Assessment of Some Heavy Metals in some fast foods in Kalubia Governorate

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Abstract

Heavy metals are chemical elements which cannot be destroyed or broken down through heat treatment or environmental degradation, so pollution of environment with it can be a serious problem. In Egypt, there were many sources of heavy metals, often due to smelert and mining activities .This has led to toxic metals in the environment that directly affect air, water, soil and food. The presence of heavy metal residues particularly in fast foods is potentially hazardous to human specially children. So that the objective of this study aimed to detection of Cd,Pb and Hg in some Egyptian fast foods (Shawerma, Kabab,grilled and fried chicken and fish) obtained from Urban and Ruler areas in Kalubia Governorate. The study revealed presence of heavy metal residues is higher level in Urban area than Ruler one due to pollution of environment with industrial activities and cars full and mercury residue in grilled and fried fish is the highest one due to industrial effluents discharged into river Nile without treatment.

Introduction

Today, the environmental pollution by heavy metals is considered as one of the most serious problems in the world over the last few decades. Heavy metals such as cadmium, lead and mercury are potentially harmful to most organisms even in very low concentrations and have been reported as hazardous environmental, as toxic heavy metal can cause dermatological diseases, skin cancer and internal cancers (liver, kidney, lung and bladder), cardiovascular disease, diabetes, and anemia, as well as reproductive, developmental, immunological and neurological affects in the human body. **(Johri et al., 2010).**The accurate quantification of heavy metals in tissues of animals may help elucidate the role of heavy metals in the living animals and serve as biological indicators of the status of pollution by these metals in the environment **(Mokgalaka etal.,2008)** .Since meat is a significant part of human feed ,thus levels of heavy metals should be determined routinely in meat intended for human consumption**(Ambush etal., 2012)**found that cadmium and lead levels in liver ,kidney , muscle and fat of bovine below the maximum residue level(MRLs) that have been set by Codex Alimentarius Commission and Commission of the European Communities ,also**(Krupa and Kogut 2000)**found that all meat samples met polish regulations for cadmium and lead residuies , while offal samples contained relatively high levels of both and **Ghidini *et al.* (2005)** found that lead and cadmium concentrations, were very low and did not differ between organic and conventional products of milk and meat samples while **Aranha *et al.* (1995)** examined lead level in liver and kidneys of cattle obtained from Federal Government slaughter houses of various Brazilian States. The mean levels of lead in liver and kidneys were 0.12 and 0.15ppm, respectively.

