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RESEARCH ARTICLE

INVESTIGATION FOR HEAVY ELEMENTS TO SOME CANNED FOOD WHICH AVAILABLE IN LOCAL MARKETS

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ABSTRACT

Canned food is one of the main source of exposure to heavy metals for people around world .Canned food samples from local markets in Diyala province was collected and used to investigate for heavy metal including (Pb, Fe, Cr and Ni). Atomic absorption spectrophotometer was used to determine the concentration of heavy metals .The results of this study showed that there were contamination with Pb, Fe and Cr in canned food while two of these metals not detected (Cd and Ni) in present study. This study concluded that many canned food may contaminated with heavy metals and more studies must be done to investigate of these materials.

INTRODUCTION

Heavy elements are a major environmental pollutants and their continuous releasing from different sources leads to increase their concentration in the environment and accelerate their potential risks to human health. These elements can be naturally present in low concentration and considered as a necessary factors for many biological activities , in other hand , some of these elements are unnecessary and represent contaminated material due to their high toxic effects (Al_jurani , 2003) Even low concentration of these elements, they consider very dangerous environmental pollutants since they are not insoluble and they can enter the organism body through the air , drinking water , food and canned food or countless varieties of man –made chemicals and products .Their accumulation occur in organism tissue gradually and over time causing various damages to these tissues (Blanco, 2005) .

The molecules of heavy metals are considered the most dangerous deposited molecules due to the fact that these toxic molecules accumulate in the body after easy entry for example cadmium (cd) is absorbed by plant and get it way to fruit then it enter to human body while the lead is easier to absorbed than cadmium so it easier to enter human body (Al_ Safadi and Al_ Zahir, 2008).

Food is one of the main route of exposure to heavy metals for most people and recent studies are interesting with using suitable methods to determine food pollution levels with these element (Mahmood, 2010). Increasing food contamination by metals may be due to manufacturing procedure, the equipments used during the process, packing and storage (Abo saada, 2011).

The canned food are popular, most favored and most consumed by people in many part of the world because they are inexpensive and affordable (David, 2006).

The packing process aim to prolong the period of keeping food as much as possible (Wolf, 1992), but as a result of the prosperity of this industry the process of cheating increase largely (David, 2006).

In spit of the WHO / FAO committee legislation stated that the raw materials used in this industry must be of a high quality and having no defects , many canned foods enter to the local markets without quality control and this lead to the presence of a great number of canned food that violate the legal and healthy condition . These effects the consumers' health indirectly through the deposited impact of the heavy metals found in these foods. This study aims to investigate the presence of the heavy metals in some types of canned food available in the local market at Diyala province center.

MATERIALS & METHODS

Eleven food samples (peas, peas and carrots, chick peas, hores beans, sweet corn, mushroom and pineapple) of different manufacturing countries were purchased and collected from local market at Diyala province center. The samples were opened, and the contents were homogenized by electric mixer. The mixture were dried at 80 C˚ in oven and milled by using porcelain mortar. Atomic Absorption spectrophotometer was used for the determination of heavy metals in canned foods indicated by part per million (ppm) followed digestion procedure.

Half gram of the dried materials were taken and placed in 100 ml beaker and the digested operation was done by using Sulfuric , Nitric and Perockloric acid (1:1:2 , respectively) was add slowly in portions . Each beacker was covered with a watch glass and stored for 2_4 hours. The volume was completed to 50 ml with distilled water (APHA, AWWA, 1998).

RESULTS

Eleven samples of canned food were analyzed for lead (Pb) , Iron (Fe) , Chromium (Cr) , Cadmium (Cd) , and Nickel (Ni) . These samples were classified according to their

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manufacturing. Table 1 showed the variety of sources for these samples (found in local market).

Table 1 Varieties of manufacturing countries of samples and their percentage

Food type	Number of samples	Manufacturing countries	The percentage
Peas + chickpeas	2	Saudi Arabia	18.181%
chickpeas	1	Italy	9.090%
Peas + chickpeas	2	Jordan	18.181%
Chickpeas+ + hores beans Mushroom	3	China	27.27%
hores beans	1	United Arab Emirates	9.090%
Pineapple + Sweet Corn	2	Thailand	18.181%

As showed in table 1, there were six countries manufactured of these canned food samples. Two products were taken from each of Saudia Arabia (Peas + chickpeas), Jordan (Peas + chickpeas) and Thalend (Pineapple+ Sweet Corn) with percentage % 18.181 for each one.

