



Water Pond Quality, Microbiological and Chemical Contaminants Analysis in Fish Farming



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Fig. 1: Red tilapia aquaculture ponds in Algeria. Source: La Voie d'Algérie, 2025.

INTRODUCTION

Freshwater aquaculture in Algeria is mainly based on irrigation-fed ponds, where nutrient-rich water can be reused for crop irrigation, improving resource efficiency. The decline in production and risks from microbial and chemical contamination highlighted the need for better monitoring and sustainable practices.



Figure 02. Fish affected by pesticide pollution. Source: The Guardian, 2019.



Figure 03. Freshwater fish farming in southern Algeria. Source: eBourse, 2017.

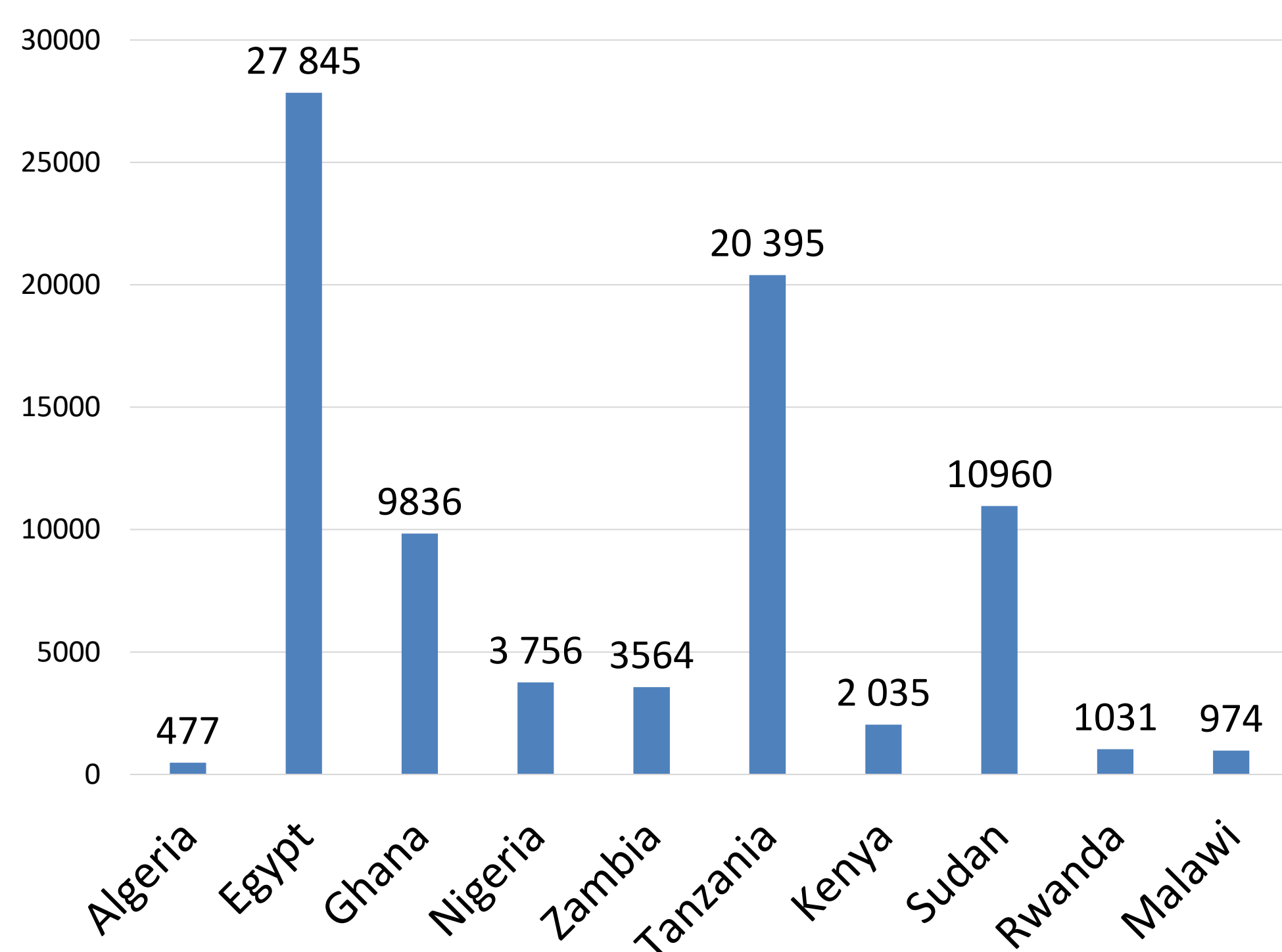


Figure 04: Top 10 Aquaculture production in Africa, including Algeria (2021). Source: FishStatJ (2023)

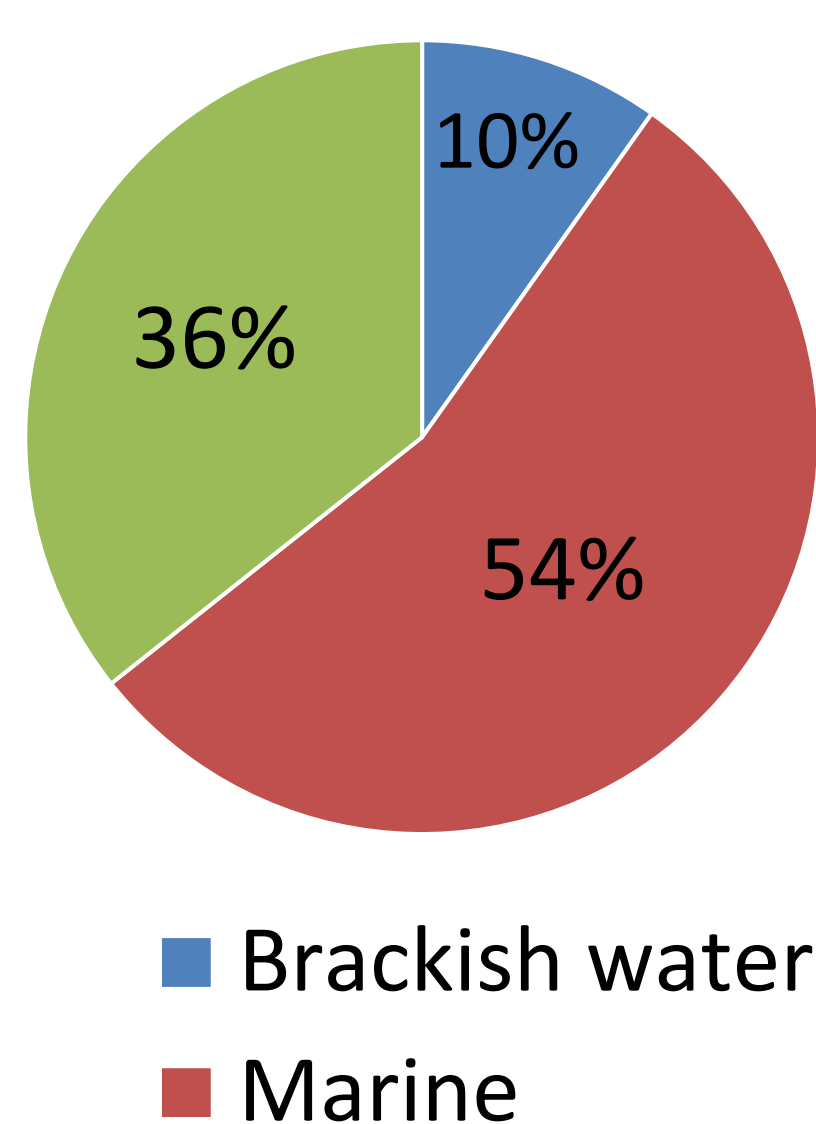


Figure 05: Aquaculture production in Algeria by farming environment 2021. Source: FishStatJ (2023)

ABSTRACT

Aquaculture is expanding worldwide and is developing in Algeria through freshwater fish farming and integrated aquaculture systems. Pond water quality strongly influences **fish health, production efficiency, and environmental sustainability**. Microbiological contamination and chemical residues may affect fish survival and represent potential risks for human health, highlighting the importance of monitoring aquaculture pond water.

