



# Probiotic bacteria may prevent haemorrhagic septicaemia by maturing intestinal host defences in Brazilian native surubins

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## Abstract

The farming of hybrid surubins in Brazil has been affected by bacterial diseases. To avoid this problem, the development of prophylactics such as probiotics has proved to be a promising tool against bacterial outbreaks. This study evaluated the dietary supplementation with lactic acid bacterium *Weissella cibaria* and its probiotic action in the intestinal tract focusing the hemato-immunological parameters, histology and electron microscopy. A total of 96 fish were maintained in a recirculation system and divided into 12 tanks, two treatments (supplemented and unsupplemented fish) and six replicates. Fish were fed supplemented commercial diet with *W. cibaria* for a period of 45 days, and the unsupplemented fish were with commercial feed without probiotic. The numbers of red blood cells, thrombocytes and lymphocytes were higher in supplemented fish after 45 days ( $P < 0.05$ ). The percentage of phagocytosis, the agglutination titre and the total immunoglobulin concentration were higher in fish fed probiotic. Fish fed supplemented diet presented increased length and width of the intestinal villi, the number of goblet cells and villi's perimeter. The probiotic *W. cibaria* was capable of colonizing and benefitting the surubins' gastrointestinal tracts, improving intestinal health and the hemato-immunological parameters of fish.

**KEY WORDS:** gut colonization, intestinal cells, Pimelodidae, probiotic, scanning electron microscopy, transmission electron microscopy

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## Introduction

The hybrid surubim (*Pseudoplatystoma reticulatum* female × *P. corruscans* male), an important and valuable fish for Brazilian aquaculture, is one of the most appreciated freshwater species for human consumption and for ornamental marketing in South America (Roubach *et al.* 2003). Factors such as good growth, high carcass yield, excellent quality meat, gentle flavour, light colour, lack of intramuscular bones and high market price make this fish appreciated by fishermen (Campos 2004; Godinho *et al.* 2007; Nuñez *et al.* 2011).

As a result of intensive surubim farming, bad management practices, high stocking densities, bad quality of feeds and poor water quality (Moraes & Martins 2004), disease emergence can occur (Silva *et al.* 2012). The use of probiotics is an alternative to keep the fish healthy, especially by the fact that they improve the immune system and reduce stress and disease occurrence (Ringo & Gatesoupe 1998; Merrifield *et al.* 2010a; Ringo *et al.* 2010; Mouriño *et al.* 2012).

Benefits linked to the use of probiotics have already been proved in many studies, such as their action in the competitive exclusion of pathogenic bacteria (Vine *et al.* 2004), as