

Effect of Thermal Treatments in Content of Some Heavy Metal Elements in Common Carp “*Cyprinus Carpio*”

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Opinion

Heavy metals enter the environment as a result of both natural and anthropogenic activities. Anthropogenic sources comprise all contribution made by mankind including industrial processes that contribute to atmospheric land depositions, mining and metallurgy, urban and industrial wastes along with sewage and fertilizer applications. Uncontrolled manufacturing and disposal of metals containing materials inevitably cause environmental pollution. Recently, it is well realized that anthropogenic sources are the greater environmental threat as a result of surface inputs to bio systems making the metal accessible for plant/animal uptake. Heavy metals elements are the most dangerous pollutants of the aquatic environmental, as they are widely used in various industries which discharges its polluted water without any treatment, and these substances accumulate in the water sources causing the most dangerous types of pollution with heavy metals, including mercury, cadmium, zinc, copper, and lead, Iron (Hg, Cd, Pb, Cu, Zn, and Fe). Knowledge of heavy metal concentrations in fish is important with respect to nature of management and human consumption of fish.

In the literature, heavy metal concentrations in the tissue of freshwater fish vary considerably among different studies possibly due to differences in metal concentrations and chemical characteristics of water from which fish were sampled, ecological needs, metabolism and feeding patterns of fish and also the season in which studies were carried out. In the river, fish are often at the top of the food chain and have the tendency to concentrate heavy metals from water. Therefore, bioaccumulation of metals in fish can be considered as an index of metal pollution in the aquatic bodies that could be a useful tool to study the biological role of metals present at higher concentrations in fish. There has been a growing interest to find out the heavy metal contamination level of public food supplies, particularly fish and fishery products. Levels of heavy metals in fish are of particular interest because of the potential risk to humans who consume them. Fishes are widely consumed because it has high protein content, low saturated fat and also contains omega fatty acids known to support good health. Fishes are constantly exposed to heavy metals because of pollution from chemicals and contamination in waters. Fish muscle is commonly analysing to determine contaminant concentrations and to assess the health risks because it is the main part consumed by humans. The levels of contaminants especially heavy metals in fish are of particular interest because of the potential risk to humans who consume them. The accumulation of heavy metals of fish was size specific and varied as a function of the different localities.

Fish is one of the most widespread food in the world and one of the most important sources of high-value animal protein nutritional, the human body needs it permanently and continuously. Fish is the most important source of Unsaturated Fatty Acids (UFA) and Polyunsaturated Fatty Acids (PUFA), especially the omega-3 fatty acids, Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA). The intake of the n-3 fatty acids has been relatively low in our diet, mainly due to the low consumption of seafood. Recommendations for increasing dietary omega-3 fatty acid intakes for potential health benefits have been

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proposed for protecting against cardiovascular diseases, and against specific risk factors for coronary heart disease. Fish that taken from polluted water may be caused many hazards to health. Eating fish containing heavy metals (that accumulated in fish and transported in food chain and finally arrived to human body) may cause birth defects, liver damage, cancer, and other serious health problems. From the above, we conducted this search in order to study the effect of various thermal treatments using oil frying, grill with oven and microwaves in the chemical composition and the content of common carp fish (*Cyprinus Carpio*) from some heavy metal elements (Fe, Cu, Zn, Hg, Cd and Pb). Samples were collected from the common carp fish from the local market, the edible fish slices were taken and then treated by previous thermal treatments.

The results showed that the fish slices prepared by microwave were higher in percentages of moisture compared to the other tested methods, and the protein content was significantly higher ($P < 0.05$) in the microwave slices compared to the oil-fried slices,

while there were no significant differences ($P > 0.05$) between grill and microwave methods. The fat ratio was significantly higher in the oil-fried samples compared to the other preparation methods. The percentage of ash was significantly higher in the microwave slices compared to the other methods. The content of these slices from Fe, Zn, Cu and Cd was higher than the content of the slices prepared by other methods, but the differences between them were not significant ($P > 0.05$). The results also indicated to significantly decreased in Hg content in microwave-prepared slices, but the Pb content significantly increased ($P < 0.05$) compared to the other preparation tested methods. Accumulation of trace elements in aquatic organisms is one of the most striking effects of pollution in aquatic system. Some trace metals are necessary in small amounts for individual metabolic processes, being assimilated by marine organisms. However, their capacity to form complexes with organic substances can result in concentrations up to 1000 times higher than their assimilation and fixation in tissues, becoming toxic.

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