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Determination Some Heavy Metal In Dates Of Local Market In AL-Diwaniyah City

Lujain Ibrahim Hussain

Lujain.ibrahim@qu.edu.iq

Abstract :

This study was conducted to identify some heavy elements (Pb, Zn, Cu and Mn) in the local markets of the city of Diwaniyah. 10 types were selected, including five Iraqi types:(zahdi, Barhee, Khasab , Shwethy and Khadrawi dates) As for the imported types found in local markets, they were:(Asal Iran dates , Nurah Saudi dates, AlKadamy Iran dates ,Abomarye Saudi dates and Behnam Iran dates). The results showed that for lead, the lowest value was Iraqi Zahdi dates 1.53 µg\ g dry weight, and the highest value was Saudi Nurah dates , which reached 9.65 µg\ g dry weight.

As for Zn , the lowest value was Iraqi Zahdi dates 16.4 µg\ g dry weight, and the highest value was Saudi Nurah dates , which reached 93.8 µg\ g dry weight.For Cu the lowest value was Iraqi Zahdi dates 0.41 µg\ g dry weight, and the highest value was Iran Asal dates , which reached 2.87 µg\ g dry weight ,and the Mn the lowest value was Iraqi Zahdi dates 13 µg\ g dry weight, and the highest value was Saudi Abomarya dates , which reached 231 µg\ g dry weight

Introduction :

Date palm one of the most important historical fruit to the people around the world, date palm can live in desert and does not need much water, in addition to that date palm providing food, plant oil, sugar, animals fodder, cosmetics, medicine and several benefits. (1). Dates have high quality of carbohydrates such glucose, fructose and sucrose which made the dates palm playing as energy booster, also date play as a source of protein and activate the immune system due to increase the beneficial organisms in the digestive system (2). Palm dates contains glucose, fructose, sucrose and another carbohydrates, which made date palm (Phoenix dactylifera L.) fruit is a sweet, nutritious, the date palm acts as the most ancient cultivated fruit tree, offering

significant socioeconomic and nutritional benefits and energy sources, many regions from Asia, Africa and the middle east specially Arabic countries proud to have a lot of types of palm dates across various regions due to its benefit, many farmers growing dates palm in their land because dates palm tolerates high temperature, lack of water and drought(3). Heavy metals are drawing much attention and excess accumulation of heavy metals in frequently consumed food (e.g., vegetables, fruits) is a serious threat to human health as well as contamination of the food chain, the unwanted heavy metal in dates may appear from the outside factors, it was found that contaminated soil may produce contaminated dates (4). Irrigation waters also contaminate dates whether they were treated or ground water , contamination may also occur by air dust that has heavy metal in it (5).The escalation of urban populations has resulted in the proliferation of anthropogenic activities and the combustion of fossil fuels, the primary contributors to air pollution stem from various sources such as road traffic reliant on fossil fuels, industrial processes agricultural practices, sewage sludge, and waste incineration (6)). Heavy elements in dates have been detected in many studies, including (7) the study proved the presence of some elements in high concentrations, such as lead, cadmium, and chromium, in dates in the Arab contries. (8) also showed an increase in lead in dates at high concentrations, and this increase is closely and significantly linked to the salinity of agricultural soil.

The aim of study Investigation of some heavy metals in 11 types of local and imported dates found in the local markets of Diwaniyah Governorate.

Materials and methods :

Samples were collected from local markets in Al-Diwaniyah Governorate, local and imported types, which are the most consumed types in the governorate. Samples were collected: 10 types, 3 replicates for each sample, then transported to the laboratory for the purpose of knowing the concentrations of heavy metals in them .

