Curriculum Vitae Dr. Samiullah Khan

Civil status:	***Married***
Nationality:	***Pakistani***
Work address:	***Department of Microbiology, Quaid-i-Azam University Islamabad Pakistan***
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University Education

PhD (Microbial Biotechnology)	23 January 2012 Lund University, Sweden
Thesis Title	Molecular Development of a Thermostable β-glucosidase for Modification of Natural Products
Supervisor	Eva Nordberg Karlsson
M. Phil (Microbiology)	2007 Quaid-i-Azam University Islamabad Pakistan
Thesis Title	Studies on Immobilization of Antibiotic Producing *Bacillus* Strain
Supervisor	Fariha Hasan
B. Pharmacy	2004 Gomal University D.I.Khan Pakistan

Present Job/Designation

Professor 24 March 2025-Continue, Quaid-i-Azam University Islamabad, Pakistan
Associate Professor 18 March 2021-23 March 2025, Quaid-i-Azam University Islamabad, Pakistan
Assistant Professor 17 September 2012- 17 March 2021, Quaid-i-Azam University Islamabad, Pakistan

Job Description

Research and Teaching to BS, M.Sc and M.Phil/Ph.D degree classes, courses include Bacteriophages and their applications, Antimicrobial Resistance, Antimicrobial Chemotherapy, Microbial Enzyme Technology; Microbial Physiology; Industrial Microbiology, Recombinant DNA Technology, Medical Microbiology, Advances in Biotechnology, Laboratory course-2 and Laboratory course-3, Fundamental of Microbiology, Soil Microbiology, Microbial Enzymology and Human Physiology, Introductory Biology

Postdoctoral Research

Department of Biotechnology, Lund University, Sweden, February 1-September 15, 2012

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Research Gate
23 (https://www.researchgate.net/profile/Samiullah-Khan-6)

Google Scholar
24 (https://scholar.google.com/citations?user=s1D-enQAAAAJ&hl=en&authuser=1)

Peer Reviews
24 **https://www.webofscience.com/wos/author/record/AAF-1474-2019**

Research Interests

- Bacteriophages and their Enzyme as Enzy biotics for the control of multi drug resistance bacteria
- Microbial production of industrially important metabolites with special focus on enzymes and antimicrobials
- Special research focuses is on hydrolase group of enzyme e.g. glycosidase from extremophiles, Proteases and Phytases
- Probiotics and prebiotics
- Divesity, Cultivation, Screening and Characterization of edible and non-edible mushrooms of Phamaceutical Importance
- Use of Algae for Biotechnological application e.g. Algae in Food Biotechnology, Pharmaceutical Biotechnology and paper and pulp industry
- Screening and isolation of glycosidases, Proteases and Phytases producing bacteria and fungi from species adapted to the extreme environments.
- Cloning of the gene that encodes the enzyme and overexpression of the selected genes.
- Purification and characterized of the expressed genes (Enzymes)
- Bioinformatics, Structure/Function studies and modelling of enzymes
- Enzymes from thermophiles (activity, kinetics and deactivation/denaturation studies)
- Cultivation of microorganisms (recombinant *E. coli*)
- Enzyme engineering and designing of new biocatalyst
- Enzymatic production of prebiotic Resistant Starch
- Enzymes production for Bio-refinery such as conversion of chicken feather wastes into value added products
- Enzymatic modification of natural products such as antioxidants for use in different industrial products e.g. food, pharmaceuticals and cosmetics using synthetic approach.

Research Grants

1. Principal Investigator in a project (PKR. 12.856022 million) funded by Higher Education Commission of Pakistan “Bacteriophage Derived Proteins a Novel Approach as Enzobiotics to Combat Multi Drug Resistance Bacteria”

2. Principal Investigator in a project (PKR. 8.954,722 million) funded by Pakistan Science Foundation and TUBITAK, Turkey “Specific designing of β-glucosidase for modification of natural products with the aim to enhance their cancer preventing potential”

3. Principal Investigator in a project (PKR. 3.807,224 million) funded by Higher Education Commission of Pakistan “Utilization of poultry feather waste by keratinases producing microorganisms for production of sustainable value-added products and biogas”

4. Principal Investigator in a project (PKR. 2.68 million) funded by Higher Education Commission of Pakistan and Turkey “Green and Economical Production of Resistant Starch”

5. Principal Investigator in a project (PKR. 0.5 million) funded by Higher Education Commission of Pakistan “Isolation and molecular identification of amylase producing bacterial strains and characterization of amylase”

6. Co-principal Investigator in a project (PKR 9.876 million) funded Higher Education Commission of Pakistan “Synthesis of biowaste derived titania Nanoparticles and their efficiency in developing Novel restorative material for dental caries treatment”

7. Co-principal Investigator in a project (PKR 4.08 million) funded Higher Education Commission of Pakistan “Utilization of Jatropha curcas for coproduction of biodiesel, biogas, biofertilizer and antimicrobials”

8. Co-principal Investigator in a project in a project (PKR 3.8 million) funded by International Foundation for Science “Bacteriophages Proteins: Alternative Approach to Antibiotics against Gram Negative Bacteria in Resistance Era”

PhD Research Project

The PhD project was focused on molecular development of enzyme into highly specific carbohydrate engineering tools, leading to increased impact of specificity modifying reactions by identifying key residues for hydrolysis, pointing out residues responsible for the coordination of specific substrates, their enzymatic analysis and increased production of extremophilic carbohydrate active enzymes by co-expression with chaperones, for fundamental studies and applied uses (including techniques for production of the recombinant enzymes) in processes related to industrial biotechnology, food biotechnology and green technology. Carbohydrate containing substrates i.e. poly/oligo-saccharides, glycosylated polyphenolic substances are modified into biologically active compounds of applied interests e.g. antioxidants and anticancer. The work was based on molecular insight into the active sites of microbial glycoside hydrolases for selective removal of glycoside residues in naturally occurring polyphenolic glycosides (i.e. antioxidants from natural resources). The selected mutant was immobilized on different acrylic supports for the online bioconversion of glycosylated antioxidants, present in biomass and extracted with pressurised hot water.

