

Curriculum Vitae 2025

Dr. Sana Riaz

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Work Experience

2022-Present | Senior Research Officer (PPS 09/BPS 19)
Food and Biotechnology Research Centre (FBRC), PCSIR Lahore

2018-2020 | Scientist/Researcher
School of Biomedicine, KU Leuven, Belgium

2009-2018 | Research Scientist
NOVA PLUS Molecular Diagnostic Lab and Research Centre, Lahore

2009-2011 | Lecturer - Forensics
Government College University (GCU), Lahore

Academic Qualifications

2015-2021 | PhD in Microbiology and Molecular Genetics
The Women University Multan and School of Biomedicine, KU Leuven, Belgium
Research Fellowship: Health Security Partner USA
Thesis: Biochemical and molecular characterisation of potential anticancer phytochemicals: An *in silico* and *in vitro* Study

2008-2010 | MPhil in Molecular Biology, Virology
Centre of Excellence in Molecular Biology (CEMB), University of the Punjab, Lahore
Research Thesis: Antiviral Potential of Indigenous plant extracts on HCV and screening of active agents

2005-2007 | MSc in Chemistry
Government College University (GCU), Lahore
Research Thesis: Comparison of the composition of epicuticular wax of *Solanum nigrum* Complex and its anti-microbial activity

2003-2005 | BSc. Botany, Zoology, Chemistry
Government College University (GCU), Lahore

Fellowships and Distinctions

- **2025-2027:** American Society of Microbiology (ASM) USA Future Leaders Mentorship Fellowship
- **2024-2025** 17025 ISO Accreditation and PT Project Labs
- **2023-2024:** Health Security Partner USA Responsible Research Fellowship
- **2023:** Biosafety and Biosecurity Training, Kuala Lumpur, Malaysia
- **2023-2024:** Responsible Research Fellowship
- **2024:** Health Security Partner USA Research Project Grant (\$5,000)
- **2021:** PhD Distinction highest CGPA 3.89

- **2015-2021:** Prime Minister Laptop Scheme (HEC)
- **2018-2019:** International Research Support Initiative Program (HEC), KU Leuven, Belgium
- **2018:** IRSIP Travel Grant Return Ticket, Belgium
- **2012:** Superintendent, BISE Lahore Exams
- American Society for Microbiology (ASM) Membership No. 200449271
- Microbiology Society, UK Membership No. C05219

R&D Projects (ISO/IEC 17025:2017 Accredited Laboratory)

- Active Pharmaceutical Ingredient (API) Production Lab to Pilot Scale
- Halal Testing Facility (2023-24)
- GMO Food Testing Facility (2023-24)
- Bioavailability/Bio-fortification Facility (2023-24)
- Total, Soluble and Insoluble Dietary Fiber Analysis (FAPAS, UK approved proficiency testing) Accredited
- Total Crude Protein & Acid Detergent Insoluble Nitrogen (ADIN) Analysis (2024)
- Medical Device Testing Sterility, Endotoxin Testing, Cytotoxicity Accredited
- Primary & Secondary Cell Culture (BSL-2, BSL-3)
- Quantitative Ash Analysis
- Quantitative Protein Analysis
- Water and Food Microbe Testing
- Bio-analytical Facilities: Nanodrop, Spectrophotometer, Inverted Microscope, Fluorescent Microscope, FTIR, HPLC, Sanger Sequencing

Research Projects as Senior Research Officer, PCSIR

- A herbal topical gel composition comprising *Tecomella undulata* leaves extract
- Kit development for instant detection of microbes in pasteurized milk
- DNA Extraction Kit for Plant, Meat and Body Fluids
- RNA Extraction Kit from Viruses
- Rapid paper-based strips for microbial detection in milk and water
- Staining Kit for Instant Detection of Gram-Positive and Gram-Negative Bacteria
- Waste bread utilization as microbial growth media in fermentation
- Production of catalyst tablets for food sample protein analysis

