Human biotoxic, Human Reproduction Effects and Biomarkers to Assess the Health of the Ecosystem by Estimate the Ratios of Heavy Elements

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Abstract

This study was conducted to investigate the concentration of some heavy metals (Cr, Zn, Cu, Cd, Pb) in some types of frozen and canned fish in Diwaniyah. Five types of fish were widely available (*Stromateus Sp*., *Parastromateus niger, Labeo rohita , Sardina pilchardus). And the number of replicates of one species, where the number of fish during the study period 20 fish.* The results obtained showed a difference in results and the concentrations of the heavy elements above were measured by ppm (0,231-13,18 / 0.012-0,915 / 0.028-0,0234 / 0,400-2,161 / 0.021-0,141) for Cr, Zn, Cu, Cd and Pb respectively. The above results showed the increase in concentrations of heavy metals compared to previous studies, as well as their comparison with global and local determinants of these elements. The concentrations of heavy elements in the tissues of the muscles and muscles of theStromateus Sp fish (0.30, 0.89, 0.89, 0.89, -0.59 / ND / 0.100) for CR, Zn, Cu, Cd and Pb respectively. But in gils and frozen erythematic muscles were (0.2 / 0.473 - 0.019 / 0.043 - 0.053 / 0.115 - 1.589 / 0.929 - ND / 0.100) for Cr, Zn, Cu, Cd and Pb respectively.

Keywords: *Human biotoxic, biomarkers, health, ecosystem, heavy elements*

Introduction

Studying and estimating trace element content in the living and non-living components of aquatic ecosystems helps to assess the level of pollution in them and reduce their spread and knowledge of their sources [19].

This type of contaminant enters the environment through two natural source and human source sources and is classified as Persistent Toxic Subs-tances for the inability of microor-ganisms to decompose, as well as their accumulation and toxicity to living organisms. Their penetration through the components of the ecosystem is a serious and unavoid-able future As well as threatening the living environment of aquatic organisms, possessing the ability to integrate and move in food chains, and then their concentration in living organisms with the presence of mortality, in some cases when they increase their concentrations beyond permissible limits [17] What is dangerous is the persistence of biotic activities and activities that transport these elements throughout the food chain, as well as the ability to bioaccumulate the food chain and affect the compo-sition and diversity of the aquatic environment communities [13] And also have the capacity to form complex compounds with most organic and inorganic compounds found in organisms, leading to their accumulation in food levels increasingly from one level of food to another of these living ecosystems [14].

The transmission of this type of contaminant across the food chain and its accumulation in the body of organisms increasingly from one level of food to another in the aquatic environment is one of the most serious problems in the pollution of the aquatic environment [4] .The first path is the concentration or aggregation of the elements by the living at all levels of the food chain. This process is carried out through a variety of methods, including entering through breathing to the fish or through the membrane of the body of the organism or by sticking to the body as in the zooplankton, The transition gets from As well as some species of fish, crustaceans, worms and grafts [18] .The other way to transport these contaminants is by feeding each other through the different food chain, an important method that can reach the elements (Monperrus, et al., 2005). Therefore, the estimation of trace elements in the aquatic ecosystem is of great importance in determining and controlling their levels [8] . Damage caused by contamin-ation of trace elements in aquatic organisms is not limited to toxic and deadly effects, but also causes other damage, such as Mutagnic mutations, Embryo toxic and Gonadotoxic infections, and also reduced growth rates and disruption of processes Metabolic processes [(5,2).] They are also found in the bodies of living organisms, too, with very low concentrations, some of which are essential for sustaining their life, such as copper, zinc, iron and manganese. In general, these elements are important for building part of the body. They also play a role in regulating body fluids through ion exchange (Al-Tai, 1987), but high or low levels of the optimal limits lead to physiological damage and loss of life [3.] Living organisms have the ability to absorb. The heavy elements dissolved in the water medium by some body tissues such as skin and skin. And its concentration in the liver, kidneys, muscles and muscles, lead-ing to the accumulation of high concentrations in the body [7]. These elements are dangerous even if they are found in low concentrations in the environment and when increased, lead to poisoning and death. (Park and Presley, 1997). [1] stressed that the level of toxic effect of these elements depends on the type of element and its concentration on the aquatic environment as well as the time of exposure to this element.

