

NAILA SHAHID (PH.D.)

Assistant Professor

Centre of Excellence in Molecular Biology

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Google scholar link: <https://scholar.google.com/citations?user=bqmrls8AAAAJ&hl=en>

About Me:

My field of interest is Plant Molecular Biology, Plant Transformation, Plant Tissue Culture and Edible Vaccine Production. I had the opportunity to work in the Bio-Pharmaceutical Unit and Interferon research group for five years from 2005-10. I joined the University of Pennsylvania's Edible Vaccine Production Group as a researcher in August 2015 to February 2016 and as a postdoctoral fellow in June 2021 to March 2022. My particular area of research is production of plant-based edible vaccine humans and animal infectious diseases. There are a number of vaccines to control these diseases like inactivated virus vaccines, attenuated virus vaccines, live virus vaccines, and subunit vaccines but they are often relatively expensive and require a cold storage, which is difficult to maintain; and trained people need to deliver these vaccines. Plant-based vaccines provide a better option to control these diseases. My long-term goal is to excel in Biological research and to develop low-cost edible vaccines which are easy to disseminate and deliver.

EDUCATION

2017

- **PhD (Molecular Biology)**
Centre of Excellence in Molecular Biology University of the Punjab
Dissertation: Expression of F protein gene in maize for production of edible vaccine against Newcastle disease virus
Advisor: Dr. Abdul Qayyum Rao

2010

- **M. Phil. (Molecular Biology)**
Centre of Excellence in Molecular Biology University of the Punjab
Dissertation: Transformation of multiple genes in cotton variety VH-289
Advisor: Dr. Abdul Qayyum Rao

2004

- **M.Sc. (Zoology)**
Government College University Lahore

2002

- **B.Sc. (Botany, Zoology, Chemistry)**
University of the Punjab Lahore

HONORS AND AWARDS

2012-2016

1. **Indigenous PhD Fellowship for 5000 Scholars** Awarded by Higher Education Commission of Pakistan.

2015

2. **International Research Support Initiative Program** Awarded by Higher Education Commission of Pakistan.

2016

3. **Performance Evaluation Award.** Awarded by University of the Punjab. (2016)
4. **Research Incentive Award** Awarded by University of the Punjab. (2016).

2017

5. **Research Incentive Award.** Awarded by University of the Punjab. (2017).

2018

6. **Research Incentive Award.** Awarded by University of the Punjab. (2018).
7. **Performance Evaluation Award.** Awarded by University of the Punjab. (2019)

2020

8. **Completed Post-doctorate Scholarship by HEC, Pakistan** Department of Biochemistry University of Pennsylvania, United States of America.

PROFESSIONAL EXPERIENCE

2019- Present (Continue)

1. **Working as Assistant Professor.** Centre of Excellence in Molecular Biology, University of the Punjab, Lahore.

2005-2019

2. **Working as Research officer cum Lecturer.** Centre of Excellence in Molecular Biology, University of the Punjab, Lahore.

