Dr. MUHAMMAD AKMAL

Lecture, Department of Fisheries & Aquaculture, University of Veterinary and Animal Sciences, Pakistan.

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**Profile Summary**

Fish pathologist specializing in Bacterial and Viral diseases diagnosis, antimicrobial resistance, and bacteriophage therapy. Expertise in isolating and characterizing lytic bacteriophages, microbial genome analysis, and fish health management, with extensive research and teaching experience.

**Research Interest**

* Fish disease diagnostics and health management
* Drug resistance mechanisms in fish pathogens
* Isolation and characterization of bacteriophages
* Bacteriophage genome analysis and therapeutic applications

**Education**

* **Ph.D. Marine Biological Sciences (2021-2024)**

Department of Applied Biological Sciences

University of Miyazaki, Japan

**Thesis Title:** Isolation and genetic characterization of lytic bacteriophages infecting bacterial fish pathogens and drug resistance mechanisms in *Lactococcus garvieae* serotype II

* **Masters in Fisheries Science (2017-2019)**

Department of Microbiology,

Pukyong National University, South Korea

**Thesis Title**: Isolation and Characterization of bacteriophage for the possible treatment of experimental infection of *Aeromonas hydrophila* in fish

* **M.Phil. Fisheries and Aquaculture (2015-2018)**

Department of Fisheries and Aquaculture,

University of Veterinary and Animal Sciences, Pakistan.

**Thesis Title**: Evaluation of dietary probiotic (*Bacillus subtilis*) supplementation on growth and reproductive performance of Indian major carp, *Labeo rohita*

* **BS (Hons) Fisheries and Aquaculture (2009-2013)**

Department of Fisheries and Aquaculture,

University of Veterinary and Animal Sciences, Pakistan.

**Thesis Title**: Nutritive value of selected aquatic plants of Head Baloki on Ravi River, Pakistan: A way towards the cost-effective feed formulation for carps

**Employment History**

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| **Position** | **Affiliation** | **Responsibilities** | **Duration** |
| **Lecturer** | Department of Fisheries andAquaculture, University of Veterinary and Animal Sciences, Lahore. | Research and teaching | 2014 till date |
| **Internee** | National Agriculture Research Centre,Pakistan | Hands-on training in fish farming management | Less than one year |
| **Internee** | Punjab Fisheries Department, Pakistan | Hands-on training in fish farming management | Less than one year  |

**Research Articles Published**

**Akmal M**, Yoshida T, Nishiki I. Complete genome sequence of *Lactococcus garvieae* MS210922A, isolated from farmed greater amberjack (*Seriola dumerili*) in Japan. Microbiology Resource Announcements. 2022;15;11(12):e00890-22

**Akmal M**, Akatsuka M, Nishiki I, Yoshida T. Resistance and genomic characterization of a plasmid pkh2101 harbouring erm (B) isolated from emerging fish pathogen *Lactococcus garvieae* serotype II in Japan. Journal of Fish Diseases. 2023;46(8):841-8.

**Akmal M**, Araki K, Nishiki I, Yoshida T. Isolation and Complete Genome Sequencing of NS-I, a Lytic Bacteriophage Infecting Fish Pathogenic Strains of *Nocardia seriolae*. PHAGE. 2023;1;4(4):151-8.

**Akmal M**, Nishiki I, Zrelovs N, Yoshida T. Complete genome sequence of a novel lytic bacteriophage, PLG-II, specific for *Lactococcus garvieae* serotype II strains that are pathogenic to fish. Archives of Virology. 2022;167(11):2331-5.

**Akmal M**, Rahimi-Midani A, Hafeez-ur-Rehman M, Hussain A, Choi TJ. Isolation, characterization, and application of a bacteriophage infecting the fish pathogen *Aeromonas hydrophila*. Pathogens. 2020;13;9(3):215.

Sidra S, Rashid M, **Akmal M**, Arooj F, Khan BN, Javid A, Nimra A, Jamil M, Hussain A. Comparative assessment of invasive and non-invasive approaches for estimating metallic pollutants in the environment. Journal of King Saud University-Science. 2022;1;34(6):102146.

