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LEAD POLLUTION IN SHAWERMA FROM ZAGAZIG CITY, EGYPT

(With 1 Table)

By

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تلوث الشاورمة بالرصاص في مدينة الزقازيق- مصر

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تم تجميع عدد ٤٠ عينة من الشاورمه من المطاعم والسوبر ماركت بمدينة الزقازيق حيث تم تحليلها باستخدام مقياس الأمتصاص الذري الطيفي (AAS) لتعيين مستويات الرصاص بـــها أوضحت النتائج أن تركيز الرصاص تراوح من ٠,٠٧٦ إلى ٠,٣٨١ بمتوسط قـدره ٠,٠٣٧ ± ٠,٢٢١ ميكروجرام لكل جرام. دلت النتائج التى تم الحصول عليها بأن تركيز الرصـلص في العينات التى تم فحصها كان أقل من الحد المسموح به وهو ٠,٥ جزء في المليون حسـب المواصفات القياسية المصرية لهذا فإن استهلاك الشاورمه في مدينـــة الزقـازيق لا يشـكل خطورة على صحة المستهلك.

SUMMARY

A total of 40 random samples of shawerma were collected from different restaurants and supermarkets at Zagazig City, Egypt and were analyzed by AAS for determination of Pb levels in it. The obtained results revealed that Pb concentration ranged from 0.076 to 0.381 with mean value of 0.221±0.037 µg/g wet weight. All the examined samples contained Pb conc. lower than the maximal permissible limit of Egypt (0.5 ppm), so it could be concluded that consumption of such food in Zagazig City had no danger for human health.

Key words: *Lead pollution, Shawerma*

INTRODUCTION

Shawerma belongs to the category of ready-to-eat food products which does not undergo further preparation or cooking. Shawerma is usually made from beef meat. The meat is sliced and fixed around a metalic rod, then covered allover with sheep fat. The rod carrying the meat is rotated facing fire. Cooked meat is then cut into very thin slices dropped in an open pan. Small parts of tomatoes are added for improving its taste. The product could be consumed as such or as sandwiches.

In recent years, the product became a popular food article in Egypt, and the rate of its consumption is continuously increased (Morshdy et al., 1986).

On the other hand, shawerma is usually manufactured and sold outside the supermarkets and small restaurants, that make it liable for lead (Pb) pollution by exhausts of leaded gasoline especially at areas of high traffic density like squares and near stations where such product is frequently sold.

The aim of this study was to evaluate the degree of Pb-pollution in shawerma marketed at Zagazig City, Egypt, to ensure its safety for human consumption.

MATERIALS and METHODS

Collection of samples:

A total of 40 shawerma meat samples were collected from different shops and restaurants at Zagazig City. The collected shawerma samples were separately kept in polyethylene bags and stored at deep freezer till digestion was taken place.

Digestion of samples:

Digestion was carried out by the method recommended by Khan et al. (1995) with some modifications. One gram of shawerma meat sample was digested separately in 6 ml of a 4:2 mixture of ultrapure concentrated HNO_3: $HclO_4$ in 20-ml screw-capped tubes. The tubes were tightly closed and allowed to stand overnight at room temperature, then the tubes were heated for about 3 hours in water-bath at about 80°C. The resulting solutions were diluted with deionized water till 20 ml then filtered through Whatman filter paper No. 41. Blank and standard solutions were prepared and used for quality control.

Analysis of samples:

Duplicate measurements on all samples using Flame Atomic Absorption Spectrophotometer (Buck Scientific Model 210 VGP) at Central Laboratory, Faculty of Veterinary Medicine, Zagazig University. The following parameters recommended by the instrumental instructions were operated for Pb-determination:

Lamp wave length (nm)	Slit width (nm)	Lamp current (ma)	Fuel flow rate (l/min)	Burner height (cm)	Detection limit (ppm)
217.0	0.7	12	30	8	0.01

RESULTS and DISCUSSION

Lead is one of the most toxic metals that has probably plagued humans since early civilization. The major sources of Pb-contamination are wastes from leaded gasolines, pesticides manufacturing, combustion of coal, incineration of refuse and leaded paints (Pagenkopf and Neuman, 1974). Transport and distribution of Pb from stationary or mobile sources into the air over areas of high traffic density falls out mainly and may reach to human food (WHO, 1977). Shawerma is among human foods that may be polluted with Pb.

The toxicity of Pb could results in anemia, abdominal colic, liver dysfunction, renal damage, peripheral neuropathy in adults, CNS disorders in the form of permanent brain damage in children and in case of extreme Pb-poisoning, convulsion followed by coma and death might occurred, moreover Pb had a biological half-life of about 27 years in human bones (Goldfrank et al., 1990; Gossel and Bricker, 1990; Manahan, 1992; and Shibamoto and Bjeldanes, 1993).

Table 1: Lead concentration (µg/g wet weight) in shawerma "n=40".

Minimum	Maximum	Mean	± SE
0.076	0.381	0.221	0.037

The result of analysis recorded in Table (1) revealed that Pb concentration in examined shawerma samples (n=40) was ranged from 0.076 to 0.381 with a mean value of 0.221±0.037 µg/g wet weight. Nearly similar results were reported in beef meat by Penumarthy et al. (1980) in USA, Solley et al. (1981) in New Zealand, Tsoumbaris and

Tsoukali-Papadopoulou (1994) in Greece, and El-Atabany (1995) in Egypt. On the other hand, several authors had recorded lower mean concentration of Pb in bovine meat at different countries (Holm, 1976; Kreuzer et al., 1980; Hecht, 1983; Jorhem et al., 1991; and Doganoc, 1996), while higher mean of Pb concentration had been reported by Protasowicki (1992); Boulis (1993) and Abo El-Enaen (1998). Such variation of Pb concentration might be referred to differences of age of animals (El-Sherif, 1991; and Hafez, 1995) as well as the differences of degree of environmental contamination at which slaughtered cattle were fed and grown up (Ward et al., 1978; Kreuzer et al., 1980; and Leita et al., 1991) who also concluded that Pb residues in animal tissues is directly related to both soil and pasture content of Pb, traffic density, as well as area of mining, smelting and sewage drainage.

EOS (1993) of Egypt, had proposed 0.5 µg/g wet weight as a maximal permissible limit of Pb in meat and meat products. All the examined shawerma samples were found to have Pb concentration lower than this limit, so it is concluded that there is no danger to human health through consumption of such food.

In order to obtain shawerma with a minimal pb-pollution it is recommended to manufacture such product inside the restaurants and shops away from the exhaust of leaded gasoline especially at areas of high traffic density.

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