



Symbiotic supplementation on the hemato-immunological parameters and survival of the hybrid surubim after challenge with *Aeromonas hydrophila*

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Abstract

This study evaluated the effects of dietary supplementation with two symbiotics in the hybrid surubim (*Pseudoplatystoma corruscans* × *P. reticulatum*) prior to and after challenge with *Aeromonas hydrophila*. The fish were divided into unsupplemented fish, supplemented fish with *Weissella cibaria* and inulin, and supplemented fish with *Lactobacillus plantarum* and inulin. Twenty days after being fed symbiotics, the fish were sampled for immunological, haematological, and microbiological analysis pre-challenge. After this period, they were challenged with *Aeromonas hydrophila*, and after 96 h the fish were sampled for blood collection and survival. Fish fed *W. cibaria* and inulin from the pre-challenge showed the highest values of lysozyme activity. Fish fed *L. plantarum* and inulin presented a higher number of thrombocytes and granular leukocyte PAS⁺ than the other fish. After challenge, fish fed both symbiotics presented an increased red blood cells number. Fish fed *L. plantarum* and inulin showed an increased total leukocyte count (WBC), neutrophils, and monocytes number as well as total immunoglobulin. The *W. cibaria*- and inulin-supplemented fish showed improved haematological and immunological parameters and reduced cumulative mortality after the challenge.

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Introduction

Fish from the genus *Pseudoplatystoma*, commonly known as "surubim", have great economic importance to Brazilian aquaculture due to their excellent flavour, white meat, and absence of pinbones in the fillet (Inoue *et al.* 2009). The hybrid is generated from the crosses between 'pintado' (*Pseudoplatystoma corruscans*, Agassiz 1829) and 'cachara' (*P. reticulatum*, Linnaeus 1766), which are produced in great quantity, especially in Central Brazil (Campos 2010). The aquaculture production in 2012 of these catfish species in Brazil was about 5106 tons, and the estimated value of this farmed fish is US\$ 12.4 million. In Brazil, the production of *Pseudoplatystoma* has already surpassed the production of the South American catfish *Rhamdia quelem*, for which the production reached 1975 tons, resulting in an amount of US\$ 4.3 million (FAO 2013).

Stressful conditions of intensive fish production are responsible for disease and consequently mortality (Vandenberg 2004). Disease outbreaks in surubim farms, especially in winter, result in bloody intestine and anus, external lesions, and fin haemorrhages, leading to 80% mortality in some cases (Campos 2004). Silva *et al.* (2012) related *Aeromonas hydrophila* as the cause of mortality in the hybrid surubim, causing characteristically clinical signs like depigmentation, ventral and dorsal ulceration, anal bleeding, abdominal swelling, pale gills, anal deformities, alterations in the liver and kidney, white spots on the gallbladder, and haemorrhagic spots on the heart and brain similar to haemorrhagic septicemia in fish farms.