



Mini Review Paper

Human Health Benefits from fish Consumption and Environmental Toxicity issues in Fish Flesh

Ganguly Subha

AICRP on Post Harvest Technology (ICAR), Department of Fish Processing Technology, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, 5, Budherhat Road, P.O. Panchasayar, Chakgaria, Kolkata - 700 094, WB, INDIA

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Abstract

The oily fishes act as potential source of fish oil containing rich content of docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). Fishes namely, salmon, herring, mackerel, anchovies and sardines which inhabit the cold waters serve as rich source of fish oil. On the contrary, the tunas have comparatively lesser concentration of omega-3 acids present in them. The intake of fish oil has enormous implications in overall health status of the consumers. Heavy metals possess high density and toxicity towards living beings. Heavy metals like arsenic, chromium, lead and mercury are point popular and relevant. Heavy metals constitute the crust of the earth which resists degradation. Human get inflicted with heavy metals through the agency of food, water and atmosphere. Mercury poisoning by eating fishes is a prominent cause for public health hazard.

Key words: Fish oil, heavy metal, toxicity.

Introduction

Fish serves as an important and rich source of easily digestible protein supplement to our body. Also fish oil serves as an important source of omega-3 fatty acids also contains traces of mercury, as reported by the Environmental Protection Agency.

The fish oil contains omega-3 fatty acids fraction which benefit in the treatment of cardiac diseases and hypertriglyceridemia^{1,2}. It is also clinically proven antidepressant³ and prevents the occurrence of cancer⁴, anxiety⁵ and macular degeneration. The fish oil is also a rich source of Vitamin A.

Chemical Composition

Fish oil is generally obtained from fishes which have more oily fishes. Fish oil contains eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and omega-6 fatty acids as fractions of omega-3 fatty acids which act as the precursors of certain eicosanoids that are regarded as anti-inflammatory agents⁶ and having other health benefits to human body. Fishes do not possess omega-3 fatty acids originally. They derive it from the microalgae, planktons or prey fishes which contain high amount of omega-3 fatty acids⁷ along with selenium and iodide.

The omega-3 fatty acid, Docosahexaenoic acid is often present in fish oil, improves brain disorders of cognitive origin associated with Alzheimer's disease. Fish oil also has neuroprotective action in Parkinson's disease which has been established through research on mice⁸.

Utility for Human Health

Fish oils prevent the occurrence of carcinomas particularly, prostate, colon and breast cancers. Fish oil is also a recommended prophylactic intake for the prevention of cardiovascular ailments and increased blood pressure. Consumption of fish oil improves the conditions of cardiac dysrhythmia. Fish oil decreases the occurrence of mental depression and anxiety. Researchers have proved that the omega-3 fatty acid fraction called eicosapentaenoic acid (EPA) fraction proves to be beneficial in such incidences.

Omega-3 fatty acids present in fish oil helps in proper growth and development of brain of the embryo in pregnant women during their carrying stages⁹. It is beneficial both for the mother and the baby. Also, it is important for proper visual development of the neonates and consumption of docosahexaenoic acid proves to be helpful in the development of central nervous system during the first four months of the baby (breast feeding stage)¹⁰.

Chemical Properties of Heavy Metals

Heavy metals have the property of gradual accumulation over prolonged period of time leading to health problems due to poisoning and toxicity. They lead to severe health problems. Except selenium which acts as an antioxidant in our body, no other heavy metal serve as an important biological function in the human body.

Mercury toxicity of fish: Mercury generally does not pose its deleterious effect alone. It combines with carbon to form

organic compounds, like methylmercury. It is formed in water and soil as per reports of while diets should include fish as part of a nutritional regimen, this protein source rich in omega-3 fatty acids also contains traces of mercury, as put forth by the Environmental Protection Agency. Mercury, a metal that exhibits several forms, combines with carbon to form organic compounds. The most familiar one is methylmercury, which is created by microorganisms found in soil and water as per reports of the *Agency for Toxic Substances and Disease Registry*. Methylmercury generally accumulates in the fish muscles on over exposure.

According to the 2001 study by the National Academy of Sciences, it was reported that in the United States nearly 60,000 children get affected by mercury toxicity through various agencies of contact. In 2002-2003 FDA reports, it was reported that fishes like shark, tuna, swordfish etc. get maximum exposed to mercury through environment (U.S. Food and Drug Administration).

Chromium poisoning of fish: Chromium is another heavy metal which precipitates in aquatic animals and organisms. Exposure to chromium to human causes the lesions of irritation and ulceration on skin and long-term exposure causes the damage to nervous tissue and liver.

Public Health Risks Involved From Consumption of Fishes Exposed To Heavy Metal Poisoning: As per reports of EPA and FDA, the toxicity from heavy metals and the dangers of mercury poisoning from eating fish are not a major concern. The risk depends on the amount of fish intake coupled with levels of mercury in the fish. EPA and FDA recommends pregnant and nursing mothers to avoid the consumption of such type of infected fishes and are recommended for intake of fish low in mercury content.

In internationally specified and standard laboratories exposure to heavy metals toxicity and its extent can be tested effectively in humans.

Conclusion

The effect of consumption of mercury toxicity is immense on human health. It primarily affects the kidneys and brain of growing fetus. Poisoning due to mercury can cause injury not only to the brain and kidneys, but also to a growing fetus. The *Agency for Toxic Substances and Disease Registry* has reported the toxic effect of mercury on primarily the human nervous

system and that of growing fetus in particular. Contact with the metal due to ingestion of contaminated fish flesh causes difficulties with memory and distortions in hearing and vision including tremors and irritability in exposed human beings.

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