific community and humankind in terms of drug development and drug delivery in pharmaceutical Biochemistry.

Academic Career

Ph. D Biochemistry (2019) CGPA 3.80

Thesis title Evaluation of phospholipid complexes of extracts of *Bistorta amplexicaulis*
Institute PMAS Arid Agriculture University, Rawalpindi, Pakistan Research was completed in collaboration with LUMS and University of Utrecht Netherlands

M. Phil Biochemistry (2009-2011)

Thesis title Bioassay Guided Isolation of Antioxidants Constituents of *Polygonum amplexicaule*
Institute PMAS Arid Agriculture University, Rawalpindi, Pakistan

MSc Biochemistry (2006-2008)

Report title Effects of coxsackie virus on hyperglycemia
Institute PMAS Arid Agriculture University, Rawalpindi, Pakistan

B. Ed Biology and Chemistry (2007-2009)

Institute AIOU, Islamabad

B. Sc (Zoology, Botany, Chemistry) (2004-2006)

Institute The University of Punjab

Professional Career

Assistant Professor (Jan 2020- till date)

Organization Department of Basic and Applied Chemistry Faculty of Science and Technology
University of Central Punjab Lahore
Job Duties Teaching and Research

Lecturer (Dec 10th 2018-Dec 2019)

Organization Department of Biochemistry Faculty of Life Sciences
University of Central Punjab Lahore
Job Duties Teaching and Research

Researcher (Sep 2015-Feb 2016)

Organization Department of Pharmaceutics University of Utrecht
Netherlands

Organization (May 2015- Sep 2019)

Department of Chemistry and Biology Syed Babar Ali School of Science and Engineering LUMS

Research Associate (May 2012-Apr2013)

Job Duties

To carry out research under the Project No. PSF/Res/P- AAUR/BIOTECH (93) "Determination of Biological Activities and Micropropagation of *Polygonum amplexicaule*: a popular medicinal plant of North Pakistan."

Publications

1. Batool, Salma, Maryam Safdar, Saira Naseem, Abdul Sami, Rahman Shah Zaib Saleem, Estibaliz Larrainzar, and Izzah Shahid. 2024. "A Novel *Enterococcus*-Based Nanofertilizer Promotes Seedling Growth and Vigor in Wheat (*Triticum aestivum* L.)" *Plants* 13, no. 20: 2875.
2. Jabeen, I., Rashid, Z., Waheed, R., Zafar, S., Ahmad, K., Arooj, I., Aleem, A., Batool, S., Islam, N., Ahmad, I. and Deebea, F., 2024. Green Synthesis and Biological Applications of *Peganum harmala* Mediated Copper Oxide Nanoparticles. *Journal of Molecular Structure*, p.140838.
3. Batool S, Asim L, Raffaq Qureshi F, Masood A, Mushtaq M, Saleem RSZ. 2024. Molecular Targets of Plant-based Alkaloids and Polyphenolics in Liver and Breast Cancer- An Insight into Anticancer Drug Development. *Anticancer Agents Med Chem.* 2024 Jul 3. doi: 10.2174/0118715206302216240628072554. Epub ahead of print. PMID: 38963106.
4. Salma Batool, Laiba Asim, Jin Zhang, Fawad Raffaq Qureshi, Rahman Shah Zaib Saleem. 2023. Anti-inflammatory Alkaloids Targeting IL-1 against Respiratory Viral Infections: A Special Insight into Drug Development against SARS-CoV-2, *Mini-Reviews in Organic Chemistry* 2023; 20 (-) . <https://dx.doi.org/10.2174/1570193X20666230821143410>
5. Salma Batool, Izzah Shahid, Moaiza Iftikhar, Rahman Shah Zaib Saleem, Muhammad Sheraz Ahmed. 2024. Reversal of antibiotic resistance using biogenic silver nanoparticles synthesized from *Pisum sativum* L. peel extract against multidrug-resistant bacterial pathogens. (Manuscript Accepted for publication in *Current Pharmaceutical Biotechnology*).
6. Izzah Shahid, Salma Batool, Maleeha Hassan, Hammad Ismail, Samina Mehnaz, Farah Deebea, Muhammad Anwar, Faisal Zulfiqar, Rashid Iqbal, Hayssam M Ali. 2004. A decade of progress in rhizoengineering to exploit plant microbiome for salt stress amelioration. *Plant Stress*, Volume 11,2024,100325
7. Ramzan, M., Karobari, M. I., Heboyan, A., Mohamed, R. N., Mustafa, M., Basheer, S. N., Desai, V., Batool, S., Ahmed, N., & Zeshan, B. (2022). Synthesis of Silver Nanoparticles from Extracts of Wild Ginger (*Zingiber zerumbet*) with Antibacterial Activity against Selective Multidrug Resistant Oral Bacteria. *Molecules* (Basel, Switzerland), 27(6), 2007.
8. Batool, S., Asad, M.J., Arshad, M., Ahmed, W., Sohail, M. F., Abbasi, S. W., ... & Ahmed, M. S. (2021). In Silico Validation, Fabrication and Evaluation of Nano-Liposomes of *Bistorta amplexicaulis* Extract for Improved Anticancer Activity Against Hepatoma Cell Line (HepG2). *Current Drug Delivery*, 18(7), 922-934.
9. Anwar, T., Qureshi, H., Mahnashi, M. H., Kabir, F., Parveen, N., Ahmed, D., ... & Alhaider, H. A. (2021). Bioherbicidal ability and weed management of allelopathic methylesters from *Lantana camara*. *Saudi Journal of Biological Sciences*, 28(8), 4365-4374.
10. Shakir, A., Riaz, S., Afzal, M., Zeshan, B., & Batool, S. (2019). Isolation and partial characterization of antimicrobial proteins/peptides from *Moringa oleifera*. *Life Science Journal of Pakistan*, 1(2), 10-16.
11. Kashif, M., Afzal, M., Zeshan, B., Javed, H., Batool, S., & Mazhar, M. (2021). Molecular and Haematological Analysis of Dengue Virus-3 Among Children in Lahore, Pakistan. *Jundishapur Journal Of Microbiology (JJM)*, [online], 14(1), 0-0.
12. Iftikhar, M., & Batool, S. (2020). Phytochemical Analysis, Antimicrobial and Antioxidant Activities of *Thymus vulgaris* L. *Pakistan Journal of Biochemistry and Biotechnology*, 1(2).
13. Riaz, R., Batool, S., Zucca, P., Rescigno, A., Peddio, S., & Saleem, R. S. (2021). Plants as a Promising Reservoir of Tyrosinase Inhibitors. *Mini-Reviews in Organic Chemistry*, 18(6), 808- 828.