Technical skills

Bacteriophages isolation and characterization, Bacteriophages Proteins for therapeutic Applications, Knowledge in Enzymology (Screening, isolation, purification and characterization of Microbial Enzymes), Pharmaceutical biotechnology, Food biotechnology, Microbiology and Molecularbiology i.e. Microbes isolation from soil, air and water, cultivation at shake flask and fermentor level, optimization of conditions for microbes, characterization of microbes, *gene* cloning, designing of PCR primers, optimization of PCR reaction conditions, PCR product purification, increased production of active protein by co-expression with chaperones, Preparation of competent cells, Plasmid isolation and purification, Genomic DNA isolation and purification, construction of mutants by using PCR and accompanying techniques (e.g. Real time PCR), Preparation of libraries of mutant enzymes using different techniques. Production of recombinant proteins in *Escherichia. Coli*, using batch and fed batch fermentations in 2 L scale femrentors. Purification of proteins using chromatographic techniques (Äkta systems). Characterization of proteins including kinetic analysis using both natural ligands e.g. oligosacchairdes and polysaccharides as well as aryl linked substrates, its crystallization. Biophysical protein characterization using differential scanning calorimetry and spectrophotometric analyses. Analytical techniques for reaction-products determinations using high pressure liquid chromatography and thin layer chromatography.

Immobilization methods used for whole cells and purified enzyme on selected supports have been evaluated.
Extraction, Purification, Characterization and Bioactivity of natural products from plants and microorganisms (Bacteria, Fungi and Algae)

Different computer programs for protein homology modeling, molecular dynamics and simulation, sequence analysis, primer designing, structures building and enzyme kinetics etc.

Research publications

Ninety-three research articles published in peer-reviewed journals, 16 Book Chapters and twenty abstracts published at international conferences. Eight manuscripts are submitted, and ten confidential manuscripts are written and planned to be submitted up to end of December 2025 from my M.Phil. and PhD student's research projects.

Professional development

Different training courses for professional development were studied during PhD such as Introduction to Teaching and Learning in Higher Education and Technical writing course for development in pedagogic abilities.

Membership of Professional Societies

Member of Pakistan Society for Microbiology
Member of Pakistan Society for Bacteriophages
Member of International Society for Viruses of Microorganisms
Member of American Society for Microbiology
Member of European Federation of Biotechnology
Lifetime member of Pakistan Biological Safety Association

Research supervision

PhD Produced

1. **Hamid Masood:** Technical Farm Practices in Broiler Farming; Understanding the Relationship Between Antibiotic usage and Development of Superbugs (2025)
2. **Aneela Nawaz:** Molecular Characterization of Bacteriophages and their Lytic Proteins Effective Against Multi-drug Resistant Pathogens (2025)
3. **Anees Fatima:** Genetic Polymorphism of Helicobacter pylori in Gastrointestinal Diseases (2024)
4. **Marium Saba:** Hydrolysis of Chicken Feathers by Microbial Keratinases for Production of Value-added Compounds (2023)
5. **Numan Saleh Zada:** Production and Characterization of Recombinant β-glucosidases and its Application in Modification of Natural Products (2022)
6. **Anum Khan:** Production and Characterisation of Microbial Amylase and Pullulanase for Synthesis of Resistant Starch (2021)

M.Phil Produced

1. **Tanzeela Sajjad:** Exploring bacteriophage therapy: Isolation and comprehensive characterization of bacteriophages against Multi-drug resistant Salmonella strains
2. **Aneeda Iqbal:** Phage Therapy Prospects: Isolation and Characterization of Lytic Bacteriophages Targeting Antibiotic-Resistant *Salmonella* Strains
3. **Dua Noor Baig:** A Comparative Study of Antibiofilm and Antioxidant Potential in *Pleurotus ostreatus* Cultivated in Pakistan and Indonesia
4. **Urooj Fatima:** Characterization and biofilm disruption activity of crude and purified mushroom extracts against Pathogenic Bacteria
5. **Maida Chaoudhary:** Comprehensive Characterization of Lytic Bacteriophage Targeting Mastitis Causing Bacterial Strain
6. **Qurra-Tul-Ain:** Microscopic and Molecular Characterization of Mushroom Species Collected from Azad Jammu and Kashmir, Pakistan
7. **Muhammad Bilawal Haseeb:** Assessing the Effectiveness of Different Antibiotics and their synergy to control *Mycoplasma synoviae* in Commercial Broiler Parent Stock
8. **Iqra Maryam:** Isolation and Physio-morphological profiling of Bacteriophages for effective control of mastitis
9. **Momina Aamir:** Purification and characterization of lytic proteins from the bacteriophages active against Klebsiella pneumoniae and Pseudomonas aeruginosa as a potential alternative to antibiotics
10. **Sidra Zaheer:** Purification and characterization of bacteriophages derived lytic proteins effective against multi drug resistant bacterial strains
11. **Shahzar Khan:** Isolation, Physicochemical and Genomic Analysis of Bacteriophages against Mastitis causing Bacterial Strains
12. **Usama Imtiaz:** Isolation and physiomorphological characterization of lytic bacteriophages for effective mastitis control
13. **Hira Shah:** Profiling antimicrobial resistance genes from avian *Escherichia coli* isolates using whole genome Sequencing
14. **Nida Haider:** Genomic characterization of multi-drug resistant *Escherichia coli* isolated from poultry farms
15. **Muqaddas Shahzadi:** Evaluation of phage-antibiotic synergy against *Klebsiella pneumoniae* and encapsulation of phages to improve their stability under gastronomic conditions
16. **Mahnnor Ismail:** Evaluation of pine oil in combination with colistin against multidrug resistant *Escherichia coli* strains isolated from poultry
17. **Alina Majid:** Synergistic effect of phage-antibiotic combination against Pseudomonas aeruginosa and microencapsulation of bacteriophages to improve their stability in gastronomic conditions
18. **Umme Habiba Saeeda:** Screening of mushrooms collected in Azad Jammu and Kashmir to highlight their immense therapeutic potential
19. **Samreen Amjad:** Evaluation of Antibiotics Resistance Pattern of E. coli Strains Isolated from Broiler Farms
20. **Aliya Batool:** Extraction of Steviol glycosides from stevia leaves and their biotransformation with the aim to improve its taste and other biological activities
21. **Muhammad Siddiq:** Evaluation of Neomycin and Colistin Combined Effect on Multi-Drug Resistant Strains of *E. coli* Isolated from Poultry Farms
22. **Mehmoona Ashfaq:** Isolation and characterization of bacteriophage with lytic activity against multi drug resistant strain of *Klebsiella pneumonia*

