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Isolation of probiotic bacteria from the hybrid South American catfish *Pseudoplatystoma reticulatum* × *Pseudoplatystoma corruscans* (Siluriformes: Pimelodidae): A haematological approach

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ABSTRACT

This study investigated bacterial strains with probiotic potential isolated from the middle portion of healthy hybrid surubim catfish foregut (*Pseudoplatystoma reticulatum* female × *P. corruscans* male). Twenty surubims weighing 1.5 ± 0.3 kg were used for bacterial isolation. In total, 41 strains of bacteria were selected *in vitro*. Ten strains had inhibition zones >10 mm against *Aeromonas hydrophila*. Five of those strains presented inhibition zones > 9 mm against other pathogenic bacteria and reached concentrations greater than 10^5 CFU mL^{-1} in tubes containing de Man, Rogosa and Sharpe (MRS) medium. In particular, *Weissella cibaria* (P36) reached 10^6 CFU mL^{-1} in MRS and was able to reduce the pH of the medium to 3.85. In the *in vivo* intestinal colonization studies, 72 healthy hybrid surubims were fed with a commercial diet supplemented with probiotic *W. cibaria* for 15 days. Changes in gut community composition were then analyzed, and probiotic profile of *W. cibaria* was determined molecularly by amplification of rRNA 16S gene was performed using PCR. Compared to control fish, *W. cibaria*-supplemented fish showed an increase in RBC. These results show the efficacy of our haematological approach to probiotic screening in hybrid sorubim.

1. Introduction

Fish of the genus *Pseudoplatystoma* found in the Uruguay River, Paraguay River and São Francisco River basins belong to the Pimelodidae family. They can reach 152 cm in length (Agostinho et al., 2003) and are of great economic importance in Brazil (Roubach et al., 2003). According to the Food and Agriculture Organization of the United Nations (FAO, 2009), aquaculture production of South American catfish species in continental waters in 2007 reached about 670 tons, producing revenue close to $1,467,000.00 USD.

However, as reported by Moraes and Martins (2004), high production results in high stock density and equally high incidence of disease. In particular, diseases of bacterial origin cause the greatest economic losses, often manifesting as subclinical changes in infected fish (Martins et al., 2004). For example, the bacterial genus *Aeromonas* caused primary and secondary septicemia in immunocompromised hybrids of *Pseudoplatystoma* species, as determined in different aquaculture outbreaks in Mato Grosso, Brazil (data not shown).

Antibiotics have typically been used to prevent and control disease in intensive fish farming. However, studies have reported an increase in resistance to pathogens and growth in aquaculture systems (Verschuere et al., 2000). Therefore, the use of probiotics is now considered a viable prophylactic alternative. Probiotics are defined as live organisms that benefit the health of the host

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