



University of Zabol
Graduate school
Faculty of Natural Resources
Department of Fisheries

**The Thesis Submitted for the Degree of Master of Science
(In the field of Fisheries)**

**Effect of different levels of Vitamin C on growth,
hematology and antioxidant enzymes activity
indices of *Schizothorax zarudnyi***

Supervisor:

Dr. Javad Mirdar Harijani
Dr. Ahmad Gharaei

By:

Fereshteh Hemmat Koohsar

September, 2021

Abstract

In this study, the effect of different levels of vitamin C on growth, hematology and antioxidant enzymes activity indices of *Schizothorax zarudnyi* was studied. For this purpose, total of 144 pieces of fish were randomly distributed in 12 fiberglass tanks (12 fish per tanks) and fed with 3 dietary treatments containing 100, 500 and 1000 mg / kg of vitamin C and a control treatment without vitamin C for 60 days. Biological parameters of juveniles including initial weight, final weight, weight gain, body weight gain percentage, specific growth rate, feed conversion ratio, obesity coefficient and survival rate were measured at the end of the experimental period. To measure liver enzymes, antioxidant enzymes and also to study blood parameters including hematocrit (Ht), hemoglobin (Hb), red blood cell count (RBC), white blood cell count (WBC), differential cell count Bleaching and calculating the indicators of mean hemoglobin (MCV), mean hemoglobin concentration of red blood cells (MCHC), and blood sampling from the tail vein of fish were performed. The results of growth indices in different treatments did not show a significant difference with the control ($p < 0.05$). The highest mean final weight, weight gain and specific growth rate, obesity coefficient, body weight gain percentage and lowest feed conversion ratio were observed in 1000 mg / kg vitamin C treatment. The amount of red blood cells in all treatments was significantly different from the control treatment ($p < 0.05$). The highest amount of red blood cells was in the treatment of 1000 mg / kg of vitamin C, which was significantly different from the control treatment ($p < 0.05$). Also, white blood cell count (WBC) increased in all treatments and there was a significant difference with the control treatment ($p < 0.05$). The highest amount of white blood cells was recorded in the treatment of 500 mg / kg of vitamin C. Which had a significant difference with the control treatment ($p < 0.05$). Also other blood factors including: Hb (hemoglobin), Ht (hematocrit), MCHC (mean hemoglobin concentration of red blood cells, MCV (mean hemoglobin)), monocytes, lymphocytes and neutrophils with control treatment were significantly different ($p < 0.05$). Alkaline phosphatase (ALP), alanine aminotransferase (ALT), aspartate aminotransferase (AST), lactate dehydrogenase (LDH) had a significant difference with the control treatment ($p < 0.05$). Antioxidant enzymes catalase (CAT, glutathione reductase (GR), glutathione peroxidase (GPX), superoxide dismutase (SOD), total immunoglobulin (Total immunoglobulin and total protein) are significantly different from the control. ($0.05 > p$). According to the analysis of the results, it can be acknowledged that vitamin C has a positive effect on blood factors and antioxidant enzymes of *Schizothorax zarudnyi*.

Key word: Vitamin C, Antioxidant enzymes, Liver enzymes, Blood factors and *Schizothorax zarudnyi*.