LIST OF PUBLICATIONS

- 2023
1. Tanveer, S., Malik, H. A., Shahid, N., Salisu, I. B., Ahmed, N., Latif, A., ... & Rao, A. Q. (2023). Production of proinflammatory cytokines by expressing Newcastle disease vaccine candidates in corn. *Journal of King Saud University-Science*, 35(3), 102537.
- 2022
2. Latif, A., Azam, S., Shahid, N., Javed, M. R., Haider, Z., Yasmeen, A., ... & Rao, A. Q. (2022). Overexpression of the AGL42 gene in cotton delayed leaf senescence through downregulation of NAC transcription factors. *Scientific Reports*, 12(1), 1-14.
 3. Yasmeen, A., Shakoor, S., Azam, S., Bakhsh, A., Shahid, N., Latif, A., ... & Rao, A. Q. (2022). CRISPR/Cas-mediated knockdown of vacuolar invertase gene expression lowers the cold-induced sweetening in potatoes. *Planta*, 256(6), 1-15.
 4. Daniell, H., Nair, S. K., Esmaeili, N., Wakade, G., Shahid, N., Ganesan, P. K., ... & Collman, R. G. (2022). Debulking SARS-CoV-2 in saliva using angiotensin converting enzyme 2 in chewing gum to decrease oral virus transmission and infection. *Molecular Therapy*, 30(5), 1966-1978.
 5. Iqbal, A., Ali, M. A., Ahmed, S., Hassan, S., Shahid, N., Azam, S., ... & Shahid, A. A. (2022). Engineered resistance and risk assessment associated with insecticidal and weeds resistant transgenic cotton using wister rat model. *Scientific reports*, 12(1), 1-8.
 6. Khan, A., Nosheen, F., Tabassum, B., Adeyinka, O. S., Shehzad, K., Shahid, N., ... & Nasir, I. A. (2022). Comparative Silencing Effect of Different siRNA Fragments on Potato Virus X Coat Protein in Transient Transfection Assays. *Pakistan Journal of Zoology*, 54(1).
- 2021
7. Shad, M., Yasmeen, A., Azam, S., Bakhsh, A., Latif, A., Shahid, N., ... & Shahid, A. A. (2021). Enhancing the resilience of transgenic cotton for insect resistance. *Molecular Biology Reports*, 1-9.
 8. Tahir, MS., Latif A., Bashir S., Shad M., Muhammad Azmat Khan MAU., Gul A., **Shahid N.**, Husnain T., Rao AQ., Shahid AA. 2021. Transformation and evaluation of Broad-Spectrum insect and weedicide resistant genes in *Gossypium arboreum* (Desi Cotton). *GM CROPS & FOOD*, 12, 292-302.
 9. Khan, A., Nosheen, F., Tabassum, B., Adeyinka, O. S., Shehzad, K., **Shahid, N.**, ... & Nasir, I. A. (2021). Comparative Silencing Effect of Different siRNA Fragments on Potato Virus X Coat Protein in Transient Transfection Assays. *Pakistan journal of Zoology*, 2021,1-7.
- 2020
10. **Shahid, N.**, Rao, A. Q., Ahad., A, Gul, A., Latif, A., Azam, S., Shahid, M., Akhter, S., Shahid, A, A., Husnain. T 2020. "*E. coli* expression and immunological assessment of expressed

recombinant Newcastle disease virus haemagglutinin-neuraminidase protein in chicks" **Acta Virologica**, 64,3, 2020.

11. **Shahid, N.**, Samiullah, T. R., Shakoor, S., Latif, A., Yasmeen, A., Azam, S., ... & Rao, A. Q. (2020). Early-stage development of a Newcastle disease vaccine candidate in corn. **Frontiers in Veterinary Science**, 7, 499.
12. Ambreen, G., Ghulam, H., Adnan, I., Qayyum, R. A., Aneela, Y., **Naila, S.**, ... & Samina, H. (2020). Constitutive expression of Asparaginase in *Gossypium hirsutum* triggers insecticidal activity against Bemisia tabaci. Scientific Reports (Nature Publisher Group), 10(1).
13. Zahid, M., Irshad, A., Shakoor, S., Samiullah, T. R., **Shahid, N.**, Iqbal, A., ... & Husnain, T. (2020). Engineered Recombinant NDV-Fusion Protein and Its Polyclonal Antibodies Production. **Pakistan Veterinary Journal**. <http://dx.doi.org/10.29261/pakvetj/2020.034>
14. Shakoor, S., Rao, A. Q., **Shahid, N.**, Yaqoob, A., Samiullah, T. R., Latif, A., ... & Husnain, T. (2019). Role of oral vaccines as an edible tool to prevent infectious diseases. **Acta Virologica**, 63(3), 245-252.
15. Sajid, I. A., Tabassum, B., Yousaf, I., Khan, A., Adeyinka, O. S., **Shahid, N.**, ... & Husnain, T. (2019). In Vivo Gene Silencing of Potato Virus X by Small Interference RNAs in Transgenic Potato. **Potato Research**, 1-13.
16. Tabassum B., Samuel A.O., Bhatti M.U., Fatima N., **Shahid N.**, Nasir I.A. (2019) Bottlenecks in Commercialization and Future Prospects of Beneficial Halotolerant Microorganisms for Saline Soils. P: 187-208 In: Kumar M., Etesami H., Kumar V. (eds) Saline Soil-based Agriculture by Halotolerant Microorganisms. **Springer, Singapore**. Online ISBN 978-981-13-8335-9.
17. Zubair, M., Latif, A., Rao, A. Q., Azam, S., Shahid, N., Samiullah, T. R., ... & Husnain, T. (2019). A Combinational Approach of Enhanced Methanol Production and Double Bt Genes for Broad Spectrum Insect Resistance in Transgenic Cotton. **Molecular Biotechnology**, 1-11.
18. Qamar Z, Tariq M, Rehman T, Iqbal MS, Sarwar MB,**Shahid N.**, et al., (2019). Trackable CEMB-Klean Cotton Transgenic Technology: Affordable Climate Neutral Agribiotech

2019

Industrialization for Developing Countries Adv. Life Sci. 6(3): 131-138.