OBJECTIVES

Assess physicochemical parameters, identify microbial contamination, detect pesticide and veterinary drug residues, and support integrated aquaculture–agriculture systems that enhance productivity, human health, and environmental sustainability.

METHODS AND MATERIALS

In this study, freshwater samples were collected from fish basins in different regions of Algeria and analyzed to evaluate their physicochemical properties and microbiological quality. The samples were also examined for the presence of contaminants, including chemical pollutants.



Figure 04. Fish farming basin. Source: M.AZOUZ.

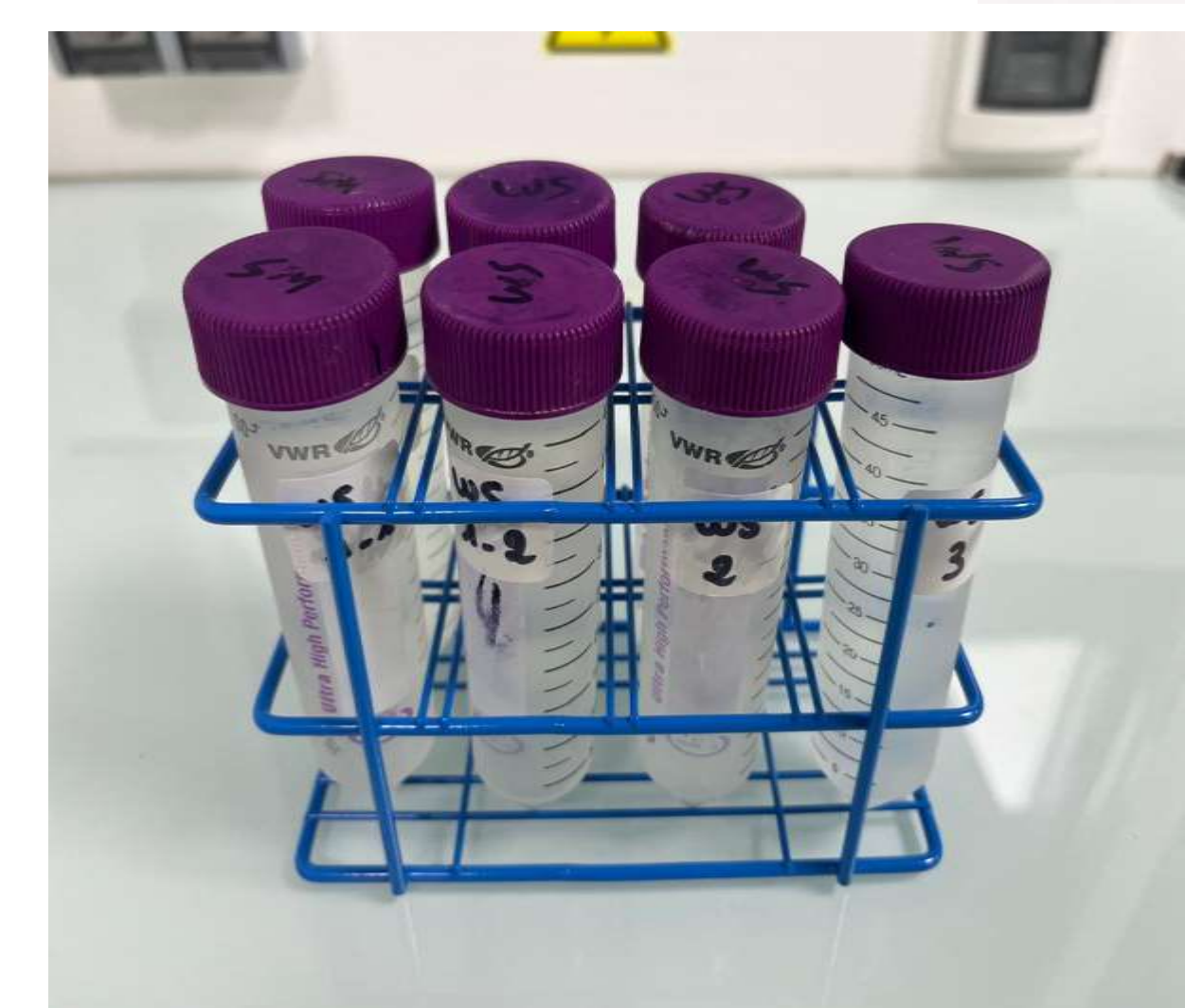


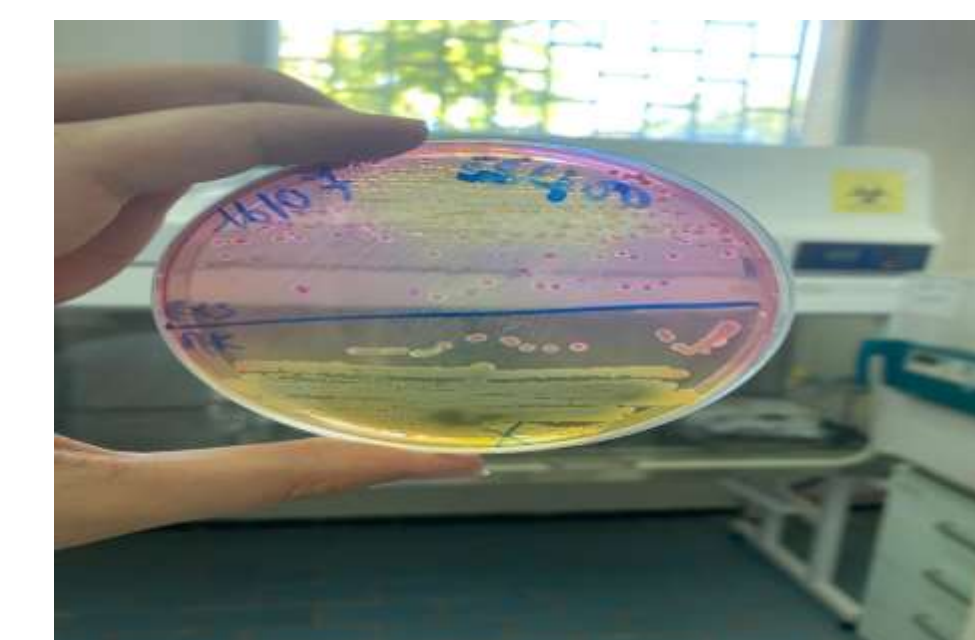
Figure 05. Water samples. Source: M.ABBOU, S.N.ABBACHE

