

ZAFAR IQBAL

PhD (Biotechnology – Specialization in Plant Molecular Virology)

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PERSONAL

Gender: Male
Nationality: Pakistan
Marital status: Married
Memberships: Member of Biochemical society, Dept. of biochemistry, UAF, Pakistan.
SESCOB (Scientific & Educational Society of Biochemists), UAF, Pakistan.
Present Address (office): Dept. of Plant Pathology, Fifield Hall, P.O 110680, University of Florida, Gainesville, FL 32611-0680, USA

EDUCATION

Ph.D (Biotechnology) 2008-2013 Pakistan Institute of Engineering and Applied Sciences, Islamabad. NIBGE campus, Faisalabad, Pakistan
Dissertation title "Analysis of virus-encoded genes required for the maintenance of betasatellites by geminiviruses"

M.Phil (Biochemistry) 2003-2005 Department of Chemistry, University of Agriculture, Faisalabad, Pakistan.
Dissertation title "Clinical study to diagnose relevance of hepatic and heart abnormalities in renal failure patients on dialysis"

M.Sc (Biochemistry) 2001-2003 Department of Chemistry, University of Agriculture, Faisalabad, Pakistan.
Dissertation title "Solid state fermentation of corn cobs for the production of laccase through a white rot fungus (Pleurotus ostreatus)"

EMPLOYMENT

October, 2017- Postdoc Dept. of Plant Pathology, Fifield Hall, P.O 110680, University of Florida, Gainesville, FL 32611-0680, USA

**October, 2016-
September, 2017** Assistant Professor Akhuwat-FIRST, 250-RB Abbaspur, University park, Faisalabad, Pakistan.

October, 2015- October, 2016	Assistant Professor	Institute of Biochemistry and Biotechnology University of the Punjab, Lahore, Pakistan.
March, 2014- March, 2015	Assistant Professor	Institute of Biochemistry and Biotechnology University of the Punjab, Lahore, Pakistan.
April, 2012- March, 2014	Researcher Funded by: P.I Project Title:	Agricultural Biotechnology Division, NIBGE ICARDA, USA. Dr. Rob W. Briddon Analysis of the diversity of cotton leaf curl begomovirus and its whitefly vector in Pakistan
January, 2013- June, 2013	Visiting Teacher	School of Biological Sciences, University of the Punjab, Lahore, Pakistan.
November, 2010- April, 2011	Researcher	Dept. of Plant Biology and Forest Genetics, SLU, Sweden.
July, 2007- Pakistan July, 2009	Researcher Funded by: P.I Project Title:	Agricultural Biotechnology Division, NIBGE, Higher Education Commission, Pakistan Dr. Rob W. Briddon Pathogenicity protein of Cotton Leaf curl disease
June, 2005- June, 2007 Ethanol	Chemist Duties:	Shakarganj Mills Limited, Bhone, Jhang, Pakistan. Quantity & quality control of Distillery plant, production through fermentation of molasses by <i>Saccharomyces cerevisiae</i> .
Jan, 2005- June, 2005	Lab Incharge	Chiniot blood bank & Dialysis centre, Faisalabad, Pakistan.

EDITORIAL

- Molecular Biology Reports (Reviewer)
- Scientific Reports (Reviewer)
- African Journal of Microbiology Research (Reviewer)
- Pakistan Journal of Zoology (Reviewer)

AWARDS AND FELLOWSHIPS

- **2011** IRSIP Fellowship for foreign (Sweden) training by HEC Pakistan
- **2008** HEC indigenous fellowship for PhD studies
- **2003** Postgraduate study assistance scholarship
- **1999** Talent award scholarship to assist graduate studies

COMPUTER SKILLS

- Wordprocessing (Wordperfect, MSWord, MSEXcel)
- Sequence analysis (Artemis, BioEdit, GeneStudio, DNASTar, MEGA7, MegAlign)
- MapDraw, pDRAW