Ghaffar I, Rashid M, **Akmal M**, Hussain A. Plastics in the environment as potential threat to life: an overview. Environmental Science and Pollution Research. 2022;29(38):56928-47.

Asghar K, Rasool F, Parveen S, **Akmal M**, Anjum KM, Mahmood S. Effect of probiotics on growth and health status of *Labeo rohita*. Pakistan Journal of Agricultural Sciences. 2022;1;59(1).

Abbas S, Iqbal A, Anjum KM, Sherzada S, Atique U, Khan MK, **Akmal M**, Rahman A, Asif AR, Ahmad S, Malik A. Body composition, growth performance and enzyme activities of *Labeo rohita* fed different commercial fish feeds. Brazilian Journal of Biology. 2021;1;83:e250402.

Laraib N, Hussain A, Javid A, Noor T, Ahmad QU, Chaudhary A, Manzoor M, **Akmal M**, Bukhari SM, Ali W, Choi TJ. Recent trends in microalgal harvesting: an overview. Environment, Development and Sustainability. 2021; 1:1-31.

Muneeb M, Rashid M, Javid A, Bukhari SM, Ali W, Hasan A, **Akmal M**, Hussain A. Concomitant treatment of tannery and paper mill effluents using extremely metal-tolerant sulphate-reducing bacteria. Environmental Processes. 2020 ;7:243-53.

Batool S, Hussain A, Iqbal MA, Javid A, Ali W, Bukhari SM, **Akmal M**, Qazi JI. Implication of highly metal-resistant microalgal-bacterial co-cultures for the treatment of simulated metal-loaded wastewaters. International Microbiology. 2019;13;22:41-8.

Hussain A, Iqbal MA, Javid A, Razaq A, Aslam S, Hasan A, **Akmal M**, Qazi JI. Application of fruit wastes as cost-effective carbon sources for biological sulphate reduction. Iranian Journal of Science and Technology, Transactions A: Science. 2019;8;43:33-41.

Imran M, Hafeez-ur-Rehman M, Abbas F, Khan N, Javid A, Hussain A, **Akmal M**. Ichthyofaunal diversity, physico- chemical and health status of fishes inhabiting the river ravi near balloki headworks, Pakistan. Pakistan J. Zool. Suppl. Ser., 2018;No.13, PP. 261-269.

Anwer I, Hafeez-ur-Rehman M, Abbas F, Javid A, Hussain A, Khan N, **Akmal M**, Abbas G, Rasool F, Azmat H. Effect of onion powder as feed additive on the growth, hematology and biochemical profile of grass carp (*Ctenopharyngodon idella).* Pakistan J. Zool. Suppl. Ser., 2018;No.13, PP. 58-64.

Ghaffar I, Imtiaz A, Hussain A, Javid A, Jabeen F, **Akmal M**, Qazi JI. Microbial production and industrial applications of keratinases: an overview. International Microbiology. 2018;1;21:163-74.

Hafeez-ur-Rehman M, Abbas F, Andleeb S, Javid A, Hussain A, Abbas G, **Akmal M**, Iqbal KJ. Effect of Feed with Varying Dietary Protein Levels on Growth, Survival and Rate of Cannibalism in Fry Rearing of *Channa marulius*. Pakistan J. Zool. Suppl. Ser., 2018;No.13, PP. 48-57.

Inayat M, Abbas F, Razzaq S, Hafeez-ur-Rehman M, Javid A, Hussain A, **Akmal M,** Anwer I. Effect of vitamin D on the growth, haematological and biochemical profile of *Labeo rohita*. Agricultural Science Digest-A Research Journal. 2020;40(4):418-23.

Iqbal S, Atique U, Mughal MS, Khan N, Haider MS, Iqbal KJ, **Akmal M**. Effect of selenium incorporated in feed on the hematological profile of tilapia (*Oreochromis niloticus*). Journal of Aquaculture Research & Development. 2017;8(10):1000513.