14. Rauf, A., Sohail, M. F., Sarwar, H. S., Naveed, S., Batool, S., Amin, U., ... & Shahnaz, G. (2020). Tuberculosis resistance and nanoparticles: Combating the dual role of reactive oxygen species in macrophages for tuberculosis management. *Critical Reviews™ in Therapeutic Drug Carrier Systems*, 37(2).
15. Asad, M. J., Ahmad, M. S., Arshad, M., Rahman, S. Z. S., & Batool, S. (2021). The supremacy of synergism: a comparison of anticancer activity of rhizome extract of *Bistorta amplexicaulis* and gallic acid in cancer cell lines and primary cells. *Curr. Nutraceuticals*, 2(1), 21-26.
16. Batool, S., Ullah, S., Tabassum, S., Bilal, A., Faisal, A., Saleem, R. S. Z., & Ahmad, M. S. (2019). Effect of extraction methodologies on antioxidant potential and synergistic anticancer behavior of leaf extract of *Polygonum amplexicaule* against HCT-116 cells. *Iranian Journal of Science and Technology, Transactions A: Science*, 43(3), 709-714.
17. Salma, B., Muhammad, G., Abida, A., SM Saqlan, N., ul Haq, I., Bushra, M., & M Sheeraz, A. (2015). Evaluation of antioxidant potential and HPLC based identification of phenolics in *Polygonum amplexicaule* extract and its fractions.
18. Sohail, M. F., Javed, I., Hussain, S. Z., Sarwar, S., Akhtar, S., Nadhman, A., ... & Shahnaz, G. (2016). Folate grafted thiolated chitosan enveloped nanoliposomes with enhanced oral bioavailability and anticancer activity of docetaxel. *Journal of Materials Chemistry B*, 4(37), 6240-6248.
19. Batool, S., & Ahmed, M. S. (2016). *Bistorta amplexicaulis*: A Brief Insight to its Ethnobotany. *Journal of Bioresource Management*, 3(3), 2.
20. Fatima, A., Raja, G. K., Shah, M. A., Gul, I., Tabassum, S., Batool, S., ... & Ahmad, M. S. (2017). Extraction and Evaluation of a Natural Dye From *Bistorta amplexicaule*. *Pakistan Journal of Science*, 69(2), 195.
21. Ahmad, M. S., Naqvi, S. S., Mushtaq, S., Ramzan, F., Sami, A., Batool, S., & Mirza, B. (2013). Phytochemical and biological evaluation of *Polygonum amplexicaule* rhizome extract. *Can J Pure Appl Sci*, 7(3), 2303-14.