The samples were washed with distilled water, then the nuclei were extracted and dried at a temperature of 60-70°C and left to cool slightly. Then the samples were ground and 0.5 g was taken from them and placed in a Pyrex tube. 5 ml of concentration HCL was added to it and left for 16 hours. After that, the samples were dried at a temperature of 70°C , Then 3 ml of HCLO4 was added to it and it was reflexed at a temperature of 70°C until its color became clear. Then it was centrifuged for 10 minutes at a speed of 3000 rpm, after which the volume was

increased to 50 ml with distilled water and the samples were kept until they were finished in special plastic containers for the purpose of examination. Using the FAAS device (9). prepare blank solution for the samples Heavy metal concentrations are calculated according to the equations mentioned in (10) :

E con. = A x B x df \ D

Where :

Econ. = Concentration of the element in the sample

A = Concentration of the element extracted from the two calibration curves

B= Final sample size

D = Dry weight of sample

Results and Discussion :-

The types chosen are:

symbols	dates
A	Iraqi Zahdi
B	Barhee Iraqi
C	Khasab Iraqi
D	Shwethy Iraqi
E	Iraqi Khadrawi
F	Asal dates Iran
G	Nurah Saudi dates
H	AlKadamy Iran dates
L	Abo marye Saudi dates
M	Behnam Iran dates

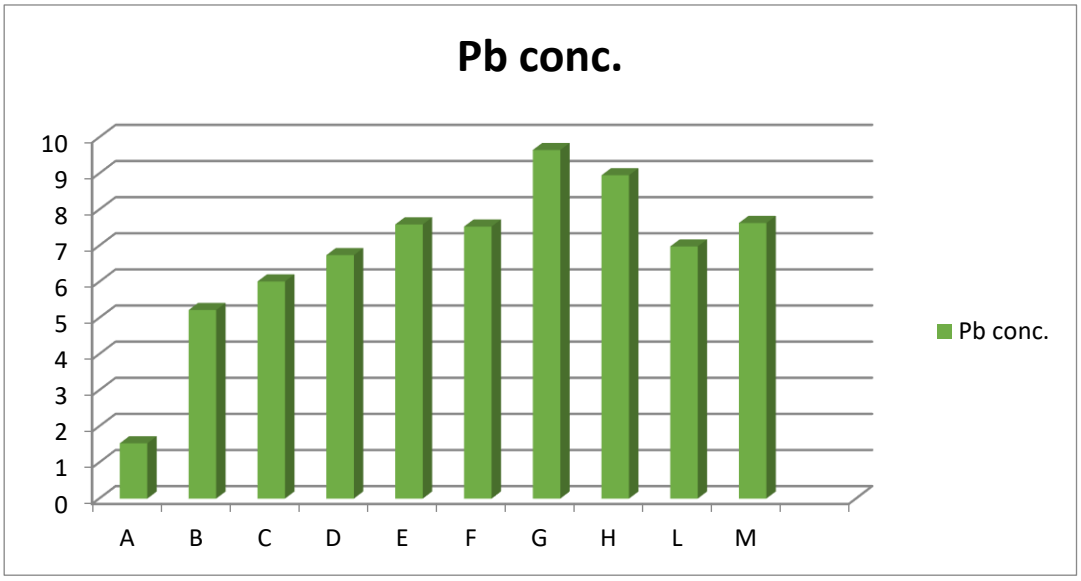

Fig (1) concentration of lead µg\ g dry weight in study samples

Figure (1) shows that the highest value were in sample G and H, which reached (9.65 ,8.95) µg\ g dry weight , and the lowest value was in sample A which was 1.53 µg\ g dry weight. Lead is a toxic element that does not have a vital role in the life of living organisms, Its source is human industrial activities and enters plants through the air and through the soil, the accumulation of Pb in high concentrations leads to a change in the anatomical structure of plant cells (11). Lead can be transferred to dates through dust contaminated with lead, or through pesticides that contain this element in varying proportions, or through some chemical fertilizers. Then the element is transferred to the fruits and to the final consumer, the human, and it enters the bloodstream and affects many vital systems, including the nervous system Kidneys and others (12).

Most of the studied Iraqi species, which include Zahdi, Barhee, Khasab, Showethy, and Al-Khadrawi are types that are resistant to diseases and difficult climatic conditions such as drought and others, especially Zahdi, and they contain high sugars and highly productive (13).

