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Determination of the optimum level of a commercial probiotic on growth performance, feed utilization efficiency, and immunity of GIFT Tilapia, *Oreochromis niloticus*

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Abstract

Traditional strategies to combat bacterial and viral pathogens, such as high doses of antibiotics have raised concerns about the development of antibiotic-resistant strains in aquaculture industry. Consequently, supplementing feeds with probiotics is widely preferred as a sustainable method to enhance the growth performance and higher survival rates of aquatic organisms. The present study was conducted to evaluate the effect of commercial probiotic, "NOVA BACILAC FISH" on growth performance, feed utilization efficiency, stress resistance and hematological parameters of GIFT tilapia (*Oreochromis niloticus*). Eight weeks of feeding trials were conducted to examine the effect of different probiotic levels. Fish with an average length of 4.0 ± 0.08 cm and weight of 1.0 ± 0.09 g were stocked at a density of 15 fish per tank. Commercial probiotic levels were introduced in diets as ED1 (Diet with 0.1% probiotic), ED2 (Diet with 0.25% probiotic), ED3 (Diet with 0.5% probiotic) and their effects were compared with the control diet which was not included with probiotic. Each treatment was followed in three replicates. During the experiment, fish were fed up to satiation. At the end of the experiment, the percentage Specific Growth Rate (%SGR), percentage Average Daily Gain (%ADG) and Food Conversion Ratio (FCR) were calculated. Simultaneously, salinity stress test and hematological analysis were performed to study the effect of the used probiotic doses on fish health. Between 4th and 8th week of feeding trial, the growth performance of fish fed with 0.5% probiotics diet was significantly higher than those of other treatments. Results showed that ED3 treatment had the highest body weight of 19.86 ± 0.28 g and body length of 10.75 ± 0.8 cm at the end of the study. Similarly, %SGR (5.60 ± 0.09) and %ADG (39.44 ± 2.27) were significantly higher in ED3 than those of other treatments. Moreover, the lowest FCR value (0.85 ± 0.02) was observed in fish fed by 0.5% probiotic diet (ED3). After exposing the experimental fish to the salinity stress test at 27 ppt, significantly lowest cumulative mortality index (CMI) was observed in fish fed by 0.5% probiotic diet (ED3). The blood profile analysis showed the significantly highest Red Blood cell (RBC) count (1.91 ± 0.02×10^{6} mm^{-3}) in ED3 treatment. According to the present study, 0.5 % of dietary supplementation of commercial probiotic "NOVA BACILAC FISH" can be used to improve the growth performance, immune status, and stress resistance of GIFT tilapia.

Keywords

Oreochromis niloticus, commercial probiotic, growth performance, feed utilization, stress test