Conference Publications

1. Moaiza Iftikhar, Amna Maqsood, Salma Batool. 2019. Phytochemical analysis, antioxidant and antimicrobial activities of *Thymus vulgaris*. 7th International Conference on Biological & Computational Sciences (C-BICS 2019) held at Capital University of Science and Technology on Nov 29th, 2019.
2. Salma Batool, M. Javaid Asad, Muhammad Arshad, Umara Afzal, Rahman Shah Zaib Saleem, Muhammad Sheeraz Ahmed. 2019. Autofluorescence and anticancer activity of Rhizome extracts of *Bistorta amplexicaulis*. 2019 "39th Pakistan congress of Zoology (International) department of Zoology, Islamia College University of the Peshawar.
3. Salma Batool, Sajida Mushtaq, Farzana Ramzan, Waseem Safdar, M Sheeraz Ahmad, Antioxidant Potential of Crude Methanolic Extract of *Polygonum amplexicaule* and its Fractions, National Science Conference, PMAS-AAUR, February 21st, 2012, Book of Abstracts, P-85. (Oral Presentation).
4. Faiza Maqsood, Salma Batool, Abdul Sami, M Gulfranz, S. M. Saqlan Naqvi and M Sheeraz Ahmad, Optimization of conditions for micro-propagation of *Polygonum amplexicaule* - an important medicinal plant, 11th Biennial Conference Molecular Biosciences - Challenges and Opportunities, November 25-28th, 2013, University of the Punjab Lahore, Abstract Book Page-104 (Poster Presentation).

Book Chapters

- Muhammad Sheeraz Ahmad, Salma Batool, Arshad Islam, Ammara Jabeen, Azka Noureen, Sana Shamshad, Tayyaba Zainab, Maryam Shahid, Warda Ahmed (2021). Neurological Disorders: Biochemistry of Drug Resistance and Future Challenges, In: Ahmed S., Chandra Ojha S., Najam- ul-Haq M., Younus M., Hashmi M.Z. (eds) *Biochemistry of Drug Resistance*. Springer, Cham. https://doi.org/10.1007/978-3-030-76320-6_9

- Salma Batool, Muhammad Sheeraz Ahmed, Ammara Jabeen, Maryam Shahid, Warda Ahmed, Muhammad Asadullah Usman. (2024). Folkloric Plants as the Potential Cancer Chemo preventive Agents. Plants as Medicine and Aromatics (9781032517902). Edited by Ansari et al. Taylor and Francis.

Conferences/ Workshops attended

- 1- Delivered a talk on "Global Conference on Sustainable Development in agriculture, Biochemistry and Biotechnology (2023)" held on 15-16 Feb, 2023 in The Women University, Lahore
- 2- Organized a session on "Effectiveness of Virtual Learning" organized by Lahore Badshahs in collaboration with University of Central Punjab, Lahore.
- 3- Organized "4th 1 Day Lab Hands on Training" held in 2023 in the University of Central Punjab, Lahore.
- 4- Participated in " Research Proposals and Grants-Challenges and Opportunities" held on 25-26 Sep, 2023 in ORIC of University of Central Punjab, Lahore.
- 5- Organized "One Day Training Workshop on Knowing ASM" held on 22 Nov, 2023 in the University of Central Punjab, Lahore.
- 6- Participated in " Cervical Cancer Awareness" held on 10 Jan, 2023 in University of Central Punjab, Lahore.
- 7- Organized " FOST Science – FEST 2024" as Publication Head held on 24th – 25th Jan, 2024, Organized by Faculty of Science and Technology in the University of Central Punjab, Lahore.

Training attended

- 1- Wolters Kluwer-OVID Training Webinar for Pakistani Researchers. November 17th, 2022.
- 2- Complete Training " Ph.D. Supervision Course Completion" held on 29th Jan, 2024 in University of Central Punjab.

Conferences & Workshops Organized/Conducted

- 1- Practical Training Session on Publication Writing & Citation Management Using Endnote. 9th October, 2019. University of Central Punjab, Lahore, Pakistan.
- 2- 1st National Conference on Emerging Horizons in Science & Technology, December 26th-27th, 2022 University of Central Punjab, Lahore, Pakistan.
- 3- Organized "3rd 2-Days Labs Hands on Training" held in 2022 in University of Central Punjab, Lahore.
- 4- Organized " One Day Endnote Workshop 2023" held on 13th Sep, 2023 in the University of Central Punjab, Lahore.
- 5- Science FEST 2023 held on March 7 and 8th March 2023 at University of Central Punjab, Lahore Pakistan.
- 6- Organized " FOST Science – FEST 2024" as Event Head and Publication Head held on 24th – 25th Jan, 2024, Organized by Faculty of Science and Technology in the University of Central Punjab, Lahore.
- 7- Webinar: Microbes and Climate Change-An ASM Inspired Event. 6th November, 2023. University of Central Punjab, Lahore, Pakistan. (As Organizer)
- 8- Seminar: Knowing ASM- Connect with American Society for Microbiology. 22nd November, 2023. University of Central Punjab, Lahore, Pakistan. (As Organizer)

