



University of Zabol  
Graduate school  
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**The Thesis Submitted for the Degree of Doctor of  
professionals (In the field of Veterinary)**

**An investigation of the concentration of  
some heavy metals and micronutrients  
in the edible tissue (muscle) of Indian  
mackerel (*Rastrelliger Kanagurta*) in  
Chabahar port**

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## **Abstract**

Today, the discharge of metal elements into the marine environment becomes one of the most important problems for human being. Entering the seas, heavy metals accumulate in the tissues and organs of aquatic animals like fish, and then enter the food chain. They enter the human body by eating infected fish. Talal fish belongs to tuna fish and they are considered as one of the important species for measuring the level of pollution and also for commercial fish in the coasts.

This study aims at measuring the heavy metals such as nickel, cobalt, manganese, cadmium, lead, mercury, arsenic and micronutrients copper, zinc, and iron using wet digestion method. Their concentration were determined using ICP-OES device. By comparing these concentrations with their appropriate amount proposed by international standards, we explore their condition in Talal fish.

The results of the study indicate that the average concentration of the studied elements is as follow: Zn>Fe>As>Cu>Mn>Co>Cd>Ni>Pb>Hg; their average concentration is, zinc, iron, Arsenic, copper, manganese, cobalt, cadmium, nickel, lead and mercury, 5.183, 4.701, 0.289, 0.249, 0.101, 0.0116, 0, 0 and 0. for Considering the international standards, concentration of these elements was lower than standard level, except for arsenic it was higher.

**Keywords: Heavy metals, Micro nutrient, chabahar port, indian mackerel**