23. **Sabeena Zafar:** Isolation and characterization of bacteriophage from hospital waste effective against multi drug resistant *Escherichia coli*
24. **Nauman Ahmed Khalid:** Isolation and characterization of bacteriophages as potential therapeutic agent against *Pseudomonas aeruginosa*
25. **Shahar Bano:** Screening, production, and characterization of β-glucosidase from indigenously isolated bacterial strain
26. **Shereen:** Evaluation of Bioactive metabolites with potential Medicinal properties derived from macrofungi
27. **Mehmoona Sharif:** Exploring Biological Potential of Macrofungi Collected from Azad Jammu and Kashmir, Pakistan
28. **Fatima Tariq:** Production, purification, and characterization of β-glucosidase from bacterial strain isolated from Hot spring of Azad Jammu and Kashmir
29. **Nasir Khan:** Isolation and characterization of lytic bacteriophage against multidrug resistant *E. Coli*
30. **Afshan Altaf:** Evaluation of microbial hydrolyzed chicken feathers protein as an alternative protein source in fish feed
31. **Salma Qasim:** Production and Characterization of β-glucosidase from Bacterial Strain Isolated from soil sample of Jacobabad, Pakistan
32. **Ameet Kumar:** Ethnopharmacological study of bioactive metabolites of macrofungi
33. **Afsheen Akhter:** Production and characterization of chicken feather degrading keratinase from *Pseudomonas aeruginosa* and its potential Application
34. **Zeeshan Gul:** Microbial Treatment of Chicken Feather and its Co-Digestion with Rice Husk for Biogas Production
35. **Kiran Jamshed:** Production and Characterization of β-glucosidase from Newly Isolated Bacterial Strain
36. **Kamal Abdul Amer:** Production and Characterization of Antimicrobial Compounds by Bacterial Strain Isolated from soil sample of Karachi coastline
37. **Amna Bibi:** Synthesis and Characterization of Enzymatically Produced Resistant starch coated Drug Microspheres and their Antimicrobial Potential
38. **Huma Ali:** Assessing Prebiotic Effects of Resistant Starch on Modulating Gut Microbiota with an in Vivo Animal Model
39. **Haseena Nazneen**: Extraction and Characterization of Bioactive Compounds from Marine Bacteria
40. **Muhammad Arif:** Prevalence and Diagnosis of Cutaneous Leishmaniasis among the Suspected Individuals of Bajaur Agency
41. **Waqas Ali Khan:** Screening, production and optimization of β-glucosidase from thermophilic bacterial strain
42. **Samiya Sidiqqui:** Invitro Digestibility and physicochemical properties of enzymatically produced Resistant Starch from Maize
43. **Zahra Jabeen:** Production and optimization of phytase by fungal strain isolated from Eutrophication site
44. **Ubaid Ur Rehman**: Enzymatic production and characterization of resistant starch from maize
45. **Aneela Nawaz:** Antimicrobial potential of newly isolated bacteria from terrestrial environment
46. **Yousaf Amin Khan:** Histopathological Grades Analysis among Helicobacter pylori Infected Gastric Diseases Patients
47. **Iram Saeed:** Optimization of culture conditions for enhanced production of cellulase from newly isolated bacteria
48. **Saba Sabir Malik:** Production and characterization of phytase from fungal strain isolated from eutrophication site
49. **Yamna Ali:** Optimization and Production of pectinase from *Bacillus licheniformis*-C1
50. **Samra Noureen:** Immobilization of phytase produced by fungus isolated from eutrophication site
51. **Tauqir Zia:** Production of bioactive compounds from marine bacteria and characterization of its crude extract
52. **Asim Ur Rahman:** Extraction of bioactive compounds from newly isolated marine bacteria
53. **Ayesha Akhter:** Production and Characterization of amylase from Thermophilic Bacillus licheniformis using various Organic Substrates
54. **Numan Saleh Zada:** Prevalence and detection of Metallo β -Lactamase Producing *Pseudomonas aeruginosa* among the Clinical isolates of a tertiary care hospital in Peshawar
55. **Marium Saba:** Isolation and Screening for phytate hydrolysing bacteria and optimization of culture conditions for enhanced production of phytase
56. **Uzma Khan:** Isolation and screening of endophytic bacteria isolated from medicinal plants for production of bioactive metabolites
57. **Imran Khan:** Isolation of bacteria from desert soil with antimicrobial potential against bacterial pathogens
58. **Anar Kalli:** Screening for agarolytic bacteria and optimization of culture conditions for enhanced production of agarose
59. **Salma Jahan:** Evaluation of antimicrobial potential of bacteria isolated from soil sample of Karachi coastline
60. **Syeda Besma Sabir:** Isolation and Production of antimicrobial compounds by indigenous fungal strains

61. **Rubina Nawab:** Production and Characterization of Antimicrobial Produced by Bacteria Isolated from Soil of Swabi Forest, Khyber Pukhtunkhwa
62. **Atrooba Saleemi:** Production and Evaluation of Bioactive Metabolites from Newly Isolated Marine Bacteria
63. **Faiz-ur-Rahman:** Production and Characterization of Antimicrobial Compounds Produced by Bacteria Isolated from Marine Soil.
64. **Raazia Siddiq:** Immobilization of phytase produced by Bacillus licheniformis.
65. **Nosheen Rabia:** Prevalence and antimicrobial susceptibility pattern of bacterial isolates from patients with otitis media
66. **Anum Khan:** Production and Characterization of Pullulanase from Thermophilic Bacillus licheniformis using various Organic Substrates
67. **Kalsoom Bano:** Production of amylase from thermophilic Reinheimera sp. TS5
68. **Majid Aijaz:** Evaluation of biological activities of selected plants collected from khanewal district
69. **Saira Yaqub:** Synthesis and biological potential of chalcones and their derivatives
70. **Zainab Khattak:** Microbial and chemical analysis of illicit drug samples from different areas of Pakistan
71. **Furkhanda Kalsoon:** Characterization of amylase producing salt tolerant thermophilic bacteria
72. Co-supervised one Bachelor and two Master students
73. Co-supervised one special project student

BS Students Supervised: 20

BS, M.Phil and PhD under Supervision
B.S: 8
M.Phil: 7
PhD: 5

Awards

- Grant for PhD Studies from Higher Education Commission of Pakistan
- Talent scholarship award from Worker Welfare Board Khyber Pakhtunkhwa, Pakistan
- Fellowship for postdoc from Lund University, Sweden
- Traveling grants from Chinese Academy of Sciences, Pakistan Academy of Sciences, HEC and PSF many times for attending International Conferences
- Travel Grant from International Science and Technology Centre for participation in Biosafety and Biosecurity conference

Management Experience

- Member of Board of Academic Council, QAU
- Member of Board of Studies, Faculty of Biological Sciences, QAU
- Member of Academic Council, QAU
- Course Coordinator, Department of Microbiology, QAU
- Member of BS Microbiology, MSc, M.Phil and PhD Admission Committee
- Student advisor at Department of Microbiology, QAU
- Data collection and preparation of Department annual report
- Data collection for the upgradation of University prospectus for Department of Microbiology
- In charge of Library matters at Department of Microbiology, QAU
- Coordinator for M.Phil and PhD Vivas
- Managing common facilities laboratory at Department of Microbiology, QAU
- Organizer for different activities at Department of Microbiology, QAU
- Responsible for different tasks within the Department e.g. presentations, chemical ordering, planning projects for master and PhD students
- Member of Board of Studies Department of Zoology, Kohat University of Science and Technology
- Member of Board of Departmental Tenured Committee of Microbiology, Abdul Wali Khan University Mardan
- Member of Board of Studies Department of Biotechnology, University of Science and Technology Bannu
- Member of Board of Studies Department of Microbiology, Abdul Wali Khan University Mardan
- Member of BS Microbiology, evaluation Committee at Haripur University