Patents (IPO-Pakistan)

- Bioactive Biopolymeric Film Composition For Pharmaceutical And Food Preservation Applications (2025)
- A Herbal Topical Gel Composition Comprising Of *Tecomella Undulata* Extract (2023)

Research Skills

BSL-2 and BSL-3 Laboratory Experience:

- Gene Editing Lab, FBRC, PCSIR Lahore (ISO 9001, 17025:2017 certified)
- School of Biomedicine, KU Leuven, Belgium
- Department of Microbiology and Molecular Genetics, University of the Punjab
- Novaplus Molecular Diagnostic Lab and Research Center
- Centre of Excellence in Molecular Biology, Lahore

Cell Culture:

- Cancer Cell lines: Huh-7, HCT 116, HeLa, MCF-7, HepG2, HepG3B, NCI-727, A549, LX-2, HMEC-1
- Fibroblast Cell lines: HUV-EC-C, MDBK, T273K, HEK293, 3T3-Swiss Albino, COS-7, Vero, CHO, CHO-K1

Apoptosis and Cytotoxicity Assays:

- Annexin V-FITC/DAPI, propidium, MTT, XTT, MTS, Trypan blue Dye, Resazurin Fluorescence Assay

Bioassay Guided Purification:

- Phytochemical solvent extraction methods

- Qualitative and quantitative phytochemical assessment
- Natural products analysis (herbs, terrestrial plants, marine plants, microorganisms)
- Antioxidant methods (DPPH, ABTS, lymphocytes, TLC)
- Thin layer chromatography, column chromatography
- FTIR, semi-preparative and preparative HPLC, GC/MS
- *Antiaging and cytotoxicity C. elegans, Zebrafish*

Microbiology:

- Ames mutagenicity assay
- Antibacterial, antifungal, antiviral assays
- Food testing (total coliform, yeast and mold, *Salmonella*, *Staphylococcus*, fecal coliform)
- Water testing (total coliform, fecal coliform, *Pseudomonas*)

Molecular Biology:

- Sanger sequencing, RNA and DNA extraction
- cDNA synthesis, real-time quantitative PCR
- Gel electrophoresis, Western blot
- SDS-PAGE protein expression
- Gene Analyzer (ABI)
- Flow cytometry, electrical impedance spectroscopy
- Roche, Agilent, ACEA, xCELLigence real-time systems

Gene Editing:

- CRISPR-Cas9 (gene knockdown, gene knockout)
- Gene expression (luciferase reporter assay)
- Cloning of Hepatitis C Virus genes (NS3a, NS5b)
- Transfection (lipofectamine)
- Luciferase assay

Virology/Diagnostics:

- Sanger Sequencing on ABI seq studio, ELISA, Real-Time PCR (HCV, HBV, TB)

Bioengineering:

- Production of Pharmaceutically Active Ingredients (API) by genetically engineered microbes (Lysine, beta-Carotene)

In silico/Software:

- Ligand structure and protein molecular docking
- Binding free energy calculations
- Software proficiency: AutoDock Vina, PyMol, ADME, TOX Tree
- In silico PCR, e-CRISPR, CRISPR Direct, SNAP Gene, Primer 3
- Synergism analysis, selectivity index, dose-response assay
- In silico IC50, CC50, EC50 calculations

Statistical Analysis:

- Compusyn
- SPSS
- GraphPad Prism 8.1
- EndNote for References

Publications

1. Perveen, I., Imran, M., Shehzadi, S., Siddiqi, A., Haq, Z. U., Javed, M. A., ... & **Riaz, S.** (2025). Advanced fermentative biosynthetic cost-effective carotenoid production using newly isolated halophilic bacterial strain *Chromohalobacter salexigens* (GenBank Accession No. MZ848239). *Industrial Biotechnology*, 21(1), 29-38.

