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Evaluation of Bio-Aqua probiotic on growth performances and survival, chemical composition, blood and biochemical parameters of silver carp (Hypophthalmichthys molitrix) and physio-chemical factors of pond water

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Introduction

Intensive fish culture has created a potential environmental stress for fish, which leads to high sensitivity to various disease factors such as bacteria, fungi, viruses, and parasites, and subsequently causes great economic losses.

Recently, the use of antibiotics has been banned due to the increasing resistance of most infectious bacteria as well as serious environmental risks. For this reason, the use of natural food additives that are used as growth promoters and immune system stimulants when supplementing aquatic foods is highly recommended.

Probiotics are complementary microorganisms such as bacteria, fungi and bacteria. The presence of probiotics in the digestive organs, especially the intestines, as a valuable factor, leads to make of a proper microbial balance in these organs.

The main aims of this study were to evaluate the effects of Bioaqua probiotic food supplement on growth performance, body composition, blood and biochemical indices of silver carp and physicochemical parameters of culture pond water.

Materials and Methods

2400 healthy silver carp fish with an average weight of 1.1 ± 0.05 grams were prepared from one of the fish farms in Mazandaran province based on the appearance and morphology characteristics and the absence of skin lesions.

In order to adapt, the fish were kept in small ponds (500 cubic meters) for 2 weeks. Then the fish were randomly distributed in 12 small ponds (200 pieces in each one) and were fed with commercial diet for two weeks.

Bioaqua probiotic supplement was obtained from Mahan Bio Darman Company (Tehran, Iran).

Probiotics were added to the water of the pools in the following amounts:

Control (0 g/ha of Bioaqua probiotics)

T1 (250 g/ha of Bioaqua probiotics)

T2 (350 g/ha of Bioaqua probiotics)

T3 (450 g/ha of Bioaqua probiotics)

At the end, 9 fish from each replicate were randomly selected from each pool. The fish were fed with pellet feed four times a day for 120 days. After 240 days, growth factors such as Body Weight (BW), Specific Growth Rate (SGR), Food conservation Rate (FCR), and Protein Efficiency Rate (PER) were calculated.

Blood samples (about 1 ml) were taken from the caudal vein and immediately transferred to non-heparinized tubes for serum collection (30 pieces of fish in each group) then blood and biochemical parameters were measured.

Weekly water sampling of selected pools was performed to measure temperature, dissolved oxygen, pH, total dissolved solids (TDS) and total suspended solids (TSS), chemical oxygen demand (COD), biological oxygen demand (BOD), ammonium and nitrite.

Also, Data was analyzed for growth factors, body composition and gene expression in significant levels by using Duncan's statistical test with 95 percent confidence and One-Way ANOVA in SPSS 16 software.

Results and discussion

The results related to the growth factors of different treatments of silver carp fed with Bioaqua probiotic supplement at the end of the period showed that the amount of specific growth rate (SGR), weight gain (WG) and food conversion ratio (FCR) in the treatment of 450 g/ha compared to other treatments have significant differences($P<0.05$).

Also, the results of analyzing the body chemical composition of silver carp fish fed with different amounts of Bioaqua probiotic supplement at the end of this treatment showed a significant difference in the body composition compared to other treatments($P<0.05$).

Blood and biochemical parameters of plasma also indicated the better conditions in the treatment of 450 g/ha. Also, this treatment showed the creation of more favorable conditions of the breeding water environment from the point of view of TSS, BOD, COD, nitrite and phosphate values ($P<0.05$).

Conclusion

As a result, the BioAqua probiotic supplement, especially at a concentration of 450 g/ha has significant effects on the indicators of growth, nutrition, survival, body composition of silver carp and the physicochemical parameters of breeding water, and its use is recommended to carp farming.