Membership

- American Society of Microbiology
- American Society of Pharmacognosy
- Climate Change Research Council University of Central Punjab
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Research Supervision at University of Central Punjab

Ph. D (ongoing)

1. Ali Raza

Thesis title: Assessment of Potentiation of antibiotics using plant-based flavonoids against drug resistant nosocomial pathogens (Supervisor)- Ongoing

2. Muhammad Ramzan

Thesis title: Characterization and Antimicrobial Activity of Silver Nanoparticles Using Zingiber zerumbet and Zingiber officinale (As Co. Supervisor)-Completed

3. Misbah Murtaza

Thesis Title: Plant-based synthetic flavonoids mediated re-sensitization of aminoglycosides and quinolone antibiotics against UTI causing MDR and XDR *E. coli* (Supervisor)-Ongoing

4. Isma Idrees

Thesis Title: Development of Nano-bio-fungicides as a sustainable solution to climate smart Agriculture (Supervisor)- Ongoing

MS

Moaiza Iftikhar L1F19MSBC0005

Green synthesis and Evaluation of Biological Activities of Silver Nanoparticles Produced Using Pisum Sativum L.

Maryam Safdar L1F20MSBC0007

Optimization and Characterization of Microbial synthesis of Silver Nanoparticles by using Auxin Producing Bacteria for Improved Seed Germination

Huria Saeed L1F20MSBC0012

Green Synthesis and Characterization of Silver Nanoparticles Using Phosphate Solubilizing Bacteria

Aqsa Chaudhary L1F20MSBC0005

Evaluation of Extract of Bistorta amplexicaulis against Antibiotic Resistant Enteric Pathogens

Sonia Mazhar L1F19MSBC0003

Evaluation of Antimicrobial Potential of Plant based Polyphenolics against Nosocomial Pathogens

Hafiza Nida Shahzadi L1F21MSBC0012

Assessment of efflux pump inhibition of flavonoids using Berberine accumulation assay against nosocomial pathogens

Areeba Akram L1F21MSBC0023

Assessment of plant growth promotion efficiency of microbially synthesized Silver nano-biofertilizer using auxin producing bacterium on wheat in controlled conditions

Maria Zia L1F21MSBC0022

Assessment of plant growth promotion efficiency of microbially synthesized Silver nano-biofertilizer by phosphate solubilizing bacteria on wheat in controlled Conditions

Ayesha Arif L1S22MSBC0010

Biological evaluation of extracellularly synthesized nanoparticles using Rhizobacteria for plant growth promotion

Iqra Abbas L1S22MSBC0011

Assessment of Cytotoxicity of extracellularly synthesized Iron and silver nanoparticles using Rhizobacteria for plant growth promotion

Laiba Shahzadi L1S22MSBC0013

Assessment of Plant-based Flavonoids as Potential Antimicrobial agents against Urinary Tract Infections causing *Escherichia coli*

Adina Athar L1F22MSBC0003

Characterization of Resistance in Multi-Drug-Resistant Pathogens Using Expression Profiling of Efflux Pumps

Muskan Nazim L1F22MSBC0004

Exploring Revival of Antibiotic Susceptibility using Flavonoids as Adjuvants against Resistant Bacterial Pathogens

Ume Habiba L1S23MSBC0001

Molecular Identification of driver mutations in APC and TP⁵³ in lipoma and liposarcoma (on going)

Reviewer

1. Nature Scientific Reports (Nature)
2. Pakistan Journal of Agriculture Sciences (University of Agriculture Fsd)
3. Journal of Bio-resource Management (Wright State University)
4. Pakistan Journal of Biochemistry and Biotechnology (Women University Multan)
5. BMC Complementary Medicine and Therapies
6. Bentham Science Publishers – Anti-cancer agents in Medicinal Chemistry

Awards

1. HEC Indigenous Scholarship Batch 1 Phase II
4. HEC International Research Support Initiative Program (University of Utrecht Netherlands)

Referees**Dr. Muhammad Sheeraz Ahmed (Ph. D Supervisor)**

Associate Professor

University Institute of Biochemistry and Biotechnology (UIBB), PMAS- Arid Agriculture University Rawalpindi, Murree Road, Rawalpindi – 46300, Pakistan.

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Dr. Rahman Shah Zaib Saleem (Co-Supervisor)

Associate Professor

Department of Chemistry & Chemical Engineering.

Syed Babar Ali School of Science and Engineering SBASSE, Lahore University of Management Sciences (LUMS) Lahore – 54792, Pakistan.

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Email: rahman.saleem@lums.edu.pk

Dr. Izzah Shahid (Ex. Colleague UCP, Lahore)

Postdoc fellow

Institute of Multidisciplinary Research in Applied Biology (IMAB),

Public University of Navarre (UPNA), Campus Arrosadia,

31006 Pamplona, Spain

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