



KEY WORDS

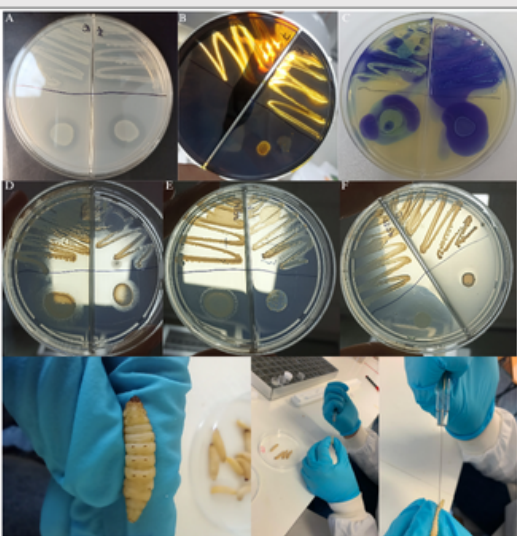
- ✓ *Aeromonas* spp.
- ✓ *Galleria mellonella*
- ✓ In vitro assays
- ✓ Virulence genes
- ✓ Whole genome sequencing

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GENOME-BASED IDENTIFICATION OF AQUATIC *Aeromonas* spp. ISOLATES AND EVALUATION OF THEIR VIRULENCE POTENTIAL USING *IN VITRO* ASSAYS AND THE *Galleria mellonella* INFECTION MODEL

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THESIS ABSTRACT

This study evaluated the pathogenic potential of 17 *Aeromonas* isolates from aquatic environments using in vitro phenotypic assays, *Galleria mellonella* larval infection models, and whole-genome sequencing. Hemolytic, DNase, and lipase activities varied among strains, and in vivo virulence was both strain-specific and dose-dependent. Several isolates caused complete larval mortality within 24 hours at 10^7 CFU/larva, whereas others showed reduced virulence.

Genome-based identification using ANI and dDDH confirmed species-level assignments, while annotation revealed major virulence genes related to adhesion, secretion systems, and toxins. Resistance profiling highlighted widespread β -lactam, tetracycline, and fluoroquinolone resistance. This integrated approach enables detailed strain-level risk assessment for aquaculture and zoonotic surveillance.

APPLICATION AREAS OF THE THESIS RESULTS

The integrated in vitro and in vivo analyses conducted in this study contribute to assessing the zoonotic potential of aquatic *Aeromonas* strains. These findings can inform occupational health and biosafety protocols, especially in aquaculture settings where human-pathogen contact is possible. Additionally, the comprehensive profiling of virulence and antimicrobial resistance supports the rational design of preventive strategies, including autogenous vaccine development and phage-based therapies. The results can aid in disease management and surveillance across both aquatic animal health and public health domains.

ACADEMIC ACTIVITIES

Ajmi, N., Duman, M., Coskun, B., Esen, C., Sonmez, O., Tasci, G., ... & Saticioglu, I. B. (2025). Unraveling Genomic and Pathogenic Features of *Aeromonas ichthyocola* sp. nov., *Aeromonas mytilicola* sp. nov., and *Aeromonas mytilicola* subsp. *aquatica* subsp. nov. *Animals*, 15(7), 948.

Ajmi, N., Duman, M., Ay, H., & Saticioglu, I. B. (2025). Genomic and Pangenomic Insights into *Aeromonas salmonicida* subsp. *oncorhynchi* subsp. nov. *Pathogens*, 14(6), 523.

Saticioglu, I. B., **Ajmi, N.,** Coskuner-Weber, O., Alpsoy, S., Ay, H., Aydin, F., ... & Duman, M. (2025). Three new *Microbacterium* species isolated from the Marmara Sea mucilage event: *Microbacterium istanbulense* sp. nov., *Microbacterium bandirmense* sp. nov., *Microbacterium marmareense* sp. nov. *Systematic and Applied Microbiology*, 48(3), 126600.