The sample A-E was local samples in the local market ,while F-M this samples were imported to local markets,So,the highest value in Nurah dates (9.65) µg\ g dry weight from KSA than Alkadamy dates from Iran (8.95) µg\ g dry weight The reason may be due to methods of preservation and long-term storage in colored plastic where they were packaged in plastic bags and other packaging materials, and were stored and transported under conditions of

storage and transportation, and then displayed in local markets this results recorded less than study of (14) in UAE.

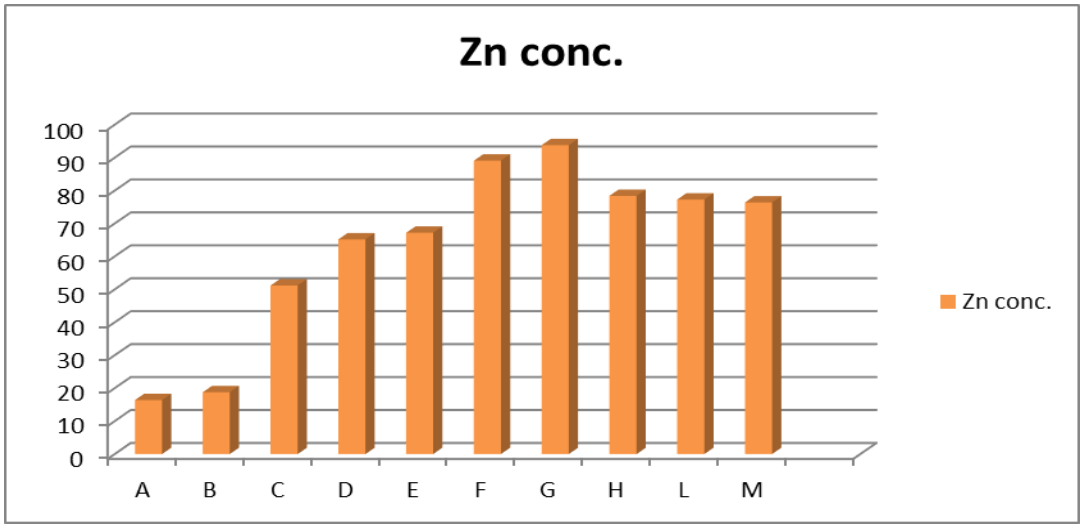

Fig (2) concentration of zinc µg\ g dry weight in study samples

In fig (2) the highest value were in In imported dates Nurah dates from Saudia,(93.8,89.1) µg\ g dry weight the lowest value was in local dates (16.4 ,18.8) µg\ g dry weight Iraqi Zahdi and Barhee dates.

Zinc is an important nutrient for humans, animals and plants. It is involved in stimulating many metabolic reactions in plants. It has a role in plant resistance Protein synthesis, to diseases, photosynthesis, and cell membrane formation. formation and enhancement of antioxidant enzymes, and plays an essential role in the manufacture of chlorophyll (15). The high values may be due to this element being rich in soil because it is widely used in agricultural fertilizers. These results were consistent with (16).