2. Nadeem, A. A., Naz, S., Zaman, M., Asad, M. H. H. B., **Riaz, S.**, & Javaid, M. A. (2024). Pilot Scale Bioethanol Production Using Different Lignocellulosic Biomass. *The Journal of Microbiology and Molecular Genetics*, 4(1), 1-4
3. Abbas, N., Mazhar, S., **Riaz, S.**, & Javed, M. A. (2023). Microbial production of DHA from *Schizochytrium* sp. PKU#Mn16 in the presence of an oxidative stress-inducing agent. *Archives of Microbiology*, 205(9), 327.
4. Mazhar, **S.**, **Riaz, S.**, Abbas, N., Haider, R., Khalid, S., & Javaid, M. A. (2023). Development of Indigenous Alkaline Phosphatase Kit for Determination of Liver Function Test. *Pakistan BioMedical Journal*, 6(4), 192-194. —
5. **Riaz, S.**, Javaid, M. A., & Khalid, S. (2022). Biochemical characterization of *Tecomella undulata* extracts against acetaminophen-induced oxidative damage in HepG2 cells. *Saudi Journal of Biological Sciences*, 29(1), 191-198.
6. **Riaz, S.**, Khan, S., Javed, M. A., & Abbas, N. (2022). Biobutanol production from sustainable biomass (cotton stalks) using *Clostridium* species. *Archives of Microbiology*, 204(7), 426.
7. Essa, R., **Riaz, S.**, Javaid, M. A., & Khalid, S. (2022). Analysis of Antibiotic Resistant Gene in *Pseudomonas* Species Isolated from Clinical Samples. *Pakistan Journal of Medical & Health Sciences*, 16(08), 139-141.
8. **Riaz, S.**, Zubair, H., Khalid, S., & Javaid, M. A. (2022). Cancer mechanism and chemotherapeutic phytochemicals: An insight. *Journal of Microbiology and Molecular Genetics*, 2(1), 20-25.
9. Shabbir Malik, S., Asim, M., Saeed, H., Abbas, A., Iqbal, R., Ali, Z., ... & **Riaz, S.** (2022). Psychosomatic impact of COVID-19 on students and their coping strategies during the COVID-19 pandemic in Pakistan. *The Pakistan Journal of Biochemistry and Biotechnology*, 3(2), 18-26.
10. **Riaz, S.**, Siddiqua, A., Javed, T., & Javaid, M. A. (2021). Anti-hepatitis C Virus potential of *Szygium Cumine* targeting viral replication: In vitro and in silico study. *Archives of Microbiology*, 203, 5873–5881.
11. Khalid, S., Shahzadi, I., Iqbal, A., & **Riaz, S.** (2021). In vitro antimutagenic potential of *Fagonia indica* against sodium azide induced mutagenicity in mice. *Pakistan Journal of Pharmaceutical Sciences*, 34(3), 1197-1201.
12. Javed, T., Ahmed, M., **Riaz, S.**, & Javaid, M. A. (2021). In silico characterization of anticancer phytochemicals from *Artemisia absinthium* targeting apoptotic and metastasis pathway proteins. *Pakistan Journal of Pharmaceutical Sciences*, 34(6(Suppl.)), 2619-2626.
13. Riaz, M.A., Shabbir, S., Javed, T., & **Riaz, S.** (2021). Computational Screening of Anti-Cancer Phytochemicals Against PI3K/AKT/mTOR Pathway Proteins. *Pakistan Journal of Medical and Health Science*, 15(5), 989-994.
14. Shabbir, **S.**, **Riaz, S.**, M. A., Javed, T., & Riaz, S. (2021). SNPs Phylogeny in HIV samples from local population of Pakistan. *Pakistan Journal of Medical and Health Science*, 15(4), 827-832.
15. **Riaz, S.**, Javed, T., Afzal, N., & Javaid, M. A. (2020). Virtual screening of antitumour phytochemical from herbal source targeting epidermal growth factor receptor. *Pakistan Journal of Pharmaceutical Sciences*, 33(4), 1887-1893.
16. **Sana, R.**, & Iqbal, A. (2016). A review of hepatitis C in Pakistan: Prevalence, genotype distribution and risk factors. *Viral Hepatitis Dergisi*, 22(3), 89-96
17. Javed, T., Ahmed, M., Javaid, M. A., Riaz, S., & Hussain, A. I. (2016). Biological activity of *Terminalia arjuna* bark extract. *Pakistan Journal of Pharmaceutical Research*, 2(2), 75-81.
18. Riaz, S., Shabbir, S., Javed, T., & Javaid, M. A. (2017). Gender specific correlation among fingerprint patterns and blood groups in population of Punjab. *Pakistan Journal of Pharmaceutical Research*, 3(1), 48-51.
19. Ameen, S., Riaz, S., Abbas, T., & Iqbal, M. (2012). Organisms and antibiotic sensitivity in septicemic children. *Asian Biomedicine*, 6(3), 415-420.
20. Javed, T., Javaid, M. A., & Riaz, S. (2016). Biological activity of *Terminalia arjuna* bark extract. *Pakistan Journal of Pharmaceutical Research*, 2(2), 75-81