2018

19. Latif, A, Ahmed, A., Akhtar, S., Ahad, A., Iqbal, A., Yaqoob, A., Imran, A., Usmaan, M., Shahid, N., Azam, S., Yasmeen, A., Rehman TS., Cotton Fabre Quality Management for Sustainable Textile Industry **ICAC Recorder 2019**
20. Ahad, A., Yaqoob, A., Nawaz, R., Gul, A., **Shahid, N.**, Rao, A. Q. and Hasnain, T. (2018). Multidimensional roles of Flavonoids in background of *Gossypium hirsutum*. **Cogent Food & Agriculture**, 1510754.

2017

21. Tabassum, B., Khan, A., Tariq, M., Ramzan, M., Khan, M. S. I., **Shahid, N.**, & Aaliya, K. (2017). Bottlenecks in commercialisation and future prospects of PGPR. **Applied Soil Ecology**, 121, 102-117.
22. **Shahid, N.**, Rao, A. Q., Kristen, P. E., Ali, M. A., Tabassum, B., Umar, S., and Husnain, T. (2017). A concise review of poultry vaccination and future implementation of plant-based vaccines. **World's Poultry Science Journal**, 73(3), 471-482.
23. Toufiq, N., Tabassum, B., Bhatti, M. U., Khan, A., Tariq, M., **Shahid, N.**, and Husnain, T. (2017). Improved antifungal activity of barley derived chitinase I gene that overexpress a 32 kDa recombinant chitinase in *Escherichia coli* host. **Brazilian Journal of Microbiology**.
24. Rao, A.Q., Latif, A., Azam, S., Gul, A., Yaqoob, A., Din, S., Akhtar S., **Shahid N.**, Shahid. A.A, Nasir, I.A. and Husnain, T. (2017). Management of Biotic Stress in Cotton. Proceedings and Recommendations of the 7th Meeting of the Asian Cotton Research and. 2017.

2016

25. **Shahid, N.**, and Daniell, H. (2016). Plant based oral vaccines against zoonotic and non-zoonotic diseases. **Plant Biotechnology Journal**.
26. Tabassum, B., Nasir, I. A., Khan, A., Aslam, U., Tariq, M., **Shahid, N.**, and Husnain, T. (2016). Short hairpin RNA engineering: In planta gene silencing of potato virus Y. **Crop Protection**, 86: 1-8.
27. Ramzan, M., Tabassum, B., Nasir, I. A., Khan, A., Tariq, M., Awan, M. F., and Husnain, T. (2016). Identification and application of biocontrol agents against Cotton leaf curl virus

disease in *Gossypium hirsutum* under greenhouse conditions. **Biotechnology & Biotechnological Equipment**, 30(3), 469-478.

2015

28. **Shahid, N.**, Tahir, S., Rao, A. Q., Hassan, S., Khan, A., Latif, A., and Husnain, T. (2015). *Escherichia coli* expression of NDV fusion protein gene and determination of its antigenic epitopes. **Biologia**, 70(12), 1553-1564.
29. Rao, A. Q., Ullah Khan, M. A., **Shahid, N.**, Gul, A., Muzaffar, A., Azam, S., and Husnain, T. (2015). An overview of phytochrome: An important light switch and photo-sensory antenna for regulation of vital functioning of plants. **Biologia**, 70(10), 1273-1283.
30. Latif, A., Rao, A. Q., Khan, M. A., **Shahid, N.**, Bajwa, K. S., Ashraf, M. A., and Husnain, T. (2015). Herbicide-resistant cotton (*Gossypium hirsutum*) plants: an alternative way of manual weed removal. **BMC research notes**, 8(1), 453.
31. Khan, M. A. U., Shahid, A. A., Rao, A. Q., **Shahid, N.**, Latif, A., ud Din, S., and Husnain, T. (2015). Defense strategies of cotton against whitefly transmitted CLCuV and Begomoviruses. **Advancements in Life Sciences**, 2(2), 58-66.
32. Zameer, M., Munawar, S., Tabassum, B., Ali, Q., **Shahid, N.**, Saadat, H. B., and Sana, S. (2015). Appraisal of various floral species biodiversity from Iskandarabad, Pakistan. **Life Sci J**, 12(3s), 77-87.

2013

33. Tabassum, B., Sher, Z., Tariq, M., Khan, A., **Shahid, N.**, Bilal, M., and Husnain, T. (2013). Overview of acquired virus resistance in transgenic plants. **Exp. Agricult. Horticult**, 2(2), 12-28.
34. Nasir, I.A., Jamal, A., Tabassum, B., Husnain, T., Sher, Z., Tariq, M., Khan, A., **Shahid, N.**, Bilal, M., Ramzan, M. and Iqbal, M.S., Regeneration Response from Old Cell Suspension Cultures of *Gladiolus*.