- Member of M.Phil Microbiology test preparation committee at Haripur University
- Member of PhD Evaluation Committee University of Malakand

References

1	Dr. Eva Nordberg Karlsson	Professor Department of Biotechnology, Lund University, Sweden	Email: Eva.Nordberg_Karlsson@biotek.lu.se Telephone# +46-46-2224626
2	Dr. Charlotta Turner	Professor Department of Microbiology, Quaid-i-Azam University, Islamabad, Pakistan	Email: Farihahasan@yahoo.com Telephone#+92519063065
3	Dr. Aamer Ali Shah	Professor Chairman Department of Microbiology, Quaid-i-Azam University, Islamabad, Pakistan	Email: alishah@qau.edu.pk Telephone# +92519063116

Publications

1 Nawaz A, Khalid NA, Zaheer S, Khan MI, Khalid A, Shah AA, Badshah M and **Khan S.** Isolation and Characterization of a Potent Bacteriophage KA Targeting an Antibiotic-Resistant Human Pathogenic Strain of *Klebsiella pneumoniae* KP1. Microbail Pathogenesis 2025 Article No. YMPAT_108150. https://doi.org/10.1016/j.micpath.2025.108150. **(I.F 3.5)**

2 Masood H, Duarte A. S. R., Akbar A, Abbas S. H, Badshah M,. Shah AA and **Khan S**. The assessment of antibiotics usage and disease trends in commercial broiler farms of Potohar region in Pakistan: Implications for food safety. Animal and Plant Sciences 2025. 35(6) (2025). 605 **(I.F 0.60)**

3 Nawaz A, Khalid NA, Majid A, Shahzadi M, Zafar S, Khan MI, Khan S, Khalid A, Shah AA, Badshah M and **Khan S.** Characterization of bacteriophages PAA and PAM and evaluation of their antibiotic synergy against *Pseudomonas aeruginosa* PAZMYU isolated from urine sample. BMC Microbiology 2025, Article No. 605. https://doi.org/10.1186/s12866-025-04195-x. **(I.F 4.2)**

4 Khan S, Ilyas N, Nawaz A, Khan MI, Aamir M, Khalid N.A, Shah AA, Zada NS, Shabbir G, Badshah M and **Khan S.** Bacteriophage-based Vaccination Platform for Antigen Discovery and Development of Next-Generation Vaccines. Next Research 2025, Article No. 100776 https://doi.org/10.1016/j.nexres.2025.100776 .

5 Khan A.Z, Din Ud S, Sharif M, Hasan F, Khan S, Badshah M, Belduz A.O and Shah AA .Isolation and Characterization of Aspergillus niger AZ2 from Pulp and Paper Mill Effluent that Degrade Lignin under Alkaline Conditions. Current Microbiology. 2025, 82(6): article No 421. https://doi.org/10.1007/s00284-025-04413-9. **(I.F 2.4)**

6 Alam T, Din Ud S, Abdullah M, Ali M, Badshah M, Farman M, **Khan S**, Hasan F and Shah A.A. Bioactive Metabolites from Radioresistant Bacterium *Kocuria* sp. TMM 11 and Their Role in Prevention of Ultraviolet-Induced Photodamages. Current Microbiology. 2025, 82(6): article No 243. DOI10.1007/s00284-025-04194-1. **(I.F 2.4)**

7 Din Ud S, Israr A, Jabeen S, Rana Q, Din Ud S, Kun Z, **Khan S**, Hasan F, Badshah M, Zhou Y.J, and Shah A.A. Production of Free Fatty Acids from Alkaline Organosolvent Pretreated Sugarcane Bagasse and Trash by Yeast Pichia pastoris. Journal of Waste and Biomass Valorization, 2025. https://doi.org/10.1007/s12649-025-02963-4. **(I.F 2.6)**

8 Din Ud S, Alam T, **Khan S**, Hasan F, Badshah M, and Shah A.A. Bioactive metabolites from radioresistant bacterium Kocuria sp. TMM 11 and their role in prevention of Ultraviolet-induced photodamages. Journal of Current Microbiology, 2025. **82**:243 (2025). https://doi.org/10.1007/s00284-025-04194-1 **(I.F 2.3)**

9 Zada NS, Belduz A.O, Aleesa H.A, Guler HI, Karaoğlan M, Badshah M, Shah AA, Kalsoom A and **Khan S** Comparison of active site mutations at subsite +2 of Anoxybacillus ayderensis A9 β-glucosidase for hydrolysis of pNPG and polydatin. BMC Biotechnology, 2025, **25**:52 (2025). https://doi.org/10.1186/s12896-025-00984-4 **(IF: 3.2).**

10 Saba M, Farooq S, Aleesa H.A, Bektas K.I, Belduz A.O, Khan A.Z, Shah AA, Badshah M and **Khan S**. Green synthesis of silver nanoparticles using Keratinase from Pseudomonas aeruginosa-C1M, characterization and applications as novel multifunctional biocatalyst. BMC Biotechnology, 2025, 25:27. https://doi.org/10.1186/s12896-025-00959-5 **(IF: 3.2).**

11 Mansoor A, Mansoor E, Hussain K and **Khan S**. Clinical efficacy of novel biogenically fabricated titania nanoparticles enriched mouth wash in treating the tooth dentine hypersensitivity: A randomized clinical trial. Pakistan Journal of Medical Sciences, 2025, 41(6):1743-1748**. (IF: 1.7).**

12 Kalsoom, Din Ud S, Ceylan E, Hasan F, Khan S, Çanakçi S, Belduz A.O and Shah AA. Cloning and expression of chromate reductase from Bacillus paramycoides S48 for chromium remediation. Scientific Report, 2025, **15**: 18796 (2025). https://doi.org/10.1038/s41598-025-03412-x **(IF: 3.8).**

10. Shoukat M, Rehman A, Khan A, Ali I, Nazish M, Abashr F.T, Alrefaei A.F, Khan S, Shah A.A and Badshah M. Enhancement of Biogas Production through Phase Separated Anaerobic Co-Digestion of Cattle Manure with Fruit and Vegetable Waste. Polish Journal of Environmental Studies, 2025. DOI: https://doi.org/10.15244/pjoes/201937 **(IF: 1.4).**