21. Javed, T., Ashfaq, U. A., Riaz, S., Rehman, S., & Riazuddin, S. (2011). In-vitro antiviral activity of *Solanum nigrum* against Hepatitis C Virus. *Virology Journal*, 8(1), 1-6.
22. Mohy-ud-din, A., Javed, T., & Riaz, S. (2010). Epicuticular waxes of *Solanum nigrum*. *Asian Journal of Chemistry*, 22(3), 1953-1958.
23. Rehman, S., Ashfaq, U. A., Riaz, S., Javed, T., & Riazuddin, S. (2011). Antiviral activity of *Acacia nilotica* against HCV. *Virology Journal*, 8(1), 1-6.

Publications in Process

1. Javed, T., Riaz, S., Aslam, S. "Antiviral Efficacy of *Solanum americanum* Extracts against Hepatitis C Virus Genotypes 3a and 1a: Cytotoxicity, Mechanisms of Action, and Synergistic Potential with Interferon." *Viruses MDPI*.
2. Khan, K., Tiwana, H., Riaz, S., Javed, T. "Post-COVID Multisystem Inflammatory Syndrome in a Pediatric Patient: A Case Study of Fever, Rash, and Hepatomegaly." *Journal of Health and Medical Sciences*.
3. Javed, T., Ismail, K., Riaz, S., Saeed, S., Raza, S.Q., Aslam, S. "Efficacy of *Cupaniopsis anacardioides* Extracts in Modulating Blood Glucose, Lipid Profiles, and Pancreatic Regeneration in Alloxan-Induced Diabetic Rats." *Journal of Traditional Medicine Springer*.
4. Javed, T., Riaz, S., Essa, R., Janiad, S., Raja, S.A., Riaz, A., Mazhar, M., Siraj, M., Massa, S. "Bioassay guided anti-HCV and interferon synergism potential of *Grewia asiatica* on infected hepatocytes." *Archives of Microbiology*.
5. Javed, T., Riaz, S., Aslam, S. "Evaluating the Therapeutic Potential of Pakistani Medicinal Plants: Antimicrobial, Antibiofilm, and Antimutagenic Activities." *Heliyon*.
6. Bukhari, B., Essa, R., Abbas, N., Mazhar, S., Parveen, I., Saleem, Y., Syed, Q., Abidi, S.H., Riaz, S. "Harnessing CRISPR/Cas9 for Poultry Improvement: Applications in Egg Albumin and Industrial Innovation." *Food Science and Biotechnology*.