in the other side some researches in Egypt recorded the presence of heavy metals in Egyptian food as **El-Kelish (1995)** determined cadmium and lead concentrations in tissues of cattle and sheep carcasses (10 of each and up to 2 years old) slaughtered at Zagazig abattoir. The mean values of cadmium in cattle were 0.09, 0.26 and 0.34 µg/gm wet weight in muscle, liver and kidney, respectively, while the respective values in sheep were 0.10, 0.26 and 0.38µg/gm wet weight respectively, and concluded that kidneys of slaughtered cattle and sheep contained the highest concentration of cadmium. However, liver and kidney contents of cadmium were above the permissible limit (0.lppm).While the mean values of lead (µg/gm wet weight) in muscle, liver and kidneys were (0.18, 0.42 and 0.25 µg\gm) in cattle and (0.21, 0.45 and 0.27 µg\ gm) in sheep carcasses, respectively.And **Soliman(2000)** analyzed samples from cows and buffaloes collected from different slaughter houses of Cairo and Giza to detect and determine concentrations of lead. The highest concentration of lead residues was presented in cow's carcasses followed by buffalos. The highest concentration was present in kidneys, livers, spleen, heart, and muscles .Also **Saleh and El-Nimer (1995)** determined lead and cadmium residues in liver, kidneys and muscle of 20 cattle carcasses (up to 2 years old) reared in private farm located close to an over crowded highway. They found that the mean values of lead were 0.625, 0.580 and 0.312 mg/kg wet weight in liver, kidney and muscle, respectively, while the mean values of cadmium were 0.451, 0.725 and 0.215 mg/kg wet weight in liver, kidney and muscle samples respectively. More over **Attala (1998)** determined lead (ppm, wet weight) residues in examined sheep tissues slaughtered in Zagazig abattoir. The mean values of lead residues in muscle, liver, kidneys and spleen were 0.405, 0.367, 0.288 and 0.753 in young males, 0.541, 0.414, 0.461 and 0.552 in young females, 0.609, 2.072, 1.992 and 0.909 in aged males and 1.163, 0.821, 0.929 and 0.894 in aged females respectively, moreover, the overall mean values of muscle, liver, kidney and spleen of examined sheep samples were 1.180, 0.918, 0.917 and 0.777, respectively. While **Farag (2002)** assessed quantitatively the metals burden and the levels of some important heavy metals (lead and cadmium) in certain bovine edible offal and muscle obtained from bovine carcasses slaughtered at an abattoir in Port-Said. In case of lead, elevated concentrations are generally found in the edible organs of food animals, while cadmium is a highly toxic and accumulating element, which is stored mainly in the liver and the kidneys. Cadmium is classified as a probable human carcinogen and chronic exposure to cadmium is also associated with a wide range of other diseases, including heart disease, anemia, skeletal weakness, depressed immune system response, kidneys and liver disease **(Codex Alimentarius, Commission Procedural Manual 2001) .**The mean values of lead, cadmium in shawerma were recorded by **Hala and Shireen (2008)** 1.484 ±1.771 and 0.338 ± 0.435 ppm, respectively, while **Shaltout and El-Lawendy (2003)** could detect lead and cadmium in shawerma at Kalyobia governorate and the obtained results revealed that lead concentration ranged from 0.316

to 1.168 with a mean value of 0.79 mg/kg wet weight while cadmium concentration ranged from 1.741 to 3.861 with a mean value of 2.185 mg/kg wet weight.And **El-Tawwab (2004)** measured the minimum, maximum and mean concentrations of lead in shawerma/ppm wet weight methods were: 0.233,0.408 and 0.318 ± 0.008/g, respectively, while the minimum, maximum and mean concentrations of cadmium in shawerma ppm wet weight methods were: 0.195, 0.281 and 0.241 ± 0.004/g, respectively**.**

Kan (1991) evaluated heavy metals residues in poultry meat and eggs. He concluded that heavy metals in poultry products not constitute a major residue problem .Also **Hassan (2007)** recorded that the concentration of lead were 0.07 ± 0.01 and 0.12 ± 0.01 in the examined chicken panne and sheishtawook samples, respectively, and 10% and 20% of the examined chicken panne and sheish tawook samples were unfit for human consumption according to **WHO (1984)** which stated that the permissible limit of lead shouldn't be more than 0.1 mg/kg. The author also recorded that the concentrations of cadmium were 0.15 ± 0.02 and 0.06 ± 0.1 in the examined chicken panne and sheishtawook samples, respectively, and 15 % and 5% of the examined chicken panne and sheish tawook samples were unfit for human consumption according to **WHO (1984)**.Mean while **Kulcova *et al.* (1991)** examined samples of poultry products (chicken muscles, liver, and eggs) for mercury contents. Mean mercury contents in chicken muscle (103 samples), liver (89), and eggs (42) were 0.003, 0.010 and 0.002 mg/kg, respectively. Proportion of muscle, liver and egg samples exceeding acceptable hygienic limits for mercury (2.91, 2.25, 2,30)% respectively. While in Egypt **El-Sakkary (2007)** examined 40 samples of chicken panne and chicken shiesh tawook for detection of heavy metal residues. The author found that the mean values of lead, cadmium and copper were 0.07 ± 0.01 and 0.15 ± 0.02 mg/kg wet weight, respectively, for the examined chicken panne samples and 0.12 ± 0.01 and, 0.06 ± 0.01 mg/kg for the examined sheiesh tawook samples, respectively.

