



University of Zabol  
Graduate school  
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**The Thesis Submitted for the Degree of Master of Science  
(In the field of Fisheries)**

**Effect of the barberry root powder supplementation on the  
growth performance, Liver and antioxidants enzymes of  
Grass carp (*Ctenopharyngodon idella*)**

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## **Abstract**

The present study was conducted with the aim of investigating the effect of *Berberis Vulgaris* powder supplement on growth performance, Hematology factors and immune system status of Grass carp. To perform the present experiment, 144 Grass carp with an average weight of 9 grams were prepared and transported to the Aqua Active laboratory of Zabul University's Faculty of Natural Resources. After the initial adaptation period of the fish, this experiment was conducted in the form of four treatments and three repetitions for each treatment, including control treatments without any additives and diets containing 0.5, 1 and 2% *Berberis Vulgaris* powder for 56 days. At the end of the test period, some growth and nutrition indicators including body weight gain, daily growth, specific growth rate, food conversion ratio and some blood parameters including the activity of liver enzymes Alkaline Phosphatase (ALP), Alanine aminotransferase (ALT), Aspartate aminotransferase (AST) , Lactate dehydrogenase (LDH), antioxidant enzymes glutathione peroxidase, superoxide dismutase and catalase (GPX, SOD and CAT) and hematology (CBC and differential count) were measured. According to the results, the highest mean and percentage of body weight gain and the lowest food conversion ratio were observed in the treatment containing 0.5% barberry root powder supplement, but it did not show a significant difference with the control treatment ( $p < 0.05$ ). The results of liver enzymes and antioxidant tests showed that there was no significant difference between CAT and GPX factors ( $p \leq 0.05$ ); But Malondialdehyde (MDA), SOD, LDH, ALP, ALT, AST enzymes had significant differences between different barberry root powder supplement treatments ( $p \geq 0.05$ ). The results of the analysis of blood parameters showed that there was no significant difference in the amount of lymphocytes, neutrophils, monocytes and basophils ( $p < 0.05$ ); But there was a significant difference in the number of white blood cells, red blood cells, hemoglobin and hematocrit between different treatments of barberry root powder supplement ( $p \geq 0.05$ ). The results of the research showed that barberry root powder up to a concentration of 0.5% has beneficial effects in increasing the activity of some liver enzymes, hematological indicators and the immune system of Amur fish and can be used in the aquaculture industry. It can be used as a growth stimulant and natural immunity.

**Keywords:** *Berberis Vulgaris* powder, liver enzymes, immunity, *Ctenopharyngodon idella* .