MERCURY IN FISHES – A TOPIC OVER VIEW

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ABSTRACT

Fishes are considered to be a good source of proteins and nutrients and are generally consumed by people all over the world. The tissues of the fishes are the edible parts which are consumed by the people. Unfortunately, these aquatic living beings are found to be poisoned due to the waste materials and chemicals released into the water by various industries. Among the many chemicals being released into the water through industrial wastes, the chemical, Methyl Mercury is considered to be the main cause of toxicity to the aquatic species especially the Fishes and the Shellfish.

Keywords: *Mercury, consumption, Toxic, Effects.*

1 Introduction:

Methyl Mercury is one of the toxic chemicals contaminating the Fishes and Shellfish in the aquatic environment. Methyl Mercury, through the wastes of various industries gets discharged into the water. When these aquatic living beings take in water contaminated by Methyl Mercury, this toxic substance gets accumulated in their tissues and these contaminated fishes and shell fish when consumed by the people, they show different ill-health conditions due to the toxicity of Methyl Mercury. Mercury level in Fish may vary depending on the species type, their age, source of food and the aquatic conditions.

Intake of Methyl Mercury causes many complications in human beings especially young children and pregnant women. The toxic effects of the chemical in human body depend upon the level of intake of contaminated fishes. High concentration of Methyl Mercury in Fishes causes adverse health problems compared to moderate and low concentrations.

II. Causative effects of Mercury consumption:

Consumption of Methyl Mercury contaminated fishes and shellfish by the pregnant women causes harm even to the foetus. Methyl Mercury is easily absorbed through the gastrointestinal tract into the human body. They can easily pass through the placenta and the blood brain barrier causing damage to the central nervous system of the foetus prenatally. Due to higher levels of Methyl mercury, the infants are born with impaired vision and hearing. Their brain development and muscle coordination is also affected. The newly born babies also get affected through breast milk due to the presence of high levels of Methyl Mercury in breast milk.

High levels of Methyl Mercury can even cause genetic problems in humans. Methyl mercury concentrations in cells are found to induce breakages in chromosomes. Women, who are found to have high levels of Methyl Mercury, are at a high risk of abortions and the off springs also get affected genetically. Destruction of microtubules and cytoskeletal elements involved in the division of neuronal cells are also caused due to Methyl Mercury. Irregular muscle coordination movements, cardio-vascular and pulmonary problems are generally noticed in the adults who are affected with this toxic chemical. Adults are also at a high risk of loss of memory due to the affect of Methyl Mercury.

In the early 1950s, the people in the Minamata city of Japan experienced several symptoms of a disease called Minamata disease. This disease resulted in the death of people with extreme ill health conditions. In the late 1950s, the main cause of this disease was found to be the release of one of the toxic chemicals, "Methyl Mercury" from a chemical factory into the industrial wastewater, which resulted in the accumulation of this particular chemical in the fishes and shell fishes, which in turn was consumed by people residing in the Minamata bay region. Later, in the 1960s, similar symptoms of this disease were observed in the Niigata region of Japan and hence called as Niigata Minamata disease. The mentioned two diseases were the result of the discharge of Methyl Mercury (MeHg) from the industries contaminating the lives in the water.

Globally, Mercury is well distributed in the environment. It can be released from natural as well as anthropogenic sources. After their release they get distributed into air, water and soil in various forms. Methyl Mercury is one of the toxic chemicals released through various sources into the aquatic environment. Generally, the micro-organisms decompose the organomercury compounds into inorganic mercury which further gets metabolized into Methyl Mercury. This methylation may also be caused non-enzymatically. The toxic Methyl Mercury compounds get excreted slowly and are very harmful to young children and pregnant women. It can easily pass through the blood brain barrier and also the placenta, in turn causing damage to the nervous system importantly the central nervous system. Methyl Mercury affects the central nervous system even during stages of prenatal and postnatal.

Toxic effects of Mercury:

Mercury contamination is a big concern in many countries due to its toxic effects on biotic and abiotic components of ecosystem .It is one of the most toxic metals to the organisms at the top of the food chain (Guentzel et al.,2007). He elevated level of mercury in fish are known to cause serious neuro toxic and genotoxic effects . The main source of exoposure to mercury in human beings is the consumption of fish,shell fish and sea mammals (Clarkson et al.,2003). This has led to many developed countries to issue fish consumption limits. India is one of the biggest consumers of mercury in the world and many of the Indian water bodies are severely polluted with mercury (kalra,2004) . Elevated quantity of mercury in edible fishes is also reported from several places.

Fish are constantly exposed to chemicals in polluted and contaminated waters. So the heavy metals content in fishery products need to be well established. Since fish is the last link in the aquatic food chain,the heavy metal concentrations in many fish species have been determined in relation to the metal content of aquatic environment.

III. ESTIMATES OF HUMAN INTAKE:

A variety of methods have been used to estimate human intake of methyl mercury in fish . the U.S. Food and Drug Administration (FDA) have reported yearly on human dietary intake of mercury since 1971 . The current methods of estimating intake have been described. " typical "composite diets are constructed that are nationally representative of different age groups and of each sex. Such composite deits may contain over 200 food items . The diet depicts average daily food consumption by weight and by average daily calorie intake according to age and sex. Average concentrations of total mercury in each food item are available from the agency's monitoring programs . Thus, it is possible to calculate the average daily intake of total dietary mercury of various age groups. The average intake is remarkably constant for all groups and each sex with a digression only in the 2 year age group. The average

value is about 50 ng / kg/d . these values are for total mercury and will overestimate intake of methyl mercury. Also, they include food items other than fish.

IV. Discussion & Conclusion:

The findings of this review also stated that as most of the brackish water fishes captured are being consumed by the urban population it is essential to carry out a detailed study in this regard with the urban fish eating population also. The risk analysis data of different studies shows that the contamination level has a high potential; for posing hazardous effects to the local community, but the health status survey did not give any significant evidence for the appearance of the mercury poisoning symptoms. Even though high level of mercury contamination has been reported from several parts of India. We have not implemented any limits or standards for our fish consumption, this is because of the lack of proper monitoring and risk assessment studies at ecological and human health aspects.

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