

## Curriculum Vitae (CV)



### E-Card:

#### **Dr. MUHAMMAD SHAHDAT HOSSAIN**

B.Sc. (Fisheries), M.S., **Ph.D.** (Hydrobiology, CAS)

Senior Scientific Officer (SSO)

Fisheries Biotechnology Division

National Institute of Biotechnology (NIB), Dhaka, Bangladesh

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### Technical Skills:

- Fish Health Management, Fish Vaccine Development, Fish Bacteriophage Therapy
- Fish and Microbial Genomics, Whole Genome Sequencing (WGS)
- Gut Microbiota Analysis, Microbial Community Profiling, Fish Probiotic
- Transcriptomics, Gene Expression & Regulation, RNA-seq
- NGS & 3rd Generation Sequencing Data Analysis, Computational Biology
- Biotechnology, Molecular and Cellular Biology
- 12+ years of research experience in the fisheries microbiology and biotechnology

### Research interest:

Dr. Hossain's research focuses on diverse aspects of aquaculture and fish biology, with particular emphasis on fish health, genetics, and biotechnology. His interests include fish disease prevention using vaccines and bacteriophage therapy, fish-microbe interactions, and the role of the fish gut microbiota in health and nutrition. He is actively engaged in fish genetics, transcriptomics, and gene regulation studies in both fish and shellfish. His work utilizes cutting-edge techniques in transgenic and metagenomics research in fish and other animals. He conducted the metagenomics study of fish, cats, dogs, zoo animals, water and soil in Bangladesh. He also focuses on transcriptomic studies in fish due to emerging fish and shrimp disease. He has experience with NGS data assembly, annotation of various fish and animal microbiota, and phylogenetic diversity of microbial communities. Since the beginning of his publication registry in 2014, he has published 17 publications of these, 4 are first author publications including Aquaculture research, Aquaculture International, Frontiers in Microbiology, etc.

### Education & Research:

Degree	College/University	Major subjects
Ph.D.	University of Chinese Academy of Sciences	<b>Thesis:</b> Characterization of gut microbial communities of commercially important and intensively cultured shrimps and eels.
M.S.	Bangladesh Agricultural University	Fish and feed microbiology, Biochemistry, Preservation, Quality control, Project design & management. <b>Thesis:</b> Effects of antibiotics on bacterial flora in four commercially important fish species of Bangladesh.
B.Sc.	Bangladesh Agricultural University	Aquaculture, Fish Biology, Management, Genetics, Biotechnology, Biochemistry, Nutrition, Physiology, Disease management, Ecology, Oceanography, Limnology, and Statistics.

### **Position Held:**

<b>Name of employing organization</b>	<b>Designation</b>	<b>Date of joining</b>	<b>Date of leaving</b>
National Institute of Biotechnology	Senior Scientific Officer	2022/10	Till to date
National Institute of Biotechnology	Scientific Officer	2014/10	2022/10
Bangladesh Fisheries Research Institute	Scientific officer	2014/06	2014/09
Bangladesh Agricultural University	Research Fellow	2012/10	2014/05
Bangladesh Agricultural University	Research Assistant	2012/06	2012/10