Wang *et al* (2005) stated that consumption of fish contaminated with heavy metals like lead and mercury is the most likely route for human exposure in Tianjin, China and added however, consumption of both vegetables and fish would lead to potential health risks especially for children**. Kirby *et al.* (2001)** measured copper, cadmium and zinc concentration in *Mugil cephalus* from Lake in Australia. Mean flesh concentration of copper was 3.6 ± 0.1 mg/g, cadmium was 2.3 ± 0.3 mg/g and zinc was 14 ± 1 mg/g. Little variation in trace metal level in *Mugil cephalus* was explained by mass, gender or age.While in Egyptian condition **Mohamed (2003)** stated that the residual content of lead in fish caught from Ismaelia canal at mustorod was 0.09 ± 0.012 ppm, while its level was 0.62 ± 0.015 ppm in fish caught at Massara and 0.86 ±0.03 ppm in fish caught at Shubra EL-Khima, and **Ragab (2001)** found that lead and mercury levels in Bolti fish were 0.168± 0.289 and 0.050 ± 0.010 ppm, respectively. Also, **Rashed (2001)** found that cadmium and lead are determined in different tissues (muscle, gill, stomach, intestine. liver, vertebral column and scales) of *Tilapia nilotica* from the high

Dam lack, Aswan (Egypt) to assess the lake water pollution with these toxic metals. Fish samples were chosen from different ages and weights to be analyzed along with samples of the aquatic plant (Nojas, Ormeta), sediment and lake water. The results showed that the cadmium and lead concentrations were higher in fish scales and vertebral column than in the other parts of the fish. Cadmium and lead levels in high Dam lake water and fish *(Tilapia nilotica)* were a result of the pollution which tack up from aquatic plants, sediments and gasoline containing lead that leaks from fishery boats. *Tilapia nilotica* was used as a good bio-assay indicator for the lake pollution with cadmium and lead. The fish muscles in this study were in the safety of Gasoline levels for man. **Noha and Ghada (2007)** estimated the concentration of mercury and lead in *Tilapia nilotica* collected from Giza and Cairo markets. The authors found that the mean value of mercury in fish flesh of *Tilapia nilotica* was 2.2 ± 0.26 and 1.1 ± 0.88 ppm in Giza and Cairo Governorates, while the lead residues were 1.015 ± 0.5 and 1.1 ± 0.84 ppm, respectively.But **Abd El-Nasser *et al* (1996)** investigated fish samples *(Tilapia species and Calrias Lazera)* collected from River Nile at Assiut governorate for their heavy metals content. Mercury, cadmium, lead and copper concentrations in fish muscle of Tilapia species ranged from 0.27 to 33.7 ppm, 0.012 to 0.830 ppm, 0.1 to 2.35 ppm and 0.62 to 17.5 ppm, respectively, while the values of mercury, cadmium, lead and copper in muscle of *Clarias lazera* ranged from 0.27 to 26.3 ppb., 0.014 to 0.10 to 2.01 ppm and 0.17 to 12.8 ppm, respectively. As **Daoud *et al* (1999)** stated that high cadmium content attributed to the collection of water and fish samples from areas exposed to industrial pollution such as nickel - cadmium batteries, rubber tires, coal, steel and iron factories which found in Helwan and Kafr-El-Zayat.

MATERIAL AND METHODS

Collection of samples:

A total of 90 random samples of some fast food represented by Shawerma ,Kebab, Grilled chicken, Fried chicken, Grilled fish and Fried fish (15 of each) were collected from different markets located in Kalyobia Governorate to determine the toxic residues of cadmium, lead and mercury in these fast food. Each sample was kept in aseparate sterile plastic bag and transferred to the laboratory in an insulated ice box as quickly as possible. All collected samples were examined for detection of their contents of heavy metals (cadmium, lead and mercury).

