



## **Improving the blood and immune characteristics of the *Astronotus ocellatus* by adding *Bacillus subtilis* probiotics**

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### **Abstract:**

As one of the most popular aquarium fish in the world, Oscar fish need more attention to ensure safety and health in breeding conditions. This study was conducted to evaluate the effects of dietary *Bacillus subtilis* on the blood and immune indices of 120 tiger Oscar (*Astronotus ocellatus*). The fingerlings which were produced by a pair brooder had an average weight of  $8.96 \pm 0.03$  g and length of  $8.23 \pm 0.02$  cm. During 70 days of experiment fishes fed by diets containing *B. subtilis*. The treatments including 0(control), 150, 300, and 450 mg *B.subtilis* per kg of food with triplicates in each treatment. At the end of the rearing period, blood sampling of all treatments performed and their blood and immunity indices were evaluated. The results showed that the use of bacteria in the diet of Oscar fish significantly improved blood and immune factors. An increase in white blood cells, hemoglobin, hematocrit, neutrophil, and monocytes percentages were observed in treatment 3 (BS<sub>450</sub>) compared to other treatments and control with statistically significant differences ( $p < 0.05$ ). Also, the results of the immune index of complementary activity (ACH<sub>50</sub>), lysozyme and IgM, in treatments 2 (BS300) and 3 (BS450) with a statistically significant difference were higher than control and treatment 1 ( $p < 0.05$ ).

**Keywords:** Tiger Oscar, *Astronotus ocellatus*, *Bacillus subtilis*, Probiotic, Immune, blood