14 Khan M.A.N, Mishqat A, Bukhari S.M.A.U.S, Haq A, Ali M, **Khan S**, Shah A.A, Ali N, Ahmed S and Badshah M. Effect of different Parameters on Biogas Production during Next Generation Digestion, Anaerobic Digestion Coupled with Microbial Electrolysis Cell. Renewable Energy.2025, 243:122620. https://doi.org/10.1016/j.renene.2025.122620 **(IF: 9.0)**

15 Mansoor A, Mansoor E, Mansoor E, Shah A, Asjid U · João Filipe Brochado Martins J.F.B, **Khan S** and Palma P.J. Synthesis of Novel Titania Nanoparticles using Corn Silky Hair Fibres and their role in developing a Smart Restorative Material in Dentistry. Computational and Structural Biotechnology Journal. 2025, 29: 29-40. **(I. F 4.5).**

16 Abbas S.H, Khan S, Shah M, Aslam J, Nawaz H, Ilyas N, Gamaryani A, Afridi S.Q, Khan I, Shah B, Shah K, Rashid A, Khan D and Khan S. Public Health Threats Posed by Biofilms and Innovative Strategies for their Control. Discovery Journal. 2024, Article number 12(3); e197

17 Nawaz A, Zafar S, Alessa AH, Khalid NA, Muqaddas S, Majid A, Badshah M, Shah AA, and **Khan S**. Characterization of ES10 lytic bacteriophage isolated from hospital waste against multidrug-resistant uropathogenic *E. coli*. Frontiers Microbiology. DOI 10.3389/fmicb.2024.1320974 **(I.F 5.2).**

18 Khan A, Mehmood K, Nadhman A, **Khan S**, Shah AA and Shah Z. Microbial Production of Keratinase from *Bacillus velezensis* strain MAMA: A Novel Enzyme for Eco-Friendly Degradation of Keratin Waste. Heliyon. 2024, 10(12), e32338. https://doi.org/10.1016/j.heliyon.2024.e32338. **(I.F 4.0)**

19 Ali Q, Zainab R, Badshah M, Sarwar W, **Khan S**, Mustafa G, Ibrahim T and Ahmed S. Prospecting the biodegradation of ciprofloxacin by *Stutzerimonas stutzeri* R2 and *Exiguobacterium indicum* strain R4 isolated from pharmaceutical wastewater. H_2 Open Journal. (2024), 7(2), 149-162. **(I.F 2.1)**

20 Sharif M, Nawaz A, Naeem S, Saeeda UH, Farid A, Saleh Zada N, Shah AA, Badshah M, Alharbi MT, Tarabulsi MK, Selim S and **Khan S**. Pharmaceutical and Nutraceutical Importance of Bioactive Metabolites from Macrofungi. Journal of Biological Regulators and Homeostatic Agents. (2024) 38(5), Article No.8019 **(I.F 3.2).**

21 Nawaz A, Khalid NA, Zafar S, Majid A, Muqaddas S, Saleem S, Shah AA, Badshah M and **Khan S**. Phage therapy as a revolutionary treatment for multidrug-resistant Pseudomonas aeruginosa infections: A narrative review. The Microbes. 2 (2024): 100030. https://doi.org/10.1016/j.microb.2023.100030

22 Fatima A, Ibrahim M, Naseer A, Pervez A, Asad M, Shah AA, Hasan F, Alonazi W.B, Ferheen I and **Khan S**. Identification, Genome Sequencing, and Characterizations of *Helicobacter pylori* Sourced from Pakistan. Microorganisms. 2023, 11, 2658. https://doi.org/10.3390/microorganisms11112658 **(I.F 4.926)**

23 Nawaz A, Zafar S, Muqaddas S, Bukhari S.M.A.S, Khan NA, Shah AA, Badshah M and **Khan S**. Bacteriophages: an overview of the control strategies against phytopathogens. Egyptian Journal of Biological Pest Control. 2023, 33 Article number: 108 (2023). **(I.F 2.3)**

24 Siddiqui S, Khan A, A, Rahman U, Shah AA, Badshah M, Rehman MM, Hayat A and **Khan S**. Understanding the Inhibitory Mechanism of Exogenous Protein on Enzymatic Preparation of Resistant Starch. Starch, 2023, Article number 2200264. DOI: 10.1002/star.202200264. **(I.F 2.741)**

25 Haq A, Malik A, Khan A, Weaver E. J, Wang L, Khan H, **Khan S**, Shah AA, Ahmed S, Jamal A, De Los Reyes F. L and Badshah M. Effect of removal of inhibitors on microbial communities and biogas yield of Jatropha curcas seeds during continuous anaerobic digestion. Journal of Cleaner Production. October 2023, 426(5):139154 **(I.F 11.1)**

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Submitted Manuscripts

1 **Khan S**, Shakil SMS, Wennerberg C, Mamo G and Nordberg Karlsson E. Increased production of the active soluble form of the thermostable β-glucosidase *Tn*Bgl1A using chaperonin co-expression in *Escherichia coli* (Submitted to Journal of Protein expression and purification)

Abstract and posters at international conferences

1 Saleh Zada N, Rahman U, Belduz A.O, Badshah M, Shah AA and **Khan S**. Designing Next-Generation β-Glucosidases for Sustainable Biofuels, Food and Pharma. 2nd International Conference on the Future of Biotechnology & Bioengineering (ICFBB-2025) organized by Department of Biotechnology, Kohat University of Science and Technology (KUST), June 18-19, 2025, Kohat, Pakistan. **(Invited Speaker)**

2 Sharif M, Naeem S, Saeeda U.H, Altaf A, Imtiaz U and Khan S. Collection and characterization of metabolites of mushrooms from Azad Jammu and Kashmir, Pakistan. International Scientific and Technical Conference: Actual Problems of the Chemistry of Natural Products, organized by Academy of Sciences of the Republic of Uzbekistan, S.Yu.Yunusov Institute of the Chemistry of Plant Substances, September 19-20, 2024, Tashkent, Uzbekistan. **(Invited Speaker)**

3 Khan S, Sharif M, Saeeda U.H and Nawaz A. Bioactivity assessment and metabolic profiling of Phellinus gilvus. A pathway to novel therapeutics. International Conference on Medical Plants and Natural Drug Research (ICMPNDR-2024), Al Farabi Kazakh National University, June 5-7, Almaty, Kazakhstan. **(Invited Speaker)**

4 Khan S, Nawaz A, Khalid N.A, Shahzadi M, Badshah M, Shah A.A. Characterization of ES10 lytic bacteriophage isolated from hospital waste against multidrug-resistant uropathogenic *E. coli.* ASM Microbe 2024 meeting, June 13–17, 2024, Atlanta, Georgia, USA.