Sources of heavy metals:

There is a difference in the sources of heavy elements between the natural effects of volcanic eruptions, fires and sources of human activity such as household wastes and various agricultural activities such as pesticides and chemical fertilizers, as well as mining, mineral extraction, petroleum refining, and automotive and mining industries (Kuwait Institute for Scientific Research, 1989; Williamson et al., 1995) explained that the waste of battery factories is one of the most important sources of cadmium and lead in the aquatic environment. The atmosphere is an important source of trace elements due to the high tide of dust. Some trace elements in the air may increase their concentration more than 1000 times From their natural level as a result of human activity [(9,10,11)] notes that the Kafue River in Zambia is one of the rivers that suffer from degradation and the potential loss of biodiversity due to the change in the quality of water resulting from the use of pesticides containing heavy metals to eliminate algae. [15] noted that the concentration of heavy elements in the environment can increase as a result of decomposition of aquatic organisms after their death. As well as the ability of high sediments to retain elements and contaminants and synthesize them in various mineral compositions in a way that is not ready (Hlavay et al., 2004). However, chemical and physical changes such as reaction, salinity, oxygen concentration and oxidative stress change, To return to the water medium, ie, the intervention of the geochemical cycle again, so that the sediment is an important source of water pollution (Cappuyns and Swennen, 2005; Audry et al., 2004).

The aims of study:

1. Determination of concentration of heavy metals (Cr, Zn, Cd, Pb, Cu) in different species of fish.

2. Comparison of the concentrations obtained from this research results of studies conducted in some countries.

3. Comparison of concentrations of these elements also allowed concentrations in international standards and standards.

Materials and Methods

Fish species studied:

1.Stromateus Sp. fish (silver)

Scientific Classification:

Family: Stromateidae

Genus: Pampus

Pampus argenteus

The species of fish follows the whiteStromateus Sp species

Features and form:

These fish are characterized by the presence of a vesicle or chisel in the esophagus to grind the food and fall after the pharynx directly.

The body is flat and wide, fineless pelvic (pelvic), the scales are small circular, the body is silvery white and the head color is dark compared to the body (Coad, 2010)

2. The thickness of raho (or roho) Scientific Classification:

Family: Cyprinidae

Genus: Labeo

Labeo rohita (Roho labeo)

These fish belong to the carpaceae. They have a large body length of 100-60 cm.

The head is moderate, the eyes are large round and have a single dorsal fin and a lower waist fin. Which are not threatened with extinction or extinction is very weak. (Dham, 1977)

The average length of the fish ranges between 30-23 cm and weight 113 g, body color from the top gray to blue and silver bottom color.

The fins are soft, non-forked, the caudal fin is deeply cleft, the scales are circular, the eyes are large, the mouth is frontal and the teeth are undistinguished or absent. (Coad, 2010)

5-mackerel Fish (bath thi-ckness):

Scientific classification

Scombridae Family:

Genus: Rastrelliger

Rastrellger Kanagutra

Its body is rectangular and pressed, ranging in length between 20 - 65 cm, and may reach 70 cm. It has crusts even on the chest area except for a small area in front of the pelvic fin. Their color is silvery with a tinted tint between blue and green on the back on the body a lot of orange color spots. They feed on crustaceans and small fish, common in mid-depth waters, away from the shores of edible fish. (Dham, 1977)

* Cleaning Tools Lab wares cleaning:

Glass tools and polyethylene bottles were cleaned according to the method described (Boehnke & Delumyea, 2000). Wash the dishes thoroughly with tap water and cleaning powder and rinse thoroughly with water several times. The tools are then placed in a basin containing diluted hydrochloric acid at 10% concent ration for at least 24 hours and then washed several times with distilled water (Nollet, 2007).

Collection of samples

In this study, five types of fish were widely available in the commercial markets and shops for the sale of frozen and canned fish and four replicates were taken for each type of different companies.

Extract trace elements from fish After collecting the fish samples and transferring them to the laboratory, they were washed with distilled water. The fish were separated for the purpose of separating some of the organs (muscles and galsam). The muscle was taken from the left side after the head area of the fish. The tuna and sardines were mixed, For digestion of fish samples for the purpose of measuring the ion of trace elements in it and summarized as follows:

A dry weight of 0.5 g dry weight was taken from the fish tissue (muscle and galsum) after drying using the 80 ° C convection oven for 24 hours. After that, it was grinded and sifted with a 0.5 mm slotted sieve and placed in a baker of Teflon. (4.5 mL) and HNO3 (1.5 ml) concentrate and then heat on a heat plate at 80 ° C. Then add 4 mL of 1: 1 mixture of perchlorate and hydrofluoric acid and then until near dehydration. Take the leachate and complete the volume with ions free distilled water to 25 ml, then centrifuge with 3000 cycles / min for 20 minutes and then transfer the solution to polyethylene bottles and store until the measurement of the Atomic Absorption Spectrophoto-meter (AA-7000)