- Presentation (Powerpoint, Corel Presentation)
- Graphics (CorelDraw, Photoshop)
- RDP4 (Recombination detection program)
- SDT (Specie demarcation tool)
- Unipro UGENE
- R-program (Beginner)

LANGUAGES

- English (Fluent - speak and write-up)
- Urdu (Native)
- Punjabi (Mother tongue)
- Arabic (Read)

RESEARCH INTERESTS

- Development of CRISPR/Cas based broad-spectrum resistance against plant pathogens.
- Investigation of the diversity, origin and function of the begomovirus-associated alphasatellites, betasatellites and deltasatellites.
- Protein-protein interactions in plant virus infection. In particular, the interactions involved in viral replication (hijacking of plant replication machinery) and the regulation thereof.
- Analysis of the virus-encoded genes required for maintenance of associated satellite molecules.
- Cotton infectivity mediated by cotton infecting begomoviruses by using indigenous means.
- Investigation of begomovirus movement by using different transgenic mutants involved in host defence.
- Role of heterologous suppressors on movement of begomoviruses and role of miRNA in begomovirus movement.
- In-vitro study about packaging and assembly of viruses.
- Investigation of recombination among/between viruses in natural co-infection.
- Biofuels (bioethanol, biogas and biohydrogen) production by using indigenous resources.

PROFESSIONAL SKILLS

- Trained many M. Phil and Ph. D students with site directed mutagenesis, making infectious geminivirus clones, delivery of virus clones into model host plants, and molecular biology techniques.
- Can coordinate advanced biochemical and Molecular Biology techniques.
- Participate in effective communication, both inter and intra department.
- Can generate quality scientific manuscripts.
- Has worked on ISO 17025 elite points
- Dealing with personnel regarding their training, job assignment and relief.

TEACHING SKILLS

- **Ph. D Level**
 - Advance Molecular Virology
 - Agricultural Biotechnology

- **Master Level**

- Recombinant DNA Technology
- Elements of Biotechnology
- Basic Molecular Virology
- Protein and Enzymes
- DNA forensic
- Basic Bioinformatics
- Microbial Biotechnology
- Industrial Downstream Technologies
- Recent trends in Biotechnology
- Plant Tissue Culture (Practical course)
- Recombinant DNA technology
- Molecular Biology (Practical course)
- Biochemistry of Carbohydrates and Lipids (Practical course)
- Basic Biochemistry
- Metabolism of Biomolecules
- Techniques in Biotechnology

TECHNIQUES

- Designing and evaluation of CRISPR/Cas cassette (sgRNA etc)
- Gene knock down (Site directed mutagenesis) by designing explicit primers through PCR based mutagenesis
- PCR (Real time qPCR, Immuno Capture and Reverse Transcriptase PCR)
- Genomic Isolation (DNA and RNA from bacterial, mammalian and plant tissues)
- *In situ* hybridization
- ELISA (All types)
- Blotting techniques (Southern, Northern and Western)
- Plant transformation (Stable and Transient)
- Rolling circle amplification (RCA)
- Protein Expression, quantification and purification
- Medical laboratory test (Human)
- Qualitative and Quantitative analysis of human viruses
- Infectious clone synthesis of geminiviruses
- DNA delivery into plants (Biolistic and *Agrobacterium*-mediated)
- Lyophilisation
- Fermentation Biotechnology
- Bioethanol (upto 99.9 %) production at industrial scale through *Saccharomyces cerevisiae* and Biogas production at industrial scale

SCIENTIFIC PROGRAM ORGANIZED/PARTICIPATED

- **As organizer**
 - Conference = 2
 - Symposium = 1
 - Workshop = 2
- **As presenter**
 - At more than twenty national and international conferences/meetings

STUDENT ASSISTANCE

- **At Akhuwat-FIRST University, Faisalabad**

- B.S. Biotechnology (5 students; 1 year Project - completed)
- B.S. Biotechnology (5 students; 1 year Project – in Progress)
- **At Institute of Biochemistry and Biotechnology, University of the Punjab, Lahore**
 - M. Phil. Students (4 students; 1 year project completed)
 - B.S. students (6 student – 1 year project completed)
- **At National Institute for Biotechnology and Genetic Engineering, Faisalabad**
 - M.Phil. students (1 year projects; 1 students)
 - Ph.D. students (4 students; taught the molecular biology techniques at the beginning of research project)

RESEARCH GRANTS

- One year research grant of 0.5 Million PKR from Higher Education Commission, Pakistan as Principle Investigator.
- One year research grant of 0.15 Million PKR from University of the Punjab, Lahore, Pakistan as Principle Investigator.