5 Sharif M, Fatima U, Ejaz M and Khan S. Characterization and Biological Potential of Ganoderma gibbosum collected from AJ&K, Pakistan. International Conference on Medical Plants and Natural Drug Research (ICMPNDR-2024), Al Farabi Kazakh National University, June 5-7, Almaty, Kazakhstan

6 Saleh Zada N, Belduz A.O, Güler H.I, and Khan S. Cloning, functional expression and characterization of active site mutants of β-glucosidse from Anoxybacillus ayderensis A9 for hydrolysis of pNPG and polydatin. International Conference and Exhibition for Science (ICES2023), February 06-08, 2023, at *King Saud University, Riyadh, Saudi Arabia*.

7 Siddiqui S, Khan A, Rahman U and Khan S. *In vitro* digestibility and physicochemical properties of Enzymatically Produced Resistant Starch from Maize. 12th International Biennial Conference Pakistan Society of

Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology February 20-22, 2019, Abbottabad, Pakistan.

8 Bibi A, Khan A, Rahman U and Khan S. Synthesis and Characterization of Enzymatically Produced Resistant Starch Coated Drug Microspheres and their Antimicrobial Potential. 12th International Biennial Conference Pakistan Society of Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology February 20-22, 2019, Abbottabad, Pakistan.

9 Alam T, Sajjad W, Hasan F, Khan S and Ali Shah A. Evaluation of Antioxidant Potentials of Intracellular Bioactive Metabolites of UV Resistant *Streptomyces c hilikenes* TMM1 Isolated from Thal Desert, Pakistan. 12th International Biennial Conference Pakistan Society of Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology February 20-22, 2019, Abbottabad, Pakistan.

10 Salahuddin A, Javeria K, Irfan M, Hasan F, Khan S and Ali Shah A. Immobilization of Partially Purified β-1-4 - Xylanase Isolated from Thermomyces lanuginosus Evaluation of Antioxidant Potentials of Intracellular Bioactive Metabolites of UV Resistant *Streptomyces Chilikenes* TMM1 Isolated from Thal Desert, Pakistan. 12th International Biennial Conference Pakistan Society of Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology February 20-22, 2019, Abbottabad, Pakistan.

11 Khan A, Bano K, F Kalsoom F, Hasan F, Ali Shah A and Khan S. Rheinheimera TS-5 isolated as a potential producer of polyextremophilic α-amylase. 10th Biennial Conference of Pakistan Society of Microbiology at Department of Microbiology and Molecular Genetics, University of the Punjab Lahore, 25-28 March 2016

12 Turner C, Börjesson P, Co M, Ekman A, Khan S, Samuelsson J, Lindahl S, Mijangos Trevino L, Mustafa A and Nordberg Karlsson E. Water, ethanol and supercritical carbon dioxide – are these solvents really green? Gordon Green Chemistry Conference, Lucca, Italy, 2012.

13 Lindahl S, Liu J, Khan S, Nordberg Karlsson E and Turner C. On-line extraction and hydrolysis of polyphnolic glucosides, 2nd International Symposium on Hyphenated Techniques for Sample Preparation, Bruges, Belgium, 2012.

14 Khan S, Mahmood Tahir, Lindahl S, Turner C and Nordberg Karlsson E. Mutagenesis of substrate interacting residues in the active site of *Tn*Bgl1A for improved deglycosylation of antioxidants. 16th European Carbohydrate Symposium, Naples, Italy, July 2011.

15 Khan S, Lindahl S, Turner C and Nordberg Karlsson E. Immobilization of thermostable β-glucosidases (*Tn*Bgl1A) for modification of antioxidants at high temperature. CBM9, Lisbon, Portugal, May 2011.

16 Nordberg Karlsson E, Khan S, Pozzo T, Mahmood T and Gulshan K.Z. Mutagenesis of substrate interacting residues in the active site of *Tn*Bgl1A for modification of flavonoid antioxidants. CBM9, Lisbon, Portugal, May 2011.

17 Khan S, Lindahl S, Turner C and Nordberg Karlsson E. Immobilization of thermostable β-glucosidases (*Tn*BglA) for modification of antioxidants using hot water. Thermophiles_2009, Beijing, China, August 2009.

18 Khan S, Lindahl S, Turner C and Nordberg Karlsson E. Modification of Glycosylated Antioxidants by the Thermostable Glucosidase Bgl1A. CBM8, Ischia, Italy, May 2009.

19 Nordberg Karlsson E, Pozzo T, Khan S, Paul C.J., Svensson D, Lindhal S, Logan D, Turner C and Adlercreutz P. Specificity development of β-glucosidases from *Thermotoga neapolitana*. CBM8, Ischia, Italy, May 2009.

20 Pozzo T, Khan S, Logan D, Nordberg Karlsson E. Structural insights for use of thermostable glucosidases as biocatalysts in environmentally sustainable applications. Extremophiles 2008, Cape town, South Africa.

21 Khan S, Hameed A, Ahmed S and Hasan F. Production of antibiotics by *Bacillus pumilus* immobilized in polyacrylamide. SIBC of Pakistan Society for Microbiology 2007, Islamabad, Pakistan.

Conferences

1 **Khan S**. Collection and characterization of metabolites of mushrooms from Azad Jammu and Kashmir, Pakistan. International Scientific and Technical Conference: Actual Problems of the Chemistry of Natural Products, organized by Academy of Sciences of the Republic of Uzbekistan, S.Yu.Yunusov Institute of the Chemistry of Plant Substances, September 19-20, 2024, Tashkent, Uzbekistan. (Plenary Presentations)

2 **Khan S,** Nawaz A, Khalid N.A, Shahzadi M, Badshah M, Shah A.A. Characterization of ES10 lytic bacteriophage isolated from hospital waste against multidrug-resistant uropathogenic *E. coli.* ASM Microbe 2024 meeting, June 13–17, 2024, Atlanta, Georgia, USA. (Poster Presentation)

3 **Khan S**, Sharif M, Saeeda U.H and Nawaz A. Bioactivity assessment and metabolic profiling of *Phellinus gilvus*. A pathway to novel therapeutics. International Conference on Medical Plants and Natural Drug Research (ICMPNDR-2024), Al Farabi Kazakh National University, June 5-7, Almaty, Kazakhstan. (Oral Presentation)

4 Sharif M, Fatima U, Ejaz M and **Khan S**. Characterization and Biological Potential of Ganoderma gibbosum collected from AJ&K, Pakistan. International Conference on Medical Plants and Natural Drug Research (ICMPNDR-2024), Al Farabi Kazakh National University, June 5-7, Almaty, Kazakhstan. (Oral Presentation).