### **Projects awarded:**

<b>SL no.</b>	<b>Problem Investigated</b>	<b>Duration</b>	<b>Funding organization</b>	<b>Level of involvement</b>
1.	Development of a killed vaccine against <i>Aeromonas hydrophila</i> for immunization of Stinging Catfish ( <i>Heteropneustes fossilis</i> )	2024/07-2025/06	Ministry of Science and Technology (MoST)	<b>Principle Investigator</b>
2.	High throughput transcriptome analysis for better prawn health management in Bangladesh	2022/06-2023/06	MoST (Bangladesh)	<b>Principle Investigator</b>
3.	Study on zoonotic diseases of pets and assessment of risk factors of commonly occurred zoonoses for better management	2020/09-2022/01	Krishi Gobeshona Foundation (KGF)	Research Collaborator
4.	Biochemical and molecular assay for detection of <i>Vibrio</i> spp from shrimp and shrimp farms in Bangladesh	2017/04-2018/08	BARC	<b>Principle Investigator</b>
5.	Exploration of economically important marine flora from the Bay of Bengal	2016/10-2017/09	Indian Ocean Rim Association (IORA)	Co-Principle Investigator
6.	Search for potential genetic markers associate with resistance traits to gastrointestinal Nematode Infections in Goat	2016/07-2017/06	MoST (Bangladesh)	Co-Principle Investigator
7.	Population genetic structure of <i>Amblypharyngodon mola</i> using DNA markers	2016/07-2017/06	MoST (Bangladesh)	<b>Principle Investigator</b>
8.	Cryogenic freezing of an indigenous endangered fish Rani ( <i>Botia dario</i> ) spermatozoa for conservation of gene pool.	2015/07-2016/06	MoST (Bangladesh)	<b>Principle Investigator</b>
9.	Study on morphological and genetical variation of natural and hatchery populations of <i>Puntias sarana</i> , by using truss method and RAPD marker	June 2015-December 2017	National Institute of Biotechnology	<b>Co-Principle Investigator</b>
10.	Development of microsatellite DNA markers for investigation of population structure of different stocks of Hilsha: Implication in better management strategies	July 2013-December 2018	National Institute of Biotechnology	<b>Associate Investigator</b>

### **Research student supervision:**

<b>Thesis/Project title</b>	<b>Student category</b>	<b>Year conducted</b>
Characterization, genomic analysis and application of <i>Aeromonas</i> bacteriophage against pathogenic <i>Aeromonas hydrophila</i> infection in Shing ( <i>Heteropneustes fossilis</i> ): An alternative to antibiotics	M.S.	2025
Development of a bivalent vaccine against infectious <i>Aeromonas hydrophila</i> and <i>Aeromonas jandaei</i> in catfish ( <i>Heteropneustes fossilis</i> )	Research Fellow	2025-2026
Molecular characterization and complete genome sequencing of pathogenic <i>Aeromonas jandaei</i> from diseased <i>Heteropneustes fossilis</i> : antimicrobial resistance and virulence factor	M.S.	2025
Metagenomics profiling of microbial diversity of supplied drinking water from WASA in Dhaka, Bangladesh.	M.S.	2024