2011

35. Ahmed, N., Khan, M. A., **Shahid, N.**, Nasir, I. A., and Zafar, A. U. (2011). One step purification of biological active human interleukin-2 protein produced in yeast (*Pichia pastoris*). **African Journal of Biotechnology**, 10(67), 15170-15178.

PATENT

1. **In process: (Revision Submitted)**

Novel Plant-based biotechnological approaches for production of edible vaccine against Newcastle disease virus of poultry IPO Pakistan 2018. Patent Application Number 328/2018 (**Evidence Attached**)

ABSTRACT PUBLISHED

- | | |
|----------------------|--|
| 2020 | 1. CRISPR Engineering to Knockdown Begomovirus (CLCuV) and Its Insect Vector Bemisia Tabaci |
| 2019 | 2. Exotic gene expression in cotton for fiber quality improvement (3 rd Sinopak International conference on innovations in cotton breeding and biotechnology) |
| 21-23 November 2017 | 3. Genetic Transformation of Modified Combination of Bt and Plant Lectin Genes to Control major Cotton Pests. CEMB 2 nd International symposium on Advances in Molecular Biology of Plants and Health Sciences. |
| 21-23 November 2017 | 4. Increased Resistance in Cotton against Sucking Insects through Genetic Modification of Amino acid pathway. CEMB 2 nd International symposium on Advances in Molecular Biology of Plants and Health Sciences. |
| 21-23 November 2017 | 5. E. coli Expression of HA gene of H9N2 Influenza Virus. CEMB 2 nd International symposium on Advances in Molecular Biology of Plants and Health Sciences. |
| 25-27 September 2017 | 6. Production of edible vaccine against Newcastle disease virus (Advances in agriculture biotechnology and regulatory affairs) |
| 25-27 October 2017 | 7. Over Production of methanol through expression of PME Enzymes Genes in <i>Gossypium hirsutum</i> to control Insects (International Conference on Agricultural and Food Science). |
| 25-27 October 2017 | 8. <i>E. coli</i> Expression of HA gene of H ₉ N ₂ Influenza Virus International Conference on Agricultural and Food Science |
| 10-14 January 2017 | 9. <i>E. coli</i> expression of Fusion and Hemagglutinin neuraminidase protein genes for production of edible vaccine against Newcastle disease virus (2017 14th International Bhurban Conference on Applied Sciences and Technology (IBCAST 2017)). |

FOREIGN TRAINING

- | | |
|------|---|
| 2015 | 1. International Research support Initiative programme Scholarship sponsored by HEC, Pakistan. Joined Edible Vaccine Production |
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Group. Department of Biochemistry, University of Pennsylvania, United States of America

2020

2. Post-doctorate Scholarship sponsored by HEC, Pakistan. Edible vaccine production group. Department of Biochemistry, University of Pennsylvania, United States of America. **(June 24th 2021 - 25th march 2022)**

TEACHING

- **Teaching/Class Credit hours**
M.Phil. /1
- **University/Department**
CEMB, University of the Punjab
- **Course Title**
Molecular Biology (Practical)

THESIS/ SUPERVISED

RESEARCH

M. PHILL

1. Expression of F and HN Protein genes in maize against NDV Genotype VII (**Hafiza Ayesha Malik, Seccession 2017-2019**).
2. Development of Polyclonal Antibody against NDV F protein expressed in *E. coli* and its application as conjugate for Nanoparticles (**Maira Zahid, Seccession 2017-2019**).
3. Transformation of Cry1 Ac and Cry2a under tissue specific promoters in cotton CEMB (**Fida Aslam, Seccession 2018-2020**).
4. Development of next generation herbicide resistance cotton through transformation of dicamba gene in cotton (**Syeda Samra Imran, Seccession 2018-2020**).
5. Development of Nanoparticles based Immunogenic Assay through *E. coli* expression of CTB fused VP2 Protein (**Sania, seccession 2019-2021**).
6. Combinational Approach of Fern chitinase like protein and CAS9 based resistance in cotton against *Bemisiatabacci* and CLCuV (**Ramsha, seccession 2019-2021**).

RESEARCH GRANT AWARD

1. Novel approaches to generate wide spectrum resistance to all cotton *begomoviruses* (Co-PI) 1.142 Million PKR PARB Pakistan Agriculture Research Board.