5 **Khan S.** International Forum on Innovative Development of Biomanufacturing. 9-11 November 2023, Crown Plaza, Tianjin, China, Organized by Tianjin Institute of Industrial Biotechnology (TIB) and Chinese Academy of Sciences (CAS), Tianjin, China. (Participated Only)

6 Saleh Zada N, Belduz A.O, Güler H.I, and **Khan S**. Cloning, functional expression and characterization of active site mutants of β-glucosidse from Anoxybacillus ayderensis A9 for hydrolysis of pNPG and polydatin. International Conference and Exhibition for Science (ICES2023), February 06-08, 2023, King Saud University, Riyadh, Saudi Arabia. (Oral Presentation)

7 **Khan S**. Biosafety Association of Central Asia and the Caucasus Conference: COVID19 - Lessons Learned 3 - 7 October 2022, Tbilisi, Georgia. Organized by Biosafety Association of Central Asia and the Caucasus in collaboration with EU CBRN Centres of Excellence Initiative, US Department of State Biosecurity Engagement Program and National Center for Disease Control and Public Health. (Participated Only)

8 **Khan S.** Metabolic Engineering Summit (MES 2019) 20-22 October 2019. Organized by International Metabolic Engineering Society (IMES) Tianjin Institute of Industrial Biotechnology, CAS. (Participated Only)

9 Khan A, Rahman U, Siddiqui S, Bibi A, Badshah M, Belduz A.O and **Khan S**. Green Synthesis of Resistant Starch type III from Maize flour and its application as drug carrier to colon. Eurasian Congress on Molecular Biotechnology at Karadeniz Technical University, 19-21 September 2019 Trabzon Turkey. (Oral Presentation)

10 Marium S, Farooq S, Belduz A.O, Badshah M, Shah AA and **Khan S**. Exploitation of keratinase potential for the green Synthesis of silver nanoparticles. Molecular Biotechnology at Karadeniz Technical University, S 19-21 eptember, 2019 Trabzon Turkey. (Oral Presentation)

11 Salehzada N, Hameed F, Bari F and **Khan S**. Phenotypic detection of Mettalo-β-Lactamase (MBL) in Imipenem Resistant Pseudomonas aeruginosa, a study from a tertiary care hospital in Peshawar.Molecular Biotechnology at Karadeniz Technical University, 19-21 September 2019 Trabzon Turkey. (Oral Presentation)

12 Khan S.I, Zarin A, Belduz A.O, Canakci S, Ahmed S, Hasan F, **Khan S** and Shah AA. Phenotypic detection of Mettalo-β-Lactamase (MBL) in Imipenem Resistant Pseudomonas aeruginosa, a study from a tertiary care hospital in Peshawar. Molecular Biotechnology at Karadeniz Technical University, 19-21, September 2019 Trabzon Turkey. (Oral Presentation)

13 Siddiqui S, Khan A, Rahman U and **Khan S**. In vitro digestibility and Physicochemical properties of Enzymatically Produced Resistant Starch from Maize. 12th International Biennial Conference Pakistan Society of Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology 20-22 February 2019 Abbottabad, Pakistan. (Oral Presentation)

14 Bibi A, Khan A, Rahman U and **Khan S**. Synthesis and Characterization of Enzymatically Produced Resistant Starch Coated Drug Microspheres and their Antimicrobial Potential. 12th International Biennial Conference

Pakistan Society of Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology 20-22 February 2019 Abbottabad, Pakistan. (Oral Presentation)

15 Ali H, Bibi A, Khan A, Badshah M, Shah AA and **Khan S**. Prebiotic potential of enzymatically prepared resistant starch type III and its effect on controlling metabolic dysfunction on rate physiology. International Pharmacy Conference and Exhibition (IPCE) on "Emerging Trends in Drug Development, Therapeutics and Commercialization" at Department of Pharmacy, University of Swabi, 18-20 June 2019, Swabi, KPK, Pakistan. (Oral Presentation)

16 Alam T, Sajjad W, Hasan F, **Khan S** and Ali Shah A. Evaluation of Antioxidant Potentials of Intracellular Bioactive Metabolites of UV Resistant *Streptomyces chilikenes* TMM1 Isolated from Thal Desert, Pakistan. 12th International Biennial Conference Pakistan Society of Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology 20-22 February 2019 Abbottabad, Pakistan. (Poster Presented)

17 Salahuddin A, Javeria K, Irfan M, Hasan F, **Khan S** and Ali Shah A. Immobilization of Partially Purified β-1-4-Xylanase Isolated from *Thermomyces lanuginosus*. 12th International Biennial Conference Pakistan Society of Microbiology on Next Generation of Microbial Therapeutics at Abbottabad University of Science and Technology 20-22 February 2019 Abbottabad, Pakistan. (Poster Presented)

18 **Khan S**. Development of microbial enzymes for modification of polyphenolic glucosides. 2018 Synthetic Biotechnology Training Course for Developing Countries, jointly 1st TWAS Symposium on Plant Natural Product Synthesis by Microbes held on 15-19 January 2018, in Beijing, China. (Oral Presentation)

19 Khan A, Bano K, F Kalsoom, Hasan F, Shah A A and **Khan S**. *Rheinheimera* TS-5 isolated as a potential producer of polyextremophilic α-amylase. 10th Biennial Conference of Pakistan Society of Microbiology, 25-28 March 2016, at Department of Microbiology and Molecular Genetics, University of the Punjab Lahore. (Poster Presented)

20 Haq A, Badshah M and **Khan S**. Comparison of antimicrobial activities of different parts of geographically two different species of *Jatropha curcus* Linn fruit. 1st international conference on recent innovations in pharmaceutical sciences (ICRIPS-2015), 3-5 March, 2015, Pakistan. (Poster presented).

