Investigation of changes in growth indices, immune factors and hepatic enzymes of koi carp (*Cyprinus carpio carpio*) in an aquaponic system

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Abstract

The present research objective was to study the effect of water hyacinth plant (*Eichhornia crassipes*) in an aquaponic system on changes in growth indices, immune factors and hepatic enzymes of koi fish (*Cyprinus carpio carpio*). For this purpose, 120 koi fish with an average weight of 10±2 g and 40 seedlings of water hyacinth plant in 4 treatments (with a control group (without plants) and 3 treatment samples, treatment 1 with 5, 2 treatments with 10 and 3 treatment with 15 seedlings of water hyacinth were cultured in aquaponic method with 3 replications in 4 aquarium. Sampling of the plants after the culture and sampling of fish after 8 weeks of the experiment period in the treatments was done randomly. After sampling, immuno-physiological factors in Koi fish, including the counting of white blood cells (leukocytes) and liver enzymes and growth indices in koi fish and water hyacinth plant, such as initial and final weight of fish, feed conversion ratio, average daily growth rate, body weight gain, specific growth rate, survival rate, protein ratio and liver index Evaluated. The results of this study showed that the use of the aquaponic system could increase the growth of the water hyacinth plant and koi carp in the aquaponic system,so that there was a significant difference in comparison between the treatments of the aquaponic system and the control group at the end of the culture period for growth variables, mean growth daily body weight gain, specific growth rate, survival rate, and protein efficiency ratio were observed. Also, there was a significant increase in the level of blood indices (RBC, hematocrit, hemoglobin) and liver enzymes in 6-plant treatment compared to the control group (P<0/05). The findings of this study showed that water hyacinth plant can affect growth factors and blood indices in Koi carp, which can be due to the effect of this plant as an agent for enhancing immune stimulation.

Keywords: Aquaponic, Water hyacinth plant (*Eichhornia crassipes*), Koi fish (*Cyprinus carpio carpio*), Immune factors, Growth Indices, Liver enzymes.

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