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Graduate School  
Faculty of Natural Resources  
Department of Fisheries  
**The Thesis Submitted for the Degree of M. Sc**  
**(in the field of Fish Product Processing)**

**Influence of dietary containing *Otostegia persica* powder on  
Non-specific immune responses of common carp and shelf-  
life of fillets**

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**Abstract:**

The aim of this study was to investigate the effect of diet containing Goldfish powder (*Otostegia persica*) on the quality of common carp fillet during refrigerated storage. For this purpose, fish with a mean weight of 28.32 ± 12.12 g were distributed in aquariums with a density of 15 fish and were fed with 0, 0.5, 1 and 1.5% of Goldfish powder for 45 days. At the end of the period, blood was collected from fish and nonspecific immune markers (lysozyme, immunoglobulin, total protein and serum complement), catalase antioxidant enzymes (CAT), superoxide dismutase (SOD), malondialdehyde (MDA) and glutathione peroxidase (GPX) were measured. Then fish fillets and chemical parameters including pH, volatile nitrogenous base (TVB-N), thiobarbitic acid (TBA), and peroxide (PV) and microbes (total bacteria and freezing bacteria on days 0, 3, 6, 9, and 12) were evaluated. Results showed that there was no significant difference between nitrogen (TVB-N), thiobarbitic acid (TBA) and peroxide (PV) levels in all treatments ( $P > 0.05$ ). The treatments containing gold powder had lower bacterial load than control ( $P < 0.05$ ) and the lowest and highest bacterial treatments were observed in 1.5 and 0.5% of gold powder, respectively. Also, immunomodulators (lysozyme, immunoglobulin, total protein and serum complements) and antioxidant enzymes (catalase, superoxide dismutase and glutathione reductase) were evaluated which increased hemoglobin, immunoglobulin and lysozyme levels. Therefore, it can be concluded that the best quality and shelf life were observed in the treatment containing 1.5% Gold extract.

**Keywords:** Goldfish, Common carp, Antioxidant, Shelf life