21 Turner C, Börjesson P, M.Co, Ekman A, **Khan S**, Samuelsson J, Lindahl S, Mijangos Trevino L, Mustafa A and Karlsson E.N. Water, ethanol and supercritical carbon dioxide – are these solvents really green? Gordon Green Chemistry Conference, 22-27 July 2012, Lucca, Italy. (Poster Presented)

22 Lindahl S, Liu J, **Khan S**, Karlsson E.N and Turner C. On-line extraction and hydrolysis of polyphnolic glucosides. 2nd International Symposium on Hyphenated Techniques for Sample Preparation. January 31-February 1, 2012, Bruges, Belgium. (Poster Presented)

23 **Khan S**, Mahmood Tahir, Lindahl S, Turner C and Nordberg Karlsson E. Mutagenesis of substrate interacting residues in the active site of *Tn*Bgl1A for improved deglycosylation of antioxidants. 16th European Carbohydrate Symposium 3-7 July 2011, Naples, Italy. (Poster Presented)

24 **Khan S**, Lindahl S, Turner C and Karlsson E.N. Immobilization of thermostable β-glucosidases (*Tn*Bgl1A) for modification of antioxidants at high temperature. 9th Carbohydrate Bioengineering Meeting 15-18 May 2011, Lisbon, Portugal. (Poster Presented)

25 Karlsson E.N, **Khan S**, Pozzo T, Mahmood T and Gulshan K.Z. Mutagenesis of substrate interacting residues in the active site of *Tn*Bgl1A for modification of flavonoid antioxidants. 9th Carbohydrate Bioengineering Meeting, 15-18 May 2011, Lisbon, Portugal. (Poster Presented)

26 **Khan S**, Lindahl S, Turner C and Karlsson E.N. Immobilization of thermostable β-glucosidases *Tn*BglA for modification of antioxidants using hot water. Thermophiles 16-21 August 2009, Beijing, China. (Poster Presented)

27 **Khan S**, Lindahl S, Turner C and Karlsson E.N. Modification of Glycosylated Antioxidants by the Thermostable Glucosidase *Tn*Bgl1A. 8th Carbohydrate Bioengineering Meeting, 10-13 May 2009, Ischia, Italy. (Poster Presented)

28 Karlsson E.N, Pozzo T, **Khan S**, Paul C.J, Svensson D, Lindhal S, Logan T.D, Turner C and Adlercreutz P. Specificity development of β-glucosidases from *Thermotoga neapolitana*. 8th Carbohydrate Bioengineering Meeting, 10-13 May 2009, Ischia, Italy. (Poster Presented)

29 Pozzo T, **Khan S**, Logan T.D, Karlsson E.N. Structural insights for use of thermostable glucosidases as biocatalysts in environmentally sustainable applications. Extremophiles, 7-11 September 2008, Cape Town, South Africa. (Poster Presented)

30 **Khan S**. Development of a sustainable method for modification of polyphenolic glucosides. 2nd Annaual conference on Advances in Biotechnology. 12-13 March 2012, Thailand (Bangkok).(Oral presentation).

31 **Khan S**, Hameed A, Ahmed S and Hasan F. Production of antibiotics by *Bacillus pumilus* immobilized in polyacrylamide. Sixth International Biennial Conference of Pakistan Society for Microbiology, 18-21 March 2007, Islamabad, Pakistan. (Poster Presented)

Courses and Workshops/Trainings

1 Fourth International Training Course on Industrial Synthetic Biotechnology (ITC-ISB) November 1-17, 2023. Organized by Tianjin Institute of Industrial Biotechnology (TIB) and Chinese Academy of Sciences (CAS), Tianjin, China.

2 Training course on "Effective Grant Proposal Writing" during Biosafety Association of Central Asia and the Caucasus Conference: COVID19 - Lessons Learned 3 -7 October 2022, Tbilisi, Georgia. Organized by Biosafety Association of Central Asia and the Caucasus in collaboration with EU CBRN Centres of Excellence Initiative, US Department of State Biosecurity Engagement Program and National Center for Disease Control and Public Health.

3 Training course on "Sampling and Recovery Strategy from Biological Contaminated Environments" during Biosafety Association of Central Asia and the Caucasus Conference: COVID19 - Lessons Learned 3 -7 October 2022, Tbilisi, Georgia. Organized by Biosafety Association of Central Asia and the Caucasus in collaboration with EU CBRN Centres of Excellence Initiative, US Department of State Biosecurity Engagement Program and National Center for Disease Control and Public Health.

4 Training workshop organized by European Union Chemical, Biological, Radiological, Nuclear Risk Mitigation, Centres of Excellence (EU CBRN CoE) November 9-11, 2021 "Sustainable management of hazardous chemical and biological waste in Central Asia: open questions, current trends and future opportunities" Partnered by NIH, Pakistan Online.

5 International Training Course on Industrial Synthetic Biotechnology (ITC-ISB) October 14- November 2, 2019. Organized by Tianjin Institute of Industrial Biotechnology (TIB) and Chinese Academy of Sciences (CAS), Tianjin, China.

6 2018 Synthetic Biotechnology Training Course for Developing Countries, jointly 1st TWAS Symposium on Plant Natural Product Synthesis by Microbes held on 15-19 January 2018, Beijing, China.

7 Training workshop on "Infectious Substances Shippers Training (ISST)" 18-19 October 2017 organized by World Health Organization, Best Western Hotel, Islamabad, Pakistan.

8 Workshop on "Inculating tolerance, critical thinking, questioning preconceived notions and narratives, and embedding the national discourse in constitutionalism and the rule of law" 1-4 June 2016, Centre for Research & Security Studies and PACE, Hill View Hotel Islamabad.

9 Workshop on "Biosynthesis of Prebiotics and Antimicrobials" 05-07 April 2016 at NIBGE, Faisalabad,

Pakistan. Organizer/Invited Faculty for training session.

10 Workshop on "Enzyme Engineering: An efficient tool to improve properties of Industrial Biocatalysts". 02-04 November 2015 at NIBGE, Faisalabad, Pakistan.

11 American Society for Microbiology (ASM) mentorship training workshop jointly organized by ASM and Department of Pathology and Microbiology Aga Khan University Karachi 13-24 January 2014, Karachi, Pakistan.

12 2013 Food Biotechnology Training Course for Developing Countries organized by CAS-TWAS Centre of Excellence for Biotechnology at the Institute of Microbiology, Chinese Academy of Sciences, 29 November-4th December 2013, Beijing China.

13 Workshop on "Emerging Superbugs- Standardizing Microbial Susceptibility Testing, Surveillance and Lab Biosafety Hands on. 25-27 February 2013, Aga Khan University, Karachi.

14 NordForsk Advanced Lecture Course for PhD students, post docs and young Scientists (Microorganisms and Health) June 2008, The Norwegian University of Life Sciences, Ås. Norway. (Poster Presented)

15 Modification of Glycosylated Antioxidants by the Thermostable Glucosidase *Tn*Bgl1A. Summer School, 27-31 July 2009, University of Nottingham U.K

16 Innovation and intellectual property rights in biotechnology. January 28-31, 2008, Aarhus University, Denmark.

17 National workshop on Biosecurity and Biosafety Organized by UN Department of State. June 2007. Marriot Hotel Islamabad, Pakistan.

18 A workshop on Biofermenters given by Swiss Bioengineering Company. March 2007, Department of Microbiology Quaid-i-Azam University, Islamabad, Pakistan.

19 International Workshop of Pharmacy. May 2004, Faculty of Pharmacy, Gomal University D.I. Khan, Pakistan.