Hussain A, Ashraf MU, Altaf MU, Khan WA, **Akmal M**, Qazi J. Relative diversity and threats to commercially important fishes of the Ravi, Pakistan. Biologia. 2015;61:145-9.

**Akmal M**, Hafeez-ur-Rehman M, Ullah S, Younus N, Khan KJ, Qayyum M. Nutritive value of aquatic plants of Head Baloki on Ravi River, Pakistan. Int J Biosci. 2014;4(10):115-22.

**Course Offered at Univerist of Veterinary and Animal Sciences, Pakistan (2015- till date)**

* Fisheries and Aquaculture
* Fish Disease and Health Management
* Fish Microbiology and immunology

**Awards (2017-2024)**

* Won MEXT fully funded scholarship(2020-2024) for Ph.D. studies by the Japanese Government at the University of Miyazaki.
* Awarded with foreign training by Govt. of Pakistan for Fisheries Science, South Korea under KOICA Fellowship(2017-2019)

**Research Students Supervise (2018-till date)**

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| --- | --- | --- | --- | --- | --- |
| **Degree** | **Supervisor** | **Major Member** | **Minor Member** | **Total** | **Status** |
| **Bachelor** | 12 | - | - |  12 | Completed |
| 3 | - | - | 3 | In Progress |
| **MPhil** | 3 | 2 | 4 | 9 | Completed |
| 1 | 2 | - | 3 | InProgress |
| **PhD** | - | - | - | 0 | Completed |
| - | 2 | - | 2 | In Progress |

**Representation at International Conferences**

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| **Sr. No** | **Conference Title** | **Presen- tation** | **Title** | **Year** | **Na- tional/****Inter- nation** | **Loca- tion** |
| 1 | KOFFST | Oral | Fisheries and Aquaculture sec- tor of Pakistan: the recenttrends, issues and develop- ments | 2017 | Inter- na- tional | Busa, South Korea |
| 2 | KOFFST | Oral | Isolation and characterization of a new bacteriophage infect- ing fish pathogenic | 2018 | Inter- na- tional | Busa,South Korea |
| 3 | The 14th KSMB annual meeting & symposium | Poster | A new bacteriophage Akh-2 as a candidate for the controlof fish pathogenic *Aeromonas hydrophila* | 2018 | Inter- na- tional | Busan,South Korea |
| 4 | IFACE | Oral and Poster | Bacteriophage based biocontrol of *Aermonas* in aqculture | 2019 | Inter- na- tional | Lahore,Pakistan |
| 5 | Annual Meeting of the Japanese Society of Fish Diseases | Oral | Isolation, characterization, and application of a lytic bacterio- phage (PLG-II) against fishpathogen *Lactococcus garvieae* serotype II | 2022 | Inter- na- tional | Miyazaki,Japan |
| 6 | Annual Meeting of the JapaneseSociety of Fish Diseases | Oral | Isolation and genomic charac- terization of a lytic bacterio-phage (NS-I) infecting fish pathogen *Nocardia seriolae* | 2022 | Inter- na- tional | Miyazaki,Japan |
| 7 | Annual Meeting of the Japanese Society of Fish Diseases | Oral | Genomic comparison, stabil- ity, and conjugation analysis of erythromycin resistant plas- mids in Lactococcus formo-*sensis* (serotype II) | 2023 | Inter- na- tional | Tokyo,Japan |