Determination of heavy metals:

The collected samples were examined for determination of cadmium, lead and mercury levels on the basis of wet weight (mg/kg).

1. Washing procedures:

The samples were prepared and digested according to the technique described by **Shibamoto and Bjeldanes (1993).**

Washing of equipment is an important process to avoid contamination especially when trace element or heavy metals are to be analyzed. The tubes, Plastic film and glassware were soaked in water and soap for 2 hours and then rinsed several times with tap water, they were rinsed once with distilled water, once with mixture of (520 ml deionized water, 200 ml conc. HCl and 80 ml H_2O_2) and once with washing acid (consisted of 900ml deionized water and 100ml conc. HC1) then followed by washing with deionized water and air-dried in incubator from contamination of dust.

2. Digestion technique:

After washing, digestion of one gram from each sample of was digested by 10ml of digestion mixture (60ml Nitric acid "HNO_3" 65% 40ml Perchloric acid "$3HCLO_4$" 70-72%) in screw capped tube after maceration by sharp scalpel. The tubes were tightly closed and the contents were vigorously shacked and allowed to stand overnight at room temperature, the tubes were heated for 4hours in water bath adjusted at 70 C to ensure complete digestion of samples. The tubes were then left to cool at room temperature and diluted with 10ml demonized water, capped with plastic film and thoroughly mixed. The digest solution was then filtered with Watt man filter paper and the filtrate solution was collected in Pyrex glass test tubes capped with polyethylene film and kept at room temperature until analyzed for heavy metal contents, preparation of blanks and standard solution in the same manner was applied for wet digestion and by using the same chemicals.

2. Determination:

The concentration of heavy metals in the prepared solutions was determined by using flame Atomic Absorption Spectrophotometer (Perkin Elmer model, Spectra-AA10, U.S.A). Accurately, the apparatus was adjusted at wave lengths of 228.8 nm for cadmium, 217.0 nm for lead and 324.8 nm for copper. Absorbance and concentration of each metal were recorded on the digital scale of the apparatus. The obtained results of cadmium, lead and copper levels in the examined samples were calculated as mg/kg on wet weight.

3. Statistical analysis

All the obtained results were evaluated statisiclly according to analysis of variance (ANOVA) test **(Rosner**, **2002)**

Results

Table (1):Presence of Cadmium in some Egyptian fast food. (n=15)

Rural					Urban*					Standard* (ppm)	Area / Product
Mean ±S.E (ppm)	Max (ppm)	Min (ppm)	Unaccepted samples		Mean ±S.E (ppm)	Max (ppm)	Min (ppm)	Unaccepted samples			
			%	No.				%	No.		
0.31± 0.03	0.58	0.03	33.33	5	0.41± 0.05	0.79	0.04	46.67	7	0.10*	Shawerma
0.22± 0.03	0.47	0.03	26.67	4	0.29± 0.03	0.71	0.03	33.33	5	0.10*	Kebab
0.09± 0.03	0.19	0.01	13.33	2	0.25± 0.03	0.66	0.04	33.33	5	0.10*	Grilled chicken
0.13± 0.01	0.26	0.02	13.33	2	0.11± 0.01	0.24	0.01	13.33	2	0.10*	Fried chicken
0.37± 0.05	0.63	0.04	33.33	5	0.62± 0.07	1.06	0.05	53.33	8	0.05**	Grilled fish
0.18± 0.02	0.30	0.02	20	3	0.34± 0.04	0.75	0.03	40	6	0.05**	Fried fish

*** WHO (2000)**

**** EOSQC (1993)**

*** Significant differents (P<0.05)**

Table (2): Presence of Lead in some Egyptian fast food. (n=15)