Results and Discussion

Table (1) shows the type of company producing the fish species studied

Type of fish	Product Country	company
Canned tuna	Iran	
Fishy frozen fish	Vietnam	

Cont... **Table (1) shows the type of company producing the fish species studied**

Rao is frozen	Minmar	Imported specifically for a good farms company for agricultural and livestock production and marketing
Stromateus Sp. frozen fish	Vietnam	Imported by Al-Muntar Company for General Trading and Contracting (Dolphin sign)
Canned sardines	Production and export of Sombraisha Trading Co. TAMAN-SIDO ARGO / INDONESIA	Importer Company Ideal - Haram - Giza (Egypt)

Table (2) Concentrations of heavy metals in Galsam and Zubaidi muscles in a unit (ppm)

Fabric	**Cu**	**Cd**	**Pb**	**Cr**	**Zn**
Gills	0.039	0.833	11.30	0.021	2.161
Muscle	ND	0.800	10.99	0.110	0.474
The average	0.039	0.8165	11.145	0.0655	1.3175

Table (3) Concentrations of heavy metals in Galsam and frozen erythrocytes (ppm)

Fabric	**Cu**	**Cd**	**Pb**	**Cr**	**Zn**
Gills	0.053	0.019	0.231	ND	1.589
Muscle	0.115	0.043	0.473	0.100	0.929
The average	0.084	0.031	0.352	0.100	1.259

Table (4) Concentrations of heavy metals in Ghalsam and muscles of raho thickness (ppm)

Fabric	**Cu**	**Cd**	**Pb**	**Cr**	**Zn**
Gills	ND	0.051	0.595	0.031	4.470
Muscle	0.0234	0.012	1.444	0.149	0.549
The average	0.0234	0.477	1.019	0.09	2.509

Table (5) Concentrations of heavy elements in frozen fish muscles (ppm)

Type of fish	**Cu**	**Cd**	**Pb**	**Cr**	**Zn**
Tuna muscles	ND	0.915	13.18	0.031	0.624
Sardine muscles	0.028	0.040	0.744	0.041	0.400

Fish are secondary consumers by feeding on some phytoplankton and small aquatic animals. They represent an important food source, helping to understand the accumulation of trace elements and their functional behavior in the organs and levels of food. They can also be used as good biomarkers to assess the health of the ecosystem because they occupy different levels of food Karadede and Ünlü, 2007). It is therefore an input to identify the contamination of trace elements in aquatic environments and to identify the type of elements prevailing in that environment and thus to determine the suitability of fish for human consumption Obasohan, 2008; (Dural, et.al., 2007).

In the following order:

Stromateus Sp. Fish: Galsam

Lymphatic fish: Galsm <muscles

RAHO Fish: GALASM

The results showed that the general concentration in fish and trace elements studied were as follows:

The general concentration ofStromateus Sp fish according to the elements was as follows:

Cadmium component: Galsm <muscles

Copper element: Galsm <muscles

Element Chromium: Muscle

Lead element: Galsm <muscles

Zinc element: Galsm <muscles

As for the general concentration in the pigeon fish and elements were as follows:

Cadmium component: Galsm muscles

Copper element: Galsm muscles

Element Chromium: Muscle

Lead element: Galsm muscles

Zinc element: Galsm <muscles

As for the general concentration of raho fish according to the elements were as follows:

Cadmium component: Galsm <muscles

Copper element: Labeo rohita muscles

Element Chromium: Muscle

Lead element: Galsm muscles

Zinc element: Galsm <muscles

In the sardine and tuna muscles, the concentrations were as follows:

Cadmium component: tuna muscles> sardine muscles

Copper element: Sardine muscles

Chromium Element: Sardine muscles <Tuna muscles

Lead Ingredient: Tuna muscles> Sardine muscles

Zinc element: Tuna muscles> Sardine muscles

These changes in concentrations of trace elements are very similar in their descending sequence to their presence in the studied members of the studied species, especially in concentrations of all elements inStromateus Sp studied fish.

As noted from the above sequence, the muscles and gazelles of the fish are ineffective for the accumulation of trace elements, except for the lead element in theStromateus Sp muscle. The concentration of the lead element in theStromateus Sp muscle is observed and this is consistent with Bevoets et al. (2009) Cadmium and lead in carp fish with concentrations above the ECP threshold for 2002 (ppm0.05); however, the concentration of cadmium in our study was within the permissible limits of the WHO (0.05 ppm), possibly because the musculoskeletal tissue ofStromateus Sp was high in fat .

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Dentistry/ University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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