Table (2) Concentrations of heavy metals in some heavy canning

Material food	Manufacturing source	Lead Conc SD Ppm	Iron Conc SD Ppm	Chrome Conc SD Ppm	Cadmium SD Conc Ppm	Nickel SD Conc Ppm
chick peas	Saudi Arabia	0.875± 0.0009	0.935 ± 0.0037	No detect ±0.0015	No detect± 0.0027	Nodetect±0.0007
chick peas	Italy	0.75± 0.0007	0.557 ± 0.0012	No detect ±0.0012	No detect ± 0.0011	No detect ± 0.0005
chick peas	Jordan	0.875± 0.0007	0.683 ± 0.0008	0.192 ± 0.0008	No detect ± 0.0006	No detect ± 0.0006
Peas and carrots	China	1± 0.0007	0.935 ± 0.002	0.577 ± 0.0008	No detect ± 0.0067	No detect ± 0.0006
peas	Jordan	1± 0.0009	0.914 ± 0.0013	0.577 ± 0.001	No detect± 0.0011	No detect ± 0.0007
Mushroom	China	1 ± 0.001	0.998 ± 0.0016	1.346 ± 0.0009	No detect ± 0.0007	No detect ± 0.0006
hores beans	United Arab Emirates	0.5± 0.0007	0.809 ± 0.0011	0.577 ± 0.0009	No detect ± 0.0011	No detect ± 0.0008
hores beans	China	0.875± 0.0006	1.502 ± 0.0028	0.962 ± 0.001	No detect± 0.001	No detect ± 0.0011
Sweet Corn	Thailand	0.75± 0.0006	0.452 ± 0.0006	0.577 ± 0.0009	No detect ± 0.0006	No detect ± 0.0011
peas	Saudi Arabia	0.75 ± 0.0007	0.704 ± 0.001	0.962 ± 0.0009	No detect ± 0.0009	No detect ± 0.0007
Pineapple	Thailand	1.125 ± 0.0009	0.347 ± 0.0009	0.962 ± 0.0019	No detect ± 0.0007	No detect ± 0.0007

Three samples were taken from China (Chickpeas Mushroom+ hores beans) with percentage % 27_27.Only one type was taken from each Italy and United Emarts (chickpeas+ hores beans) respectively with percentage %9.090for each of them.

The results of examining food samples showed that there was a clear occurrence of some heavy metals in these products as showed in table 2. The highest concentration of lead was in pineapple sample (1.120 ppm) while the lowest concentration was in Emirats beans (0.5 ppm).These results showed clearly that food samples contain lead with levels higher the international allowable levels. Chinese horse beans sample, showed highest concentration of Iron (1.5 ppm) as showed in table 2 while the lowest concentration of Iron (0.3 ppm) was in pineapple.

The results obtained that the highest concentration of chromium was in Chinse. Mushroom (1.346 ppm) while the lowest concentration was in Jorden chick – peas which it was (0.192 ppm). This results were high than allowable level of Cr. Two heavy metals (Nickel and Cadmium) were not detected in all samples in this study.

DISCUSSION

The results showed that these was high concentration of lead compared with international permissible levels. These results agree with (Salem *et al*., 2004; Ashraf, 2006) whose obtain that there was a high concentration of lead in canned food.
Lead is toxic metal and even in low concentration it is health hazards since it is no bio degradable (Korfali and Hamadan, 2013).

The presence of (pb) in canned food may due to use of pb in product package materials or due to absorbed lead by plants in limit level (El_Eed *et al*, 1997) Iron was higher concentration in examined canned food than allowable levels. This result agree with Korfali and Hamadan (2013) , whose obtained that canned food reported high Iron concentration . Than allowable levels. This results may be due to processing method, brend and packing materials which influence their content (Tuzen and Soylak, 2007).

High concentration of Cr was detected in the present study and this agree with Ashraf (2006) and Tuzen and Soylak (2007).
The high concentration of chromium may be due to some food processing such as homogenized or grinding using stain less steal equipment (Kumpulainen , 1992).Two heavy metals were not detected in all samples in this study include Ni and Cd. This disagrees with some studies such as (Salem *et al*., 2004; Ashraf, 2006). This study suggest more investigation studies to determine the contamination of canned food with heavy metals in different canned food in different places in province

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