Analytical methods

Physicochemical analysis



Microbiological analysis



Nuclear analysis by Radioreceptor assay



Fig. 6,7,8: Analytical methods. Source: M.ABBOU, S.N.ABBACHE

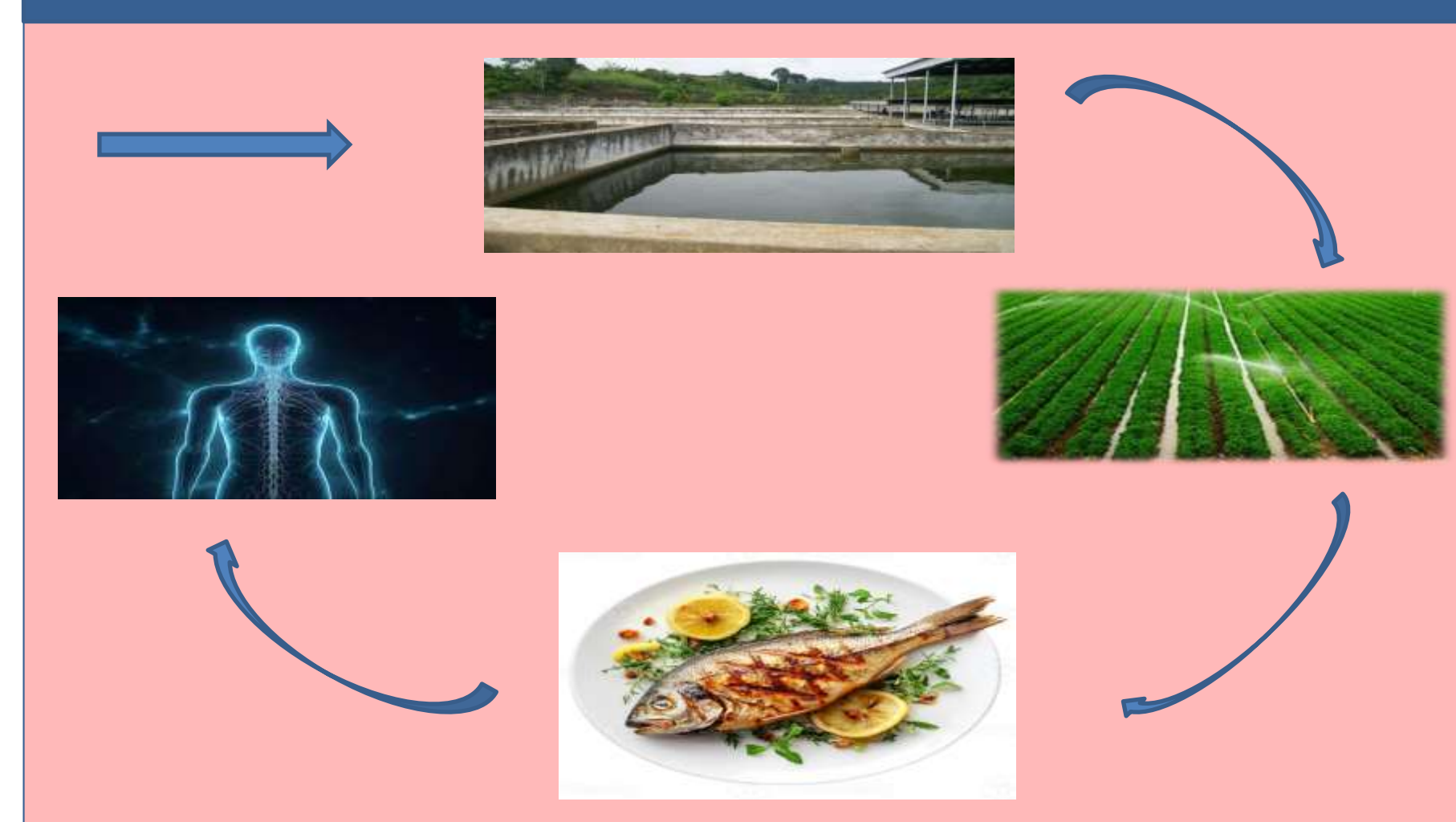
Types of contaminants	Classe
Pesticide	Methylcarbamates (CM), Organophosphates (OP)
Veterinary Antibiotics	Beta-lactams, Tetracyclines, Macrolides, Sulfonamides, Gentamicin / Neomycin (both aminoglycosides), Chloramphenicol

Tab 01. Types of pesticide and Veterinary Antibiotics used in Radioreceptor assay method. Source: CharmScience

RESULTS

The Radioreceptor assay results indicated that all seven samples were free of pesticides. Antibiotic analyses remain in progress

CONTAMINATION RISKS



CONCLUSION

In Algeria, integrated aquaculture–agriculture systems are rapidly evolving and require strengthened monitoring and control practices to ensure their sustainability. This study contributes by improving water quality management, enhancing both aquaculture and agricultural productivity, while safeguarding human health and preserving the environment