PUBLICATIONS

2018

1. Samrah Munir, Muhammad Khurshid, Hira Kanwal, Mujahid Hussain, M. Naeem Sattar, Irfan Ali, Atiq ur Rehman, **Zafar Iqbal**. Identification of *Pedilanthus leaf curl virus* and associated betasatellite infecting turnip (*Brassica rapa*) in Pakistan. Journal of Plant Pathology (Accepted). **(IF = 1.267)**
2. Sattar M. N., Qureshi F., **Iqbal Z.**, and Haider M. S. 2017. Molecular characterization of Ageratum enation virus and DNA- satellites associated with yellowing and leaf curl symptoms on mulberry in Pakistan. Canadian Journal of Plant Pathology (Accepted) **(IF = 1.424)**

2017

3. **Iqbal Z.**, Shafiq M., Ali I., Mansoor S., Briddon R.W., 2017. Maintenance of Cotton Leaf Curl Multan Betasatellite by Tomato Leaf Curl New Delhi Virus—Analysis by Mutation. *Frontiers in Plant Science* 8. **(IF = 4.298)**
4. Sattar M. N., **Iqbal Z.**, Tahir M. N., and Ullah S. 2017. The prediction of a new CLCuD epidemic in the old world. Letter to the editor. *Frontiers in microbiology*. 8 (631):1-5. **(IF = 4.076)**
5. Qureshi F., Sattar M. N., **Iqbal Z.**, and Haider M. S. 2017. First report of *Cherry tomato leaf curl virus* and associated DNA-satellites infesting an invasive weed, *Parthenium hysterophorus*, from Pakistan. *Journal of Plant Pathology*. 99:263-268. **(IF = 1.267)**
6. **Iqbal Z.**, and M. Khurshid. 2017. Immunocapture PCR detection of ToLCNDV from plant extract by using TYLCV-CP antisera. *Pakistan Journal of Zoology*. 49, 1025-1031. **(IF = 0.48)**

7. Sattar M. N., Qurashi F., **Iqbal Z.**, and Haider M. S. 2017. Molecular characterization of *Hollyhock leaf curl virus* and associated DNA-satellites infecting *Malva parviflora* in Pakistan. *Canadian Journal of Plant Pathology*. 39:229-234. **(IF = 1.424)**
8. Shafiq M., **Iqbal Z.**, Ali I., Abbas Q., Amin I., Mansoor S., and R. W. Briddon. (2017). Development of a quantitative real time PCR assay for the virus and satellite components of the CLCuD complex. *Journal of Virological Methods*. 248:54-60. **(IF = 1.693)**
9. Sattar M. N., **Iqbal Z.**, Tahir M. N., Shahid M. S., Khurshid M., Al-Khateeb A. A., Al-Khateeb, S. A. (2017). CRISPR/Cas9: A practical approach in date palm genome editing. *Frontiers in Plant Science* 8. **(IF = 4.298)**
10. Sattar M. N., Qurashi F., **Iqbal Z.**, and Haider M.S. (2017). Identification and molecular characterization of a monopartite begomovirus complex infecting mulberry in Pakistan. *Canadian Journal of Plant Pathology*. 99:263-268. **(IF = 1.424)**