Rural					Urban*					Standard* (ppm)	Area / Product
Mean ±S.E (ppm)	Max (ppm)	Min (ppm)	Unaccepted samples		Mean ±S.E (ppm)	Max (ppm)	Min (ppm)	Unaccepted samples			
			%	No.				%	No.		
1.05± 0.06	1.58	0.22	53.33	8	1.15± 0.09	2.06	0.28	60	9	0.5	Shawerma
0.76± 0.06	1.12	0.15	26.67	4	0.94± 0.08	1.27	0.19	40	6	0.5	Kebab
0.41± 0.05	0.79	0.10	20	3	0.60± 0.04	1.02	0.14	26.67	4	0.5	Grilled chicken
0.33± 0.02	0.68	0.07	13.33	2	0.47± 0.03	0.81	0.09	20	3	0.5	Fried chicken
0.40± 0.04	0.83	0.05	60	9	0.62± 0.05	1.15	0.06	73.33	11	0.1	Grilled fish
0.26± 0.03	0.79	0.03	46.67	7	0.39± 0.03	0.74	0.03	53.33	8	0.1	Fried fish

**** EOQC (1993)**

*** Significant differences (P<0.05)**

Table (3): Presence of Mercury in some Egyptian fast food. (n=15)

Rural				Urban*				Standard* (ppm)	Area / Product
Mean ±S.E	Max (ppm	Min (ppm	Unaccepted samples	Mean ±S.E	Max (ppm	Min (ppm	Unaccepted samples		

(ppm)	)	)	%	No .	(ppm)	)	)	%	No .		
0.22± 0.03	0.58	0.04	6.67	1	0.29± 0.03	0.70	0.09	13.3 3	2	0.5	Shawerm a
0.17± 0.02	0.51	0.02	6.67	1	0.21± 0.03	0.54	0.04	6.67	1	0.5	Kebab
0.08± 0.01	0.19	0.02	-	-	0.11± 0.02	0.32	0.01	-	-	0.5	Grilled chicken
0.05± 0.01	0.12	0.01	-	-	0.10± 0.01	0.20	0.01	-	-	0.5	Fried chicken
0.59± 0.06	1.03	0.10	40	6	0.76± 0.08	1.13	0.14	53.3 3	8	0.5	Grilled fish
0.53± 0.04	0.78	0.07	26.6 7	4	0.64± 0.05	0.99	0.11	46.6 7	7	0.5	Fried fish

**** WHO (2000)**

*** Significant differences (P<0.05)**

DISCUSSION

Having in mined the adverse effects of heavy metals, many of food safty agencies set permissible limits for their levels in meat and meat products .Consequently, the continuous consumption of food stuffs contaminated with these heavy metals exceeding the safe permissible limits may result in a public health hazard progressive irreversible accumulation in human body.**(Shibamoto and Bjeldanes, 2000)**

Cadmium in fast food samples:

Concerning the cadmium level, table (1) declared that 46.67%, 33.33%, 33.33%, 13.33%, 53.33% and 40% were contaminated with cadmium at Urban area, and 33.33%, 26.67% , 13.33%,13.33%, 33.33% and 20% were contaminated with cadmium at Rular area, in the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) respectively.

