

Disease infection by Enterobacteriaceae family in fishes: A review

Abstract

Enterobacteriaceae family microorganisms are the major cause of infection in humans. Usually, they are commonly found in normal microbiota from fish. The incorrect handling of professionals that work with fish farm, and the indiscriminate use of antibiotics in the pisciculture can lead to the onset of diseases in fishes transmittable to human consumer.

Keywords: *Enterobacteriaceae*, fish infection, pisciculture

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Introduction

Fish farming has increased in the last decades, in order to the growth of animal protein consumption. The food safe handling is a topic widely discussed in various studies that discussed the migration of microorganisms exclusive from fish to human feed. *Enterobacteriaceae* family is one group, which includes the most species related with infection in humans. Microorganisms of *Enterobacteriaceae* family are Gram-negatives, positives for catalase, facultative aerobics and non-glucose fermenters.¹ These microorganisms are usually found in gastrointestinal tract from fish, but a study performed by² showed that microorganisms like *Escherichia coli*, *Enterobacter spp.* and *Klebsiella pneumoniae*.³⁻⁵ are frequently isolated from fish in pisciculture.

The presence of *Enterobacteriaceae* bacteria in fish farming lead to a serious health public risk. Despite in most cases these microorganisms are part of normal microbiota from fish, when colonizing human sites, they can cause some diseases, like urinary tract infection.⁶ For preventing infection on fish and economic loss,⁷ the use of antibiotics in aquaculture has been widely used,^{6,8} but the indiscriminate use of these drugs has led to the emergence of resistant strains, a very dangerous situation for the consumers.⁹ Isolation of *Enterobacteriaceae* species has been the focus of researches, especially in fish farming, due to the transmission of resistant bacteria to humans.¹⁰

In a research performed by Peixoto et al.⁴, *Pseudomonas aeruginosa* and *Enterobacter cloacae* were isolated from curimba, *Prochilodus lineatus* (Valenciennes, 1837) in a closed system. The fish exhibited the following descriptions: adult member with 42.69 mm total length and 31.96 mm length pattern. The fish had the following infectious processes: bleeding in the pectoral fin, ulceration head above the eyes. Oliveira et al.³, isolated strains of *Klebsiella pneumoniae* from a nishikigoi carp, *Cyprinus carpio* Linnaeus, 1758, in a closed system vivarium. In this case report, the authors observed lesion of necrosis, but no systemic infection was observed. *Escherichia coli* are the most frequent microorganism isolated in fish meal and water in fish farming. Ristori et al.¹¹ investigated the presence of *E. coli* O157:H7 in fish meal, in order to prevent the transmission to the consumers.

Conceição et al.¹² investigate the presence of microorganism in fish farming at Conceição das Alagoas, Minas Gerais - Brazil, and *Enterobacteriaceae* the most isolated species were from *Enterobacteriaceae* family. Yagoub.² isolated *Enterobacteriaceae* family and *Pseudomonas spp.* from fresh fish bought in supermarket (*Tilapia nilotica* Linn). Among the bacteria from *Enterobacteriaceae* family, 23.2% of the strains isolated were identified as *E. coli*. The authors point out the need that the experimental and theoretical methods must be done like described in Nascimento et al.¹³.

Since several of these microorganisms are transmitted by fecal-oral route as observed with contaminated fruits or vegetables, the risk to human health may be during handling, processing or, where it is difficult to determine the source of the microbes. When it occurs during handling, a hypothesis that could be raised could probably be the reflection of the use of bovine manure to stimulate the production of plankton in nursery. The authors point out the need of eliminates the use of manure in all systems, especially when in direct contact with fish or fish farmers.

Conclusion

Bacteria from *Enterobacteriaceae* family are present in the normal fish microbiota, but some as *E. coli*, *Klebsiella pneumoniae* and *Pseudomonas spp.* can cause human diseases. The indiscriminate use of antibiotic in fish farming has led to the emergent of resistant strains that in contact with the consumer can lead to several health problems. We already know the consequences of indiscriminate use of antibiotics can lead, but despite this, even today we are not able to deal with the biodiversity of natural systems. For avoiding this imbalance, we must recognize this scenery and go further than this limitation that will help to understand the natural systems, the interactions between microorganisms, with their hosts and with the environment. Thus, the balance between host, environment and the desired food security would be established.

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Conflicts of interest

There is no conflict of interest.

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