2016

11. **Iqbal Z.**, Sattar M. N., and M. Shafiq. CRISPR/Cas9: A novel tool to circumscribe Cotton leaf curl disease complex. *Frontiers in Plant Sciences*. 7. DOI 10.3389/fpls.2016.00475. **(IF = 4.298)**
12. Zaidi S. A., Amin I., **Iqbal Z.**, Akhtar K. P., Scheffler B. E., and Mansoor S. 2016. *Sesbania bispinosa*, a new host of a begomovirus-betasatellite complex in Pakistan. *Canadian Journal of Plant Pathology*. 38(1) 107-111. doi:10.1080/07060661.2015.1128980. **(IF = 1.424)**
13. **Iqbal Z.**, Anwar Z., Ali S., Zafar M., Khurshid M., Sheikh M. A and Irshad M. 2016. Amino acid profiling of yeast cream; A potential protein enriched ingredient for poultry feed. *Journal of Microbiology, Biotechnology and Food sciences* 5 (4):369-373.
14. Akbar F., **Iqbal Z.**, Briddon R. W., Vazquez F., and Saeed M. 2016. The 35 amino acid C2 protein of *Cotton leaf curl Kokhran virus* – Burewala, implicated in resistance breaking in cotton, retains some activities of the full-length protein. *Virus Genes* 52(5):688–697. **(IF = 1.431)**

2015

15. Zaidi S. A., **Iqbal Z.**, Amin I., and S. Mansoor. 2015. First report of tomato leaf curl Gujarat virus, a bipartite begomovirus on cotton showing leaf curl symptoms in Pakistan. *Plant Disease* 99(11):1655. **(IF = 3.173)**

2014

16. Hameed A., **Iqbal Z.**, Asad S., Mansoor S. 2014. Detection of multiple potato viruses in the field suggests synergistic interactions among potato viruses in Pakistan. *The Plant Pathology journal* 30, 407-415. **(IF = 1.255)**
17. Shahzadi T., Anwar Z., **Iqbal Z.**, Anjum A., Aqil T., Afzal A., Kamran M., Mehmood S., and Irshad M., 2014. Induced production of exoglucanase, and β -glucosidase from

fungal co-culture of *T. viride* and *G. lucidum*. *Advances in Bioscience and Biotechnology* 5, 426-433.

18. Koser S., Anwar Z., **Iqbal Z.**, Anjum A., Aqil T., Mehmood S., and Irshad M., 2014. Utilization of *Aspergillus oryzae* to produce pectin lyase from various agro-industrial residues. *Journal of Radiation Research and Applied Sciences* 7(3), 327-332.
19. Briddon R. W., Akbar F., **Iqbal Z.**, Amrao L., Amin I., Saeed M., and Mansoor S., 2014. Effects of genetic changes to the begomovirus/betasatellite complex causing cotton leaf curl disease in South Asia post-resistance breaking. *Virus Research* 186, 114-119. **(IF = 2.628)**
20. Ijaz A., Anwar Z., Irshad M., **Iqbal Z.**, Arshad M., Javed M., Ahmad M. Z., Rehman A., and Ahmad A., 2014. Purification and Kinetic Characterization of statistically optimized cellulase produced from *Aspergillus niger*. *Romanian Biotechnological Letters* 19, 9835-9845. **(IF = 0.412)**

2012

21. **Iqbal Z.**, Sattar M. N., Kvarnheden A., Mansoor S., and R. W. Briddon. 2012. Effects of the mutation of selected genes of *Cotton leaf curl Kokhran virus* on infectivity, symptoms and the maintenance of Cotton leaf curl Multan betasatellite. *Virus Research* 169, 107-116. **(IF = 2.628)**

2003

22. Asghar M., **Iqbal Z.**, Sheikh M. A., and M. J. Asad. 2003. Solid state fermentation of corncobs for laccase production by *Pleurotus ostreatus*. *Pakistan Journal of Biochemistry and Molecular Biology* 36(2): 84-90.

IN PREPARATION/SUBMITTED

Zafar Iqbal, Amin, I., Mansoor, S., R.W. Briddon. Effects of the transient expression of silencing suppressors encoded by heterologous RNA viruses on the infectivity and systemic movement of the begomovirus *Tomato leaf curl New Delhi virus*. *Virus Disease* **(Under review)**.

