

**DETERMINATION OF HEAVY METALS IN AQUATIC ANIMALS-
MINI REVIEW*****Sunil Kondulkar**

Department of Zoology, Mahatma Fule Arts, Commerce and Sitaramji Chaudhary Science,
College, Warud, Amravati, M.S. India.

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Corresponding Author*Sunil Kondulkar**

Department of Zoology,
Mahatma Fule Arts,
Commerce and Sitaramji
Chaudhary Science,
College, Warud, Amravati,
M.S. India.

ABSTRACT

After decades of rapid urbanisation, population growth and industrialisation toxic waste is a main problem for both human and animals. There are various sources of heavy metals in this ecosystem such as anthropogenic activities like draining of sewage, dumping of domestic wastes and recreational activities. It may also occur in small amounts naturally through the leaching of rocks, airborne dust, forest fires and vegetation. Among the various toxic pollutants, heavy metals like Lead (Pb), Chromium (Cr), Nickel (Ni), Zinc (Zn), Cadmium (Cd), Cobalt (Co), Titanium (Ti), Iron (Fe) these metals have severe action due to their tendency of bioaccumulation in fish tissues. In this review discussed determination of heavy metals in aquatic animals.

KEYWORDS: Determination, Heavy Metals, Aquatic animals.**INTRODUCTION**

Heavy metals might be found in water at the trace levels. However, these constituents are very toxic and tend to accumulate in a long period of time. Heavy metals such as Pb, Cd and Cr are micro-pollutants and of special interest as they have both health and environmental significance due to their persistence, high toxic and bio-accumulation characteristics in water.^[1] Heavy metals in human body can affect his health, hence the need to know the concentration of heavy metals in water, sediment and aquatic animals because of its daily usage by man and proximity to urban pollution.

These pollutants build up in the food chain and are responsible for adverse effects and even death of the organisms in the aquatic system. Fish serve as biomarkers of environmental

pollution as studies on the overall health are widely carried out in order to evaluate the physiological changes of aquatic ecosystems. Heavy metals are generally referred to as those metals which possess a specific density of above 5 gm/cm^3 and adversely affect the environment and living organisms. These metals are quintessential to maintain various biochemical and physiological functions in living organisms in very low concentrations only. These metals prove to be noxious when they exceed certain threshold concentrations. Heavy metals are significant environmental pollutants and their toxicity is a problem of increasing significance for ecological, evolutionary, nutritional and environmental reasons. The most commonly found heavy metals in waste water include copper, nickel, zinc, cobalt and cadmium all of which cause risks for human health and environment.^[2]

Montazer Mensoor et al reported determine the heavy metal concentration and toxicity in some freshwater fish species collected from the Tigris River in Baghdad. The sample included twenty fishes and the selected sample locations covered two industrial areas in Baghdad (one north of Baghdad and one south of Baghdad). The levels of heavy metals were determined by using an atomic absorption spectrophotometer (AAS). The results showed that concentrations of heavy metals in the sampled fishes exceeded the acceptable levels for food sources for human consumption. The results of this study showed high levels of cadmium and chromium levels in the tissues of the selected fish sample. Cd and Cr were among the highest concentrations and both exceeded the World Health Organization and Food and Agriculture Organization of the United Nations acceptable levels for heavy metals in fishes.^[3]

Heavy metals tend to accumulate in the aquatic environment because they cannot be degraded. Ultimately, this leads to human exposure and results in serious environmental problems.^[4]

Bioaccumulation of heavy metals (Zn, Pb, Cd, and Cu) was determined in the liver, gills, and flesh from benthic and pelagic fish species collected from Lake Geriyo covering two seasons. The levels of the heavy metals varied significantly among fish species and organs. Flesh possessed the lowest concentration of all the metals. Liver was the target organ for Zn, Cu, and Pb accumulations. Cd however exhibited higher concentration in the gills. Fish species showed interspecific variation of metals.^[5]

Nabil Bader et al reported concentrations of some heavy metals (Cu, Co, and Pb) were investigated in muscle, liver and gills of three fish species (*Mullus surmuletus*, *Seriola*

dumerili, and *Sparus aurata*) collected from frozen fish markets in Benghazi city, Libya, during winter 2016, using flame atomic absorption spectrometry (FAAS).^[6]

Sivakumar Rajeshkumar and Xiaoyu Li, study the bioaccumulation of heavy metals (Cr, Cu, Cd, Pb) content were determined in freshwater edible fishes *Cyprinus carpio* Linnaeus and *Pelteobagrus fluvidraco*, which were caught from the Meiliang Bay, Taihu Lake, a large, shallow and eutrophic lake of China.^[7]

In this study Alhemmati E. M. Et al was to estimated bioaccumulation of some metals (Cr, Mn, Fe, Cu, Zn and Pb) in different fish tissue (skin, Muscle, liver and gills) of *Dicentrarchus punctatus*. The samples were collected from local supermarket in Misurata city, Libya in summer, 2017. Tissue of this study was analyzed by atomic absorption spectrophotometer (AAS) to find the concentration of heavy metal (mg/kg). The results showed that the mean concentration of Zn was higher than Pb in skin, gills. Furthermore, Fe, Zn and Mn were higher in muscle than liver, except Cu and Zn their concentrations were higher in liver. While low concentration of Pb in all study organs, moreover, Cu and Cr in Muscle and gills of fish study.^[8]

Omnya A. El-Batrawy et al. Study, Burullus Lake has received a great attention because of its environmental and economic importance for being a significant source of fish production in Egypt. It is subjected to many of environmental changes due to the huge amount of discharges originated from different sources as well as many human activities. The Nile tilapia (*Oreochromis niloticus*) is an abundant sedentary fish present in the most Egyptian lakes, Nile River, and ponds. The study was designed to evaluate some metal pollution in Burullus Lake. The values of heavy metals (Mn, Zn, Fe, Ni, Cu, and Pb) were measured in lake water and muscles of *O. niloticus* fish during winter and summer 2014.^[9]

The accumulation of four heavy metal concentration of Cd, Cu, Mn and Zn in fish was determined. Five fish species namely *Epinephelus lanceolatus*, *Rastrelliger*, *Megalaspis cordyla*, *Bramidae* and *Siganus canaliculatus* were collected from the coastal waters of Terengganu, Malaysia. The analysis was done using inductive coupled plasma-mass spectrometer.

CONCLUSION

It is important to note the effects of sewage waste water and industrial run-off on marine fish populations and the bioaccumulation of trace elements in their body tissues. The accumulation rate of trace metals in fish species varies depending on the elements extracted, concentration, accumulation time from sources, and the rate of scale formation. The efficiency of trace element uptake from contaminated water and food varies based on ecological needs, body metabolic capability, and the environmental parameters of salinity and temperature. The review results stand for valuable heavy metal concentration data in fish from national and international markets determine by various instrumental techniques. The edible fishes analyzed in this study contain metal concentrations of toxic trace elements below the levels recommended for human consumption.

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