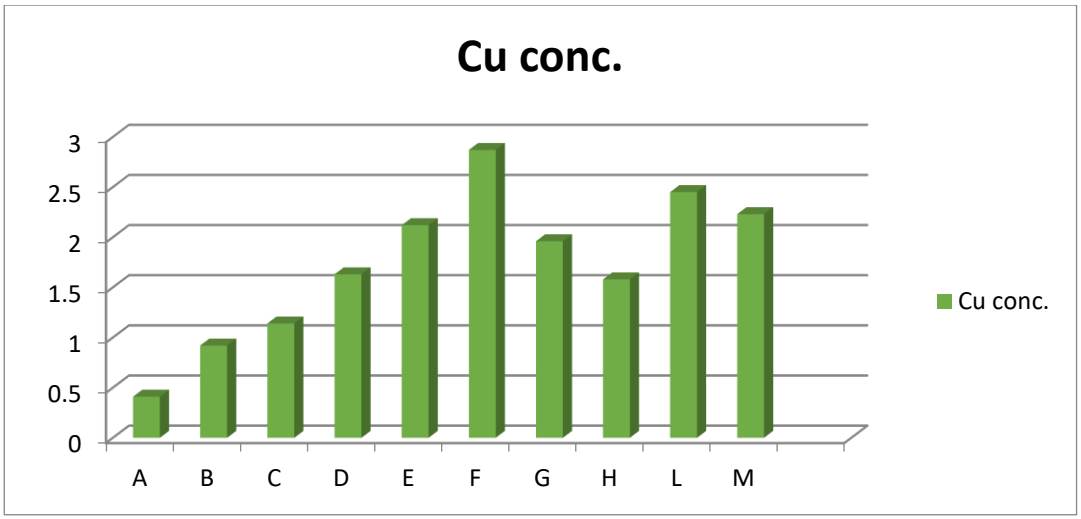

Fig (3) concentration of cupper µg\ g dry weight in study samples

In fig (3) the highest values were for imported dates (2.87 and 2.45) µg\ g dry weight in Iran Asal dates and Abomarye Saudi and the lowest values were for local dates, Zahdi and Iraqi Barhee (0.41,-.92) µg\ g dry weight. It is noted that all values were within the internationally permissible limits, and perhaps this is due to the scarcity of this element in the plant and the plant's need for it, so it is consumed in its vital activities, It is involved in the formation of oxidation and reduction enzymes and in the synthesis of chlorophyll (17). This study is consistent with the results (18).

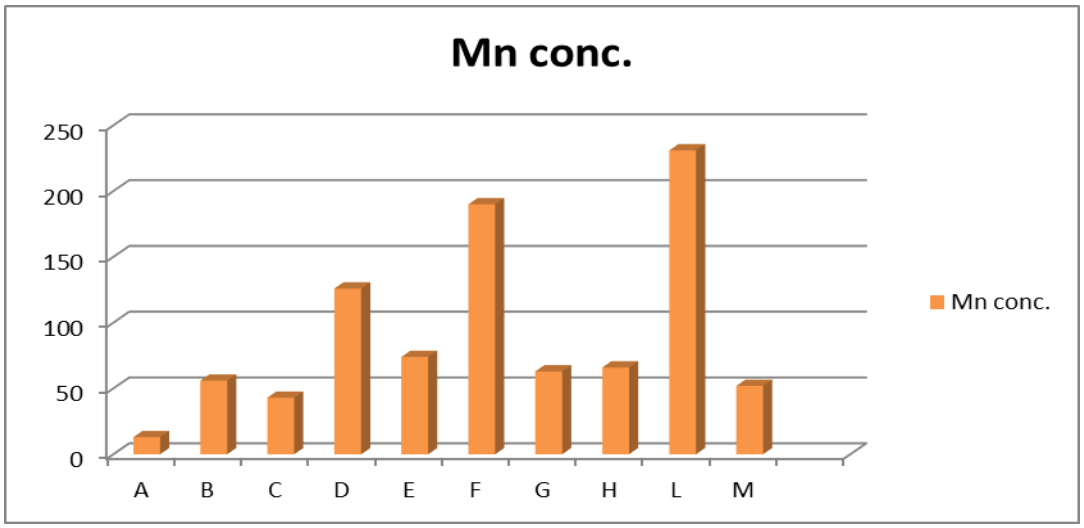

Fig (4) concentration of Mn µg\ g dry weight in study samples

In fig (4) It is noted that the highest values were recorded in imported dates, (231 , 190) µg\ g dry weight Abomarye Saudi and Asal dates Iran while the lowest values were recorded in Iraqi type Zahdi, which was 13 µg\ g dry weight, and Al-Khasab , which was 43 µg\ g dry weigh .

Manganese plays a role in photosynthesis and is involved in activating 35 active enzymes. It has a role in the metabolism of nitrogen and is involved in antioxidants that fight free radicals (19).

An excess of manganese leads to long-term effects such as bone deformation and fragility, and may lead to damage to the human nervous system. Manganese sources are often industrial, as it is used in the mining, welding,

and battery industries, as well as in types of fungicides this is the reason for the high value in this study (20).

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