

Abstract No: BO-47

Effect of dietary supplementation of probiotics and ascorbic acid on the growth, survival and haematological parameters, and enhancement of resistance to bacterial infections in Nile Tilapia (*Oreochromis niloticus*)

A. G. C. Nethmini*¹, M. G. I. S. Parakrama¹, A. D. W. R. Rajapakshe² and R. Weerasinghe²

¹ Department of Zoology and Environmental Management, University of Kelaniya, Sri Lanka
² Inland Aquatic Resources and Aquaculture Division, National Aquatic Resources Research and Development Agency, Sri Lanka
Nethmini-bs17189@stu.kln.ac.lk*

This study was conducted to evaluate the effects of dietary administration of probiotic (PROFS POWER®) and ascorbic acid in Nile tilapia fingerlings (*Oreochromis niloticus*) diets. A total of 90 Nile tilapia fingerlings were distributed into three triplicate treatments. The first treatment, T₁ was fed a balanced diet supplemented with probiotics (5 g/kg), whereas T₂ received the same basal diet supplemented with ascorbic acid (500 mg/kg). Fish of the third treatment, T₃ were served a control diet free from both probiotics and ascorbic acid. After three months of the experiment, survival and growth performances were evaluated and blood samples were collected from the experimental fish of different treatments. The protective effect of the two compounds was evaluated via a challenge infection test, using *Aeromonas hydrophila*. For the histopathological study, tissue specimens of the gills, liver, and intestine were excised from the tested fish. The specific growth rate (%) was significantly higher ($p < 0.05$) in T₁ (1.89 ± 0.04) followed by T₂ (1.88 ± 0.04) compared to the control (1.62 ± 0.04). The survival (%) was significantly higher ($p < 0.05$) in T₁ (93.33 ± 3.33) and T₂ (90.00 ± 0.00) compared to the control (63.33 ± 6.67) at the end of the feeding trials. Significant improvements ($p < 0.05$) in haematological parameters of fish such as the mean erythrocyte count (RBC), white blood cell count (WBC), haemoglobin content (Hb) and haematocrit (Hct) were found with experimental groups, fed with probiotics and ascorbic acid compared to the control group. Haemoglobin content and RBC were significantly ($p < 0.05$) reduced in T₃ after bacterial challenge, but fish in T₁ and T₂ were not significantly affected. The challenge infection showed an improved level of protection in fish fed with two supplemented treatments compared to the control. Gill hyperplasia was observed in the control treatment while almost normal gill structure was observed in fish fed with supplements. Melano-macrophage centers were observed in liver sections of fish in T₁ and T₂. Necrotic areas were observed in the gut sections of fish in the control treatment. The shown protection in fish in T₁ and T₂ may be due to the protective effect of supplemented diets. The results revealed a positive growth enhancement and improved level of protection of *O. niloticus* with the incorporation of both ascorbic acid and probiotics as growth promoters in their diet with respect to its growth, haematology, innate immunity, and disease resistance. Following the experimental design, adding 500 mg of ascorbic into one kilo of diet was cheaper than adding 5 g of probiotics. Therefore, it is suggested that the incorporation of ascorbic at a dose of 500 mg per one kilo of diet could be a potential, less expensive, and promising dietary supplementation than incorporating probiotics for Nile tilapia (*O. niloticus*) fingerlings aquaculture.

Keywords: Challenge, *Oreochromis niloticus*, Probiotic, Resistance, Vitamin C

Acknowledgment

This work was supported by the University of Kelaniya, Sri Lanka.