**Seminar and Workshop Attended**

* One day National Seminar on "Management of Open Water Fisheries in Pakistan, Issues and Options" on April 28, 2012 at Chashma Lake, Mianwali.
* One day National Seminar on "Emerging Trends & Prospects in Fisheries Management"on June 12, 2013 at Chashma Reservoir, Mianwali.
* Two-day International Conference on "Feeding Pakistan Aquaculture Conference Small Trade Show & Scientific Poster Display" on April 2-3, 2014 at Pearl Continental Hotel, Lahore.
* Two-day Workshop on "Culture of Gift Tilapia" on April 25-26, 2014 at UVAS, Lahore.
* Five-day Workshop on "Pre-Service Competency Enhancement Training For Teachers (P- SCETT)" on August 5-9, 2014 at UVAS, Lahore.
* Six-day Workshop on "Data Analysis & Proposal Development" on December 22-27, 2014 at UVAS, Lahore.
* Four-day Workshop on "Capacity Building of Young Researchers" on June 15-18, 2015 at UVAS, Lahore.
* Seven-day Workshop on "Research Methodologies Using Statistical Technique in Biological Science" on December 17-23, 2015 at UVAS, Lahore.
* Two-day Workshop on "Zoo Animals Keeping Zoonoses & Bio-safety Measures" on August 27-28, 2015 at UVAS, Lahore.
* Two days of Training on "Hands-on Training on Ostrich Farming" on April 20-21, 2016 at UVAS, Pattoki.
* One-day Workshop on "Laboratory Biosafety" on November 3, 2016 at UVAS, Lahore.
* One-day Seminar on "World Fisheries Day 2016" on November 21, 2016 at UVAS, Lahore.
* One-day Seminar on "Fish Diseases & Control Strategies" on January 28, 2019 at UVAS, Ravi Campus.
* One-day Hands-on Training on "Workshop on Techniques for Wet and Dry Preservation Methodologies for Museum Specimen" on March 6, 2019, at UVAS, Lahore.
* Two days of Hands-on Training on "Two Days Hands-on Training Workshop on Sanger Sequencing Data Analysis" on April 10-11, 2019 at UVAS, Ravi Campus.
* One-day Training on "Basic Bioinformatics Tool for Functional Genomics" on July 5, 2019 at UVAS, Ravi Campus.
* One-day Training on "Mushroom Cultivation Techniques" on November 29, 2019 at UVAS, Ravi Campus.
* Participated in the "Stakeholders Consultation Workshop for Deliberation on National Surveillance Strategy for Antimicrobial Resistance in Aquaculture" held in Islamabad.
* Engaged in a workshop on "Exploring Cytogenotoxicity (A Biomarker Perspective)" at UVAS.
* Attended faculty training organized by the Center for Educational Policy and Administration (CEPA) at UVAS.
* Completed the "Master Trainers Program for MPhil/PhD Supervisors" at UVAS.
* Contributed to the "National AMR Surveillance Strategy in Aquaculture" and participated in the symposium on "WAAW 2024" at PARC.
* Conducted a one-day training workshop on "Enzyme-Linked Immunosorbent Assay" as a resource person at UVAS.
* Attended a one-day training workshop on "Enzyme-Linked Immunosorbent Assay" at UVAS.
* Participated in the "National Workshop on Promotion of Aquaculture in Pakistan" organized by the Ministry of Maritime Affairs.

**Membership of Different Societies**

* Pakistan Fisheries Society
* UVAS – Fisheries and Aquaculture Society
* Working group UVAS Industry Liaison
* American Society for Microbiology (Member Id 200014511)

**Books Chapters /Reports**

* Noor T, Javid A, Hussain A, Bukhari SM, Ali W, Akmal M, Hussain SM. Types, sources and management of urban wastes. In Urban ecology 2020 Jan 1 (pp. 239-263). Elsevier.
* Jang Kwon-In, Rab Abdul, Akmal Muhammad, Kim Sukyeong. Baseline study of Aquaculture in Pakistan. Aquaculture status and development in Pakistan and Korea. The World Bank

**Language**

English (A), Urdu (A), Japanese (C), Korean (C)

A= Fluent/Native, C=Very basic

**References**

Professor Terutoyo Yoshida

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University of Miyazaki, Japan

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Prof. Tae Jin Choi Department Microbiology,

Pukyong National University, Busan, South Korea

Email: choitj@pknu.ac.kr

Dr. Shahzad Ali (Associate Professor) Department of Wildlife and Ecology,

University of Veterinary and Animal Sciences, Lahore-Pakistan Email: shahzad.ali@uvas.edu.pk