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Short Communication

Short Communication about the Quality of Fish Commercialized In Sao Paulo and the Risk of Zoonotic Infections

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ABOUT THE STUDY

In Brazil, the Regulation of Industrial and Sanitary Inspection of Products of Animal Origin (RIISPOA), through the Normative Instruction in 2019 is the highest instance law that defines the quality standards for fish intended for human consumption [1]. The most consumed fishes in the State of São Paulo are the Hake (*Merluccius hubbsi*) and the Nile Tilapia (*Oreochromis niloticus*), for which sanitary inspection is highly deficient, especially for the less favored populations [2].

A study published in 2022 evaluated the quality of fish marketed in cities in the interior of São Paulo, focusing on the physicochemical analyses and necropsy findings described in the current inspection regulation [3]. According to necropsy findings, external hemorrhage, splenomegaly, and kidney hemorrhage were the most frequent findings in the fish. These findings are easily unnoticed by those who are handling the fish, whether in the warehouse, in the consumer's kitchen, or in the restaurant. The verified alterations configure loss of quality of the fish and deterioration with lesions suggestive of septicemic diseases, such as those caused by the bacterium *Edwardsiella tarda*, responsible for hemorrhagic lesions, ulcers and alterations in the kidneys, spleen and liver of these animals [4]. It is important to be aware of the occurrence of this agent causing diseases in fish, considering that besides the food deterioration, it can be harmful to humans, causing gastroenteritis, meningitis, endocarditis, and liver abscesses [4,5].

Aeromonas veronii infections are common in Nile Tilapia, causing hemorrhagic lesions in the kidneys [6]. *Aeromonas* are anaerobic, gram-negative bacteria that occur in all water bodies worldwide, and in addition to kidney hemorrhage, have additionally been reported to cause hemorrhagic septicaemia in fish [5]. Cerebral ischemia is also a possibility, a finding also pointed out in the study [6]. In addition, this is a risk for the handlers, as it is a potential pathogen for humans, causing gastrointestinal lesions and septicemia [7]. *Streptococcus agalactiae* is an agent that also affects Nile Tilapia, causing hemorrhagic lesions on fins, skin and lips, hemorrhage and thrombosis in glomeruli and renal tubules, and marked splenomegaly [8]. Several environmental conditions can be considered to influence the development of *S. agalactiae* infections, such as natural stressors and pisciculture density [9].

Although rare, infection by oomycetes and some filamentous fungi are also possible, especially in favorable regions such as Brazilian rivers, where there is a tropical climate with high water temperatures and volume of organic material [5]. Species of the genus *Fusarium*, such as *F. oxysporum*, cause hemorrhagic lesions and ulcers on the skin and gills of Tilapia, as well as necrosis and hemorrhage in the kidney [10]. This agent is a risk for fish consumers, especially for immunosuppressed people and those who don't usually cook their food for long enough [9]. Through visual inspection, no internal or external parasites were found in the fish, which could be an important health concern.

As a result of the physico-chemical tests, the Total Volatile Nitrogen Base (TVB-N) of the samples exceeded the limit of 30 mg N/100 g (30 mg of nitrogen per 100 grams of muscle tissue), which qualifies fresh fish as unfit for consumption.

Brazilian legislation emphasizes the importance of food within the parameters of innocuousness. Some alterations may go unnoticed during the inspection process, e.g., internal bleeding lesions, mainly due to the handler's lack of knowledge about these infections. It is important to provide specialized training for the optimal management of piscicultures to identify possible problems and handle possible infections. It is also important to note the intrinsic universe of human-animal-environment relationships and the eminent possibilities of zoonotic infections that result not only in underdiagnosed gastrointestinal disorders but also in the development of more severe clinical conditions. The exceeded limit for total volatile nitrogen base in all samples points to a major inspection problem in the country and should not be overlooked.

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