### **Selected publications:**

1. Sarkar, M. S. I.\*, **Hossain, M. S.\***, Hasan, M. M., Khan, M., Al Islam, A., & Kamal, M., 2024. Temporal variation in quality characteristics of nutritional constituents and bacterial community during dry salt-fermentation of hilsa (*Tenualosa ilisha*). **Food Production, Processing and Nutrition** (Springer Nature; BMC), 6(1), 48. <https://doi.org/10.1186/s43014-023-00213-5>
2. **Hossain, M. S.**, Dai, J., & Qiu, D., 2021. European eel (*Anguilla anguilla*) GI tract conserves a unique metagenomics profile in the recirculation aquaculture system (RAS). **Aquaculture International** (Springer Nature), 29:1529–1544. <https://doi.org/10.1007/s10499-021-00692-8>
3. **Hossain, M. S.**, Dai, J., & Qiu, D., 2021. Dysbiosis of the shrimp (*Penaeus monodon*) gut microbiome with AHPND outbreaks revealed by 16S rRNA metagenomics analysis. **Aquaculture Research** (Wiley), 52(7):3336–3349. <https://doi.org/10.1111/are.15178>
4. Sarkar, M.S.I., Hasan, M.M., Hossain, M.S., Khan, M., Al Islam, A., Paul, S.K., Rasul, M.G. and Kamal, M., 2023. Exploring fish in a new way: A review on non-food industrial applications of fish. **Heliyon** (Elsevier). <https://doi.org/10.1016/j.heliyon.2023.e22673>
5. Alam, J., Hossain, M.M.K., **Hossain, M.S.**, Ahmed, S., Ehsan, M.A., Rubaya, R. and Bhuyan, A.A., 2023. Genome Sequence of a Bangladeshi Strain of *Raoultella ornithinolytica*, a Pathogen with Metal and Antimicrobial Resistance Genes Isolated from a Pet Cat. **Microbiology Resource Announcements** (ASM), pp.e00863–22. <https://doi.org/10.1128/mra.00863-22>
6. Sultana, S., Hasan, M.M., **Hossain, M.S.**, Alim, M.A., Das, K.C., Moniruzzaman, M., Rahman, M.H., Salimullah, M. and Alam, J., 2022. Assessment of genetic diversity and population structure of *Tenualosa ilisha* in Bangladesh based on partial sequence of mitochondrial DNA cytochrome b gene. **Ecological Genetics and Genomics** (Elsevier), 25, p.100139. <https://doi.org/10.1016/j.egg.2022.100139>
7. Sarkar S.I., Hasan M.M., Chowdhury P., Rasul G.M., Khan M., **Hossain, M.S.**, Islam A.A., Kamal M., 2022. A Review on Blue Economy in Shrimp Sector of Bangladesh. **Egyptian Journal of Aquatic Biology and Fisheries**, 26(6), pp.1215–1236. <https://doi.org/10.21608/ejabf.2022.281432>
8. Sultana, S., Khan, M., **Hossain, M.S.**, Dai, J., Rahman, M. S., & Salimullah, M., 2022. Community structure and functional annotations of the skin microbiome in healthy and diseased catfish, *Heteropneustes fossilis*. **Frontiers in Microbiology**, 551. <https://doi.org/10.3389/fmicb.2022.856014>
9. Dai, J., Dong, A., Xiong, G., Liu, Y., **Hossain, M.S.**, Liu, S., Gao, N., Li, S., Wang, J., Qiu, D., 2020. Production of Highly Active Extracellular Amylase and Cellulase From *Bacillus subtilis* ZIM3 and a Recombinant Strain with a Potential Application in Tobacco Fermentation. **Frontiers in Microbiology**. 11:1539. <https://doi.org/10.3389/fmicb.2020.01539>
10. **Hossain, M.S.**, Hashem, S., Halim, M.A., Chowdhury, P., Sultana, S., Khan, M.N., 2017. Bacterial community structure and infection in cultured Koi (*Anabas testudineus*) fish species. *Int. J. Fish. Aquat. Stud.* 5(3), 520–524.
11. **Hossain, M.S.**, Sharker, M.R., Haque, S.A., Reza, M.S., Mondal, M.A.H., 2014. Effects of antibiotic on the bacterial microflora in two commercially important catfish species, *Clarias batrachus* and *Heteropneustes fossilis* in. *J. Coast. Life Med.* 2(11), 845–848. <https://doi.org/doi:10.12980/JCLM.2.201414J47>
12. Sultana, S., **Hossain, M.S.**, Islam, M.N., Bhuiyan, M.S.I., Salimullah, M., Alam, J., 2018. Molecular characterization and phylogenetic analysis of two minnows, *Puntius sarana* and *Barbodes gonionotus*. *J Adv Biotechnol Exp Ther* 1(3), 83–87. <https://doi.org/10.5455/jabet.2018.d15>
13. Sultana, S., Hasan, M.M., **Hossain, M.S.**, Islam, M.R., Salimullah, M., Sarder, M.R.I., Saidul, M., 2017. Cryogenic preservation of critically endangered *Cirrhinus reba* fish sperm. *Int. J. Fish. Aquat. Stud.* 5(5), 334–339.
14. Halim, M.A., Salam, M.A., **Hossain, M.S.**, 2017b. Fish Biodiversity in Kafrikhal beel under Mithapukur Upazila, Rangpur, Bangladesh. *Int. J. Fish. Aquat. Stud.* 5(2), 487–491.
15. Halim, M.A., Mondal, D.K., Salam, M.A., **Hossain, M.S.**, 2017a. Impacts of climate change on pond fish farming in Amtoli, Borguna, Bangladesh. *Int. J. Fish. Aquat. Stud.* 5(2), 38–41.
16. Chowdhury, P., Hossen, J., Khatun, M.K., **Hossain, M.S.**, Rahman, M.M., 2016. Impacts of different fertilizers on production of fishes in polyculture system. *Int. J. Multidiscip. Res. Dev.* 3(6), 251–255.
17. Rubel, M.R.I., Hashem, S., Jaman, N., Rana, K.S., Ferdousi, K., **Hossain, M.S.**, 2016. A study on the fish biodiversity of Lohalia river of Bangladesh. *Int. J. Environ. Biol.* 6(1), 11–15.