Results achieved in table (1) revealed that the concentrations of cadmium in the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) ranged from 0.04ppm to 0.79ppm with a mean value of 0.41 ± 0.05ppm, 0.03ppm to 0.71ppm with a mean value of 0.29 ± 0.03ppm , 0.04ppm to 0.66ppm with a mean value of 0.25± 0.03ppm,0.01ppm to 0.24ppm with a mean value of 0.11 ± 0.01ppm, 0.05ppm to 1.06ppm with a mean value of 0.62 ± 0.7ppm and 0.03ppm to 0.75ppm with a mean value of 0.324 ± 0.04ppm at Urban area, respectively, and the concentrations of cadmium in the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) ranged from 0.03 to 0.58ppm with a mean value of 0.31 ± 0.03ppm, 0.03 to 0.47ppm with a mean value of 0.23 ± 0.03 ppm, 0.012 to 0.19ppm with a mean value of 0.09± 0.03ppm,0.02 to 0.26ppm with a mean value of 0.13 ± 0.01ppm, 0.04 to 0.63ppm with a mean value of 0.37 ± 0.5ppm and 0.02 to 0.30ppm with a mean value of 0.18 ± 0.02ppm mg/kg at Rular area, respectively .Such variations between the examined samples of fast food products were significant ($p< 0.05$)from Urban area and Rular one may be due to the industrial contamination in Urban area more than Rular area and both that exceeded the permissible limit of cadmium(0.10ppm) recommended by **WHO (2000),** this occure due to the high contamination level through industrial by products and low hygienic level in Egypt. As cadmium is released into the atmosphere from the burning of coal, other fossil fuels, sewage sludge, medical, and miserable waste. So soil, water and sediments were contaminated with cadmium, also occur through miserable wastewater treatment, electroplating, metal processing, plastic and dye manufacturing, and the application of phosphate fertilizers. Cadmium enters plants, animals and poultry life cycle from the soil and water, thus entering the food supply. Currently, food contributes 80-90% of the cadmium dose received by most people **(Codex Alimentarius, Commission Procedural Manual 2001).** High cadmium content attributed to the collection of fish from areas exposed to industrial pollution such as nickel-cadmuim batteries, rubber tiers, coal and steel factories. This held the view reported by Daoud **et al. (1999).**

Cadmium may be accumulated in body tissue of human leading to kidney failure. Kidney malfunction in man occurred when the concentration was above 200 µg/gm wet weight. They added that cadmium is a possible cause of hypertension, insomnia and testicular atrophy **(Gracey and Collins, 1992).**

Cadmium is a cumulative toxic agent with a biological half – life of 10-30 years**.** Accurately, cadmium acts on sulphhydryl groups of essential enzymes and also binds to albumin, phospholipids and nucleic acids, interferes with oxidative phosphorylation and replaces zinc in enzymes so changing their activities **(Bernard, 2004).**

Cadmium is a severe pulmonary and gastrointestinal irritant, which can be fatal if inhaled or ingested. Furthermore, cadmium plays a role in hypertension**,** diabetes mellitus in human**,** through injury of adrenal gland, adipose, hepatic, and pancreatic tissue, especially cells within islets of Langerhans, reducing insulin levels**,** altering glucose metabolism and / or glucose uptake that ultimately results in increased blood glucose **(Edwards and Prozialeck, 2009).** And Cadmium is nephrotoxic pollutant**,** causing kidney damage**,** end stage renal disease (ESRD)**,** irreversible renal failure**,** nephritis, kidney stones and overall mortality **(Johri *et al.,* 2010).** Moreover, cadmium is classified as a probable human carcinogen (group I) **(IARC, 1993).** Interestingly cadmium is not directly genotoxic, but only weakly mutagenic in mammalian cells **(Dally and Hartwig, 1997).**

Lead in fast food samples:

The results recorded in Tables (2) revealed that 60%, 40%, 26%, 20%, 73.33% and 53.33% were contaminated with lead at Urban area, and 53.33%, 26.67% , 20%,13.33%, 60% and 46.67% were contaminated with lead at Rular area, of the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) respectively, were contaminated with lead.

It is evident from results recorded in table (2) that the concentrations of lead in the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and