Books Published

1. "Chemo taxonomical implications waxes from *Solanum nigrum* Complex." Lambert Academic Publishing, Germany, 104 pp. ISBN 978-3659502996 (2013)
2. "Phytochemical and Biological studies on *Terminalia arjuna*." Lambert Academic Publishing, Germany, 76 pp. ISBN 978-3659523199 (2013)
3. "Anticancer Medicinal Plants: Therapeutic Drugs, Lab to Market." Kindle Publishing, US, 39 pp. ASIN: B08WPNXRC7 (2021)
4. "Medicinal Plants methods and protocols: Phytochemical Drug Development: Lab to Market." Kindle Publishing, US, 36 pp. ASIN: B08WRPZ58Y (2021)
5. "Production of Interferon alpha 2b from *Bacillus subtilis*." Amazon USA (2022)
6. "Therapeutic Potential of Polyoxometalates." Amazon USA (2022)
7. "In silico anticancer Phytocompound evaluation." Amazon USA (2023)
8. "Cell Viability Assays; Lab Protocols: With complete list of reagents, equations and calculations." Amazon USA (2023)
9. "Production and formation of SARS-COV-2 Variants." IntechOpen (2024)
10. "Integrated Methods for Genetically Modified Organism (GMO) identification." US (2024)
11. "Analytical Methods for Total Dietary Fiber Identification." US (2024)

Technical Reports (for Director P&D PCSIR Lahore)

1. "Development of Indigenous Alkaline Phosphatase Kit for the rapid detection of Milk Quality." Abbas, N., Mazhar, S., Riaz, S., et al.

2. "Process Development for Halal Meat Detection by Molecular Methods (DNA Extraction and Polymerase Chain Reaction)." Abbas, N., Mazhar, S., Essa, R., Riaz, S., et al.
3. "Procedure for Acid Hydrolysis of Waste Bread Crumbs as a Glucose Source for Microbial Growth Media Preparation." Abbas, N., Mazhar, S., Riaz, S., et al.
4. "Development of Indigenous Kit for differential Detection of Gram-Positive and Gram-Negative Bacteria." Mazhar, S., Abbas, N., Riaz, S., et al.
5. "Development of Green pH paper for respective colorimetric differentiation of Acid and Basic nature." Abbas, N., Mazhar, S., Riaz, S., et al.
6. "Comparison of Methods for Determining Acid Detergent Insoluble Nitrogen (ADIN)." Abbas, N., Mazhar, S., Riaz, S., et al.

Workshops & Trainings Organized

1. "Biorisk Management Training Workshop" (March 29, 2022)
2. "Training on Genome Editing using CRISPR/Cas9" (June 21, 2022)
3. "Demonstration Seminar on XRD and Oligo Synthesizer" (June 28, 2022)
4. "Three Days Internal Training on High Performance Liquid Chromatography (HPLC)" (September 5, 6, 15, 2022)
5. "Training Session on Bruker FTNIR Raman Spectrometer" (October 18, 2022)
6. "Demonstration Seminar on Bruker FTNIR Raman Spectrometer" (November 30, 2022)
7. "Lab Demonstration Seminar on Sequencer Quant Seq" (February 22, 2023)
8. "Lab Demonstration Seminar on Real-Time PCR Quant. 3 and Quant 5" (April 5, 2023)
9. "Lab Demonstration Seminar on Fluorescent Microscope" (May 30, 2023)
10. "Lab Demonstration Seminar on i-bright Imaging System, Thermo Scientific" (May 30, 2023)
11. "Lab Demonstration Seminar on Flow Cytometer" (June 18, 2023)
12. "Lab Demonstration Seminar on Solid State Fermenter" (July 30, 2023)
13. "Genome Editing, CRISPR, CAS, and Protein Purification" PCSIR Lahore (May 11, 2024)
14. "Setting Objectives ISO 17025 Training" PCSIR (June 19, 2024)
15. "Quality Manual and Objectives ISO 17025 Training" PCSIR (April 15, 2025)