SYMPOSIUM/CONFERENCES

ORGANIZER

1. Hands on training workshop on CRISPR/Cas Genome Editing Technology” Organized by Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan April 29-30, 2019.
2. Organized two days training workshop in on “The Development and Testing of Transgenics for Cotton Leaf Curl Virus (CLCuV) Disease Resistance at CEMB, University of the Punjab Lahore, Pakistan, March 18-19, 2014.
3. Organized 2nd International symposium on” Advances in Molecular Biology of Plants and Health Sciences at CEMB, University of the Punjab Lahore, Pakistan, November21-23, 2017.

ORAL PRESENTER

4. Oral presentation in 2017 International Conference on Agricultural and Food Science 7th International Conference on Biotechnology and Bioengineering ICAFS2017&7th ICBB, October 25-27, 2017 Lahore, Pakistan.
5. Oral Presentation in Advances in Agricultural Biotechnology and Regulatory Affairs Workshop (Sept. 25-27, 2017).
6. Oral presentation in International Bhurban Conference on Applied Science and Technology 2017.

INVENTION TO INNOVATION SUMMIT

7. Participated in 5th Invention to Innovation summit March 2-3 2016- ORIC, University of the Punjab as Technology presenter.
8. Participated in 7th Invention to Innovation summit March 7-8 2018- ORIC, University of the Punjab as Technology presenter.
9. Participated in 7th Invention to Innovation summit March 7-8 2018- ORIC, University of the Punjab as Technology presenter.
10. Web of Science Conference on International Scholarly Publishing from Pakistan” Held on March, 11, 2019 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.

PARTICIPATION

11. Training on Incineration and other waste treatment methods” Organized by Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan, February 21-22,2019.
12. “Risk Assessment of Genetically Modified (GM) Crops” Held on July, 20, 2018 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.
13. “Dual Use of Research of Concern (DURC) Workshop” Held on July 16-18, 2018 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.
14. Protein Structure Analysis and Computer aided Drug Designing Held on September18, 2018 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.
15. “An Awareness cum Workshop on Biological Waste Management” Held on October 9-10, 2018 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.
16. “Training on Biological waste Management and emergency Response Procedure” Held on October 11-12, 2018 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.
17. Communication and Negotiation Interlock” Held on April 25, 2017 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.
18. Behavioral based Biosafety culture Held on August 23, 2017 at Centre of Excellence in Molecular Biology, University of the Punjab Lahore Pakistan.
19. Training in “Planning of cotton production, land preparation, weed control and disease control and harvesting’ 2016.
20. Workshop on ICGEB course on Basic Biotechnology Techniques’2016.
21. Training course on “Environment health and radiation safety” for completion of Introduction to laboratory and biological safety, University of Pennsylvania, United states of America. (2015)
22. Workshop on “Young Researchers’ Skill development and (National Academy of Young Scientists (NAYS) emerging Ideas Conference (NAYS-FIC)” (CEMB) Lahore (2012).
23. Training in “Cotton Plant Genetic Resources Conservation and Gene-Bank Management”. Held at Plant Genetic Resource Programe (PGRP) Institute of Advance Biotechnology & Genetic Resources (IABGR) in collaboration with Pak-US Cotton Productivity Enhancement Programe, ICARDA Pakistan office, Islamabad at National Agricultural Research Centre (NARC) Islamabad Pakistan (2012).
24. National Workshop “Recombinant Technologies in Vaccine Development”. Organized by Institute of Biochemistry & Biotechnology, University of Veterinary & Animal Sciences

(UVAS). Lahore Pakistan (2013).

25. OIC Cotton Training Programe on “Quality Improvement Seed Quality” at Central Cotton Research Institute (CCRI) Multan (2013) organized by Statistical, Economic, Social Research and Training Centre for Islamic Countries. Ankara, Turkey.

LANGUAGES

- **English:** Proficient in Listening, Speaking, Reading, and Writing
- **Urdu:** Native Language

LIST OF REFERENCES IN YOUR COUNTRY OF BIRTH OR RESIDENCE.

1. **Dr. Abdul Qayyum Rao.**
Professor, CEMB, University of the Punjab,
Lahore, Pakistan.
E-mail: qayyumabdul77@yahoo.com
2. **Dr. Henry Daniell**
Professor of Biochemistry, University of Pennsylvania, United States of America.
E.mail: hdaniell@upenn.edu
3. **Prof. Dr. Ahmad Ali Shahid**
Director, CEMB, University of the Punjab, Lahore Pakistan.
Lahore, Pakistan.
E-mail: ahmadali.shahid@gmail.com
4. **Ayesah Imran**
PhD scholar
Email: ayeshabaig360@gmail.com
5. **Saira Azam**
Research Officer cum Lecturer
CEMB, University of the Punjab, Lahore Pakistan.
Lahore, Pakistan.
Email: saira.azam.pu@gmail.com