Fried fish) ranged from 0.28 to 2.06 with a mean value of 1.15 ± 0.09, 0.19 to 1.27 with a mean value of 0.94 ± 0.08 , 0.14 to 1.02 with a mean value of 0.60± 0.04,0.09 to 0.81 with a mean value of 0.47 ± 0.03, 0.06 to 1.15 with a mean value of 0.62 ± 0.5 and 0.03 to 0.74 with a mean value of 0.39 ± 0.03 mg/kg at Urban area, respectively, and the concentrations of lead in the examined samples of some fast food (Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) ranged from 0.22 to 1.58 with a mean value of 1.05 ± 0.06, 0.15 to 1.12 with a mean value of 0.76 ± 0.06 , 0.10 to 0.79 with a mean value of 0.41± 0.05,0.07 to 0.68 with a mean value of 0.33 ± 0.02, 0.05 to 0.83 with a mean value of 0.40 ± 0.04and 0.03 to 0.79 with a mean value of 0.26 ± 0.03 mg/kg at rural area, respectively,that exceed the permissible limit of lead (0.10ppm) recommended by **EOQC (1993)** .The industrial and agricultural discharges were the primary sources of lead contamination in Egypt , another sources of contamination with lead are gasoline and pesticides manufacturing , combustion of coal and incineration of refuse **(EL-Nabawi et al., 1987)**, which agree with our results that the level of contamination in urban area higher than rular one.

Lead is one of the most ubiquitous metals known to humans**.** Children, pregnant women, and the malnourished can absorb 40-70% of ingested lead. Dietary deficiencies of iron, calcium, zinc and ascorbic acid can result in increased gastrointestinal absorption of lead **(Sargent, 1994).** The most sensitive targets for lead toxicity are the developing nervous system, the hematological, gastrointestinal, renal, reproductive and cardiovascular systems**.** Excretion of lead is primarily via the kidneys and can also be excreted with bile through the gastrointestinal tract, and the half life of lead in blood is about 30 days and 20-30 years in bone which contains up to 94% of the body burden of lead **(Patocka and Cerný, 2003).**

Lead exposure has also been associated with reduced bone growth in fetuses and children, resulting in reduced head circumference and stature**.** Lead interferes with bone formation, maturation and resorption and may also be a potential risk factor for osteoporosis. Lead may exert both indirect and direct actions on bone turnover. Signs and symptoms of acute lead poisoning in adults may include abdominal pain, anorexia, nausea, severe vomition, intestinal cramps, epigastric, colic, constipation**,** headache, joint and muscle pain, convulsions, hemolytic anemia **(CDC, 2006).**

Mercury in fast food samples:

The results recorded in Tables (3) revealed that 13.33%, 6.67%, 0%, 0%, 53.33% and 46.67% were contaminated with mercury at Urban area, and 6.67%, 6.67% , 0%,0%, 40% and 26.67% were contaminated with mercury at Rular area, of the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) respectively, were contaminated with mercury.

It is evident from results recorded in table (3) that the concentrations of mercury in the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) ranged from 0.09 to 0.70with a mean value of 0.29 ± 0.03, 0.04 to 0.54 with a mean value of 0.21 ± 0.03 , 0.01 to 0.32 with a mean value of 0.11± 0.02,0.01 to 0.20 with a mean value of 0.1 ± 0.01, 0.14 to 1.13 with a mean value of 0.76 ± 0.08 and 0.11 to 0.99 with a mean value of 0.64 ± 0.05 mg/kg at Urban area, respectively, and the concentrations of mercury in the examined samples of some fast food(Shawerma, Kebab , Grilled chicken, Fried chicken, Grilled fish and Fried fish) ranged from 0.04 to 0.58 with a mean value of .22 ± 0.03, 0.02 to 0.51 with a mean value of 0.17 ± 0.02 , 0.02 to 0.19 with a mean value of 0.08± 0.01,0.01 to 0.12 with a mean value of 0.05 ± 0.01, 0.10 to 1.03 with a mean value of 0.59 ± 0.06and 0.07 to 0.78 with a mean value of 0.53 ± 0.04 mg/kg at Rular area, respectively ,that lower than the permissible limit of merucury (0.10ppm) recommended by **WHO (2000)**except in Grilled fish and Fried fish are higher may be due to the industrial and agricultural discharges in River Nile which contaminated with mercury as recorded by **Noha and Ghada (2007)***and* **Sallam (1997).**

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