Muhammad Shafiq, **Zafar Iqbal**, Irfan Ali, Qamar Abbas, Shahid Mansoor, Imran Amin, Rob W. Briddon. (2018). Quantitative Real-time PCR assay as a tool for examining cotton resistance to the virus causing CLCuD: the 2014-2015 National Coordinated Varietal Trials as a case study. *Canadian Journal of Plant Pathology* **(Under review)**.

Zafar Iqbal, Muhammad Shafiq, Rob W. Briddon. (2018). Analysis of *Pedilanthus leaf curl virus* and its mutants on infectivity, symptoms and maintenance of Tobacco leaf curl betasatellite. **(Ready for submission)**.

Irfan Ali, Muhammad Khurshid, **Zafar Iqbal**, Muhammad Shafiq, Neelam Sultan, Imran Amin, Shahid Mansoor, Rob W. Briddon. 5' end of Antisense V2 confers resistance against monopartite begomovirus *Cotton leaf curl Kokhran virus*-Burewala strain. **(Ready for Submission)**.

Zahid Anwar, Z., Sadique, S., Muhammad Irshad, **Zafar Iqbal**, Rashid Maqsood. Peanut shell; potential industrial wastes for the production of cellulase through solid state fermentation by using locally isolated *Fusarium oxysporum*. **(In preparation)**.

Zafar Iqbal, Muhammad Shafiq, Shahid Mansoor, Rob W. Briddon, *In-plant* maintenance of Cotton leaf curl Multan alphasatellite by ToLCNDV **(In Preparation)**.

BOOK/CHAPTER PUBLISHED/PREPARATION

1. M. Naeem Sattar and **Zafar Iqbal** (Under review). Begomovirus diversity and its management in leguminous vegetables and other hosts. CRC press, USA.
2. Muhammad N. Sattar, **Zafar Iqbal**, Amir Hameed. Replication of DNA-satellites and their role in viral pathogenesis. Elsevier.

ABSTRACTS PUBLISHED

1. **Zafar Iqbal**, M.N. Sattar, M. Shafiq, CRISPR/Cas9: A novel tool to circumscribe cotton leaf curl disease complex. 1st International conference on Advancements in Biotechnology. GCWUF and Akhuwat-FIRST. March 30-31, 2016. Abstract book page no. 29. Faisalabad, Pakistan.
2. R. W. Briddon, F. Akbar, **Iqbal, Z.**, I. Amin, S. Mansoor, M. Saeed. Analysis of the begomovirus/ betasatellite complex causing cotton leaf curl disease in South Asia post resistance breaking. 7th International Geminivirus Symposium/5th International ssDNA comparative Virology Workshop. November 3-9, 2013. Abstract book page no. 47. Hangzhou, China.
3. R. W. Briddon, F. Akbar, **Iqbal, Z.**, I. Amin, S. Mansoor, M. Saeed. Effects of genetic changes to the begomovirus/betasatellite complex causing cotton leaf curl disease in South Asia post-resistance breaking. International Conference on "Stress Biology & Biotechnology: Challenges & Management" University of the Punjab University, Institute of Agricultural Sciences (IAGS). 21-23 May, 2014. Abstract book page no. 71. Lahore, Pakistan.
4. Asad, M. J., M. Asghar and **Iqbal, Z.**, 2004. Solid State Bioprocess developments for Laccase production by *Phenarochoaet chrysosporium*. Proceedings of Agro environ 2004 "Role of Multipurpose Agriculture in Sustaining Global Environment". Udine, Italy, pp. 97-104 (October 20-24, 2004).
5. Asghar, M., **Iqbal, Z.**, M. J. Asad and R. L. Legge. 2004. Characterization of laccase produced by *Pleurotus ostreatus* in solid state bioprocessing of corncobs. Biology in Asia International Conference, Singapore. December 7-10, 2004. Abstract Book page No.76

REFERENCES

- ◆ **On request**