



E-ISSN: 2347-5129

P-ISSN: 2394-0506

(ICV-Poland) Impact Value: 5.62

(GIF) Impact Factor: 0.549

IJFAS 2020; 8(1): 84-85

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www.fisheriesjournal.com

Received: 06-11-2019

Accepted: 10-12-2019

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## A short note on human health hazard due to the consumption of heavy metal accumulated fish

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### Abstract

Fish is a nutritious and popular food item for the human being. But this can result in serious health problems in humans if it is contaminated with heavy metals. Environmental pollution created by us has resulted in the release of several potential toxic substances including heavy metals in the ecosystem. These metals can contaminate the water body and accumulate in muscle, liver, kidney and other organs of fish. Consumption of these fishes welcomes health problems in humans. Several studies carried out throughout the world have established the fish borne toxicity in humans. Though generally, the level of metals in fish we are consuming is within the safe limit, it warns us about the potential future threats.

**Keywords:** Fish, heavy metal, human, health hazard

### 1. Introduction

At the present time, environmental pollution has become a burning issue for our civilization. We have released a huge amount of toxic substances in the environment and contaminated it. The effect of these activities is also very prominent now like global warming and other climatic changes, an increase in several life-threatening diseases like cancer etc. In the large list of environmental pollutants, heavy metals occupy a special position and are largely responsible for different potential hazards in human beings. The heavy metals can enter into the human body in many ways including the ingestion of contaminated foods. Fish, being a good accumulator of pollutants from an aquatic environment and also a popular food item throughout the world; can affect the human population which consumes it regularly. The metals can release into the environment through both natural and anthropogenic sources. The effluent coming from the different industries are the major sources for disposing the metals in the ecosystem at a large rate. These metals can easily contaminate different water bodies and accumulate in aquatic organisms including fish. When these are eaten by the human, there is always a chance of metal toxicity in human. In this article, we have discussed the possible health hazards in humans due to the consumption of fish containing heavy metals.

### 2. Human health hazards

Fish is very healthy food and help to prevent several heart diseases in human. But this can also cause harm when the heavy metal contain in it is quite high. It has been observed that 90% of human exposure to heavy metals occurs through the dietary route compared to dermal and inhalation exposure <sup>[1]</sup>. A study carried out in Catalonia, Spain estimated the dietary intake of different metals like arsenic, cadmium, mercury and lead. The intake was highest in an adult male with a value of 223.6 µg/day (As), 15.7 µg/day (Cd), 21.2 µg/day (Hg) and 28.4 µg/day (Pb) respectively <sup>[2]</sup>. Though all the values were lower than the provisional tolerable weekly intake (PTWI), but fish and shellfish were recognized as a potent source of this contamination. Aschner (2002) has reported about the potential hazard of methyl mercury (MeHg) in the fish-eating population <sup>[3]</sup>. MeHg is an environmental pollutant which causes neurotoxicity in human when it is accumulated through food chain especially with the fishes. Krishna and colleagues (2014) conducted a study to assess the human health risk due to the consumption of marine fish *Liza macrolepis*. The concentrations of the metals in muscle and liver of the fish were 34.6 and 38.2 (mg/kg) for zinc, 14.2 and 15.5 mg/kg for lead, 10.4 and 11.8 mg/kg for nickel, 33.2 and 34.2 mg/kg for copper, 2.1 and 2.9 for mercury and 0.8 and 0.9 for cadmium <sup>[4]</sup>. The target hazard quotient (THQ) value for all the metals was above 1 except Cd,

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indicating a serious health hazard especially noncarcinogenic effects for the consumers. An investigation was carried out by Saha and coworkers (2016) to know the seasonal variation of heavy metals in the fish of the Bay of Bengal and the human health risk <sup>[5]</sup>. A total of 10 species were collected and concentrations of 10 metals were determined. Higher accumulation was observed in the summer season and all the fish were safe for consumption. But the level of arsenic was above the safe limit and possessed the risk of cancer. All these researches indicate that fish can be proved dangerous if it has a high heavy metal level. Many times, the concentration of metals is higher in fish compared to the concentration in water due to biomagnification. The metals are very stable in nature and easily accumulate in several organs like liver, kidney, gonad, intestine etc. It has also been found that the level of metal is comparatively lower in muscles. So, discarding the offal during the preparation of any dish can be helpful to reduce the risk <sup>[6]</sup>.

### 3. Conclusion

It is very clear that fish, one of the most nutritious food, can also result in health problems. We can only blame us for this situation. With the advancement of science and technology, we have toxified and destroyed our environment. These toxins including the heavy metals are coming back to us and causing a problem. So, we should be aware of the problem we have created. This is just the tip of the iceberg with a severe threat in the near future. Steps should be taken to reduce the environmental pollution to save ourselves from these hazards.

### 4. References

1. Loutfy N, Fuerhacker M, Tundo P, Raccanelli S, El Dien AG, Ahmed MT. Dietary intake of dioxins and dioxin-like PCBs, due to the consumption of dairy products, fish/seafood and meat from Ismailia city, Egypt. *Sci Total Environ.* 2006; 370(1):1-8. Doi: 10.1016/j.scitotenv.2006.05.012
2. Llobet JM, Falcó G, Casas C, Teixidó A, Domingo JL. Concentrations of arsenic, cadmium, mercury, and lead in common foods and estimated daily intake by children, adolescents, adults, and seniors of Catalonia, Spain. *J Agric Food Chem.* 2003; 51(3):838-842. Doi: 10.1021/jf020734q
3. Aschner M. Neurotoxic mechanisms of fish - borne methylmercury. *Environ Toxicol Pharmacol.* 2002; 10-104.
4. Krishna PV, Jyothirmayi V, Madhusudhana Rao K. Human health risk assessment of heavy metal accumulation through fish consumption, from Machilipatnam Coast, Andhra Pradesh, India. *Int. Res J Public Environ Heal.* 2014; 1(5):121-125. <http://www.journalissues.org/IRJPEH/>
5. Saha N, Mollah MZI, Alam MF, Safiur Rahman M. Seasonal investigation of heavy metals in marine fishes captured from the Bay of Bengal and the implications for human health risk assessment. *Food Control.* 2016; 70:110-118. Doi: 10.1016/j.foodcont.2016.05.040
6. Ghosh S, Pal P, Adhikary J, Sarkar A, Das BK. Bioconcentration of cadmium (Cd) in rohu (*Labeo rohita*) collected from Sealdah, Garia and Sonarpur fish market in West Bengal. *J Entomol Zool Stud.* 2019; 7(2):772-776.