ستويات الرصاص و الهيدروكاربونات في ثمار وأوراق الأشجار في مدينة الديوانية

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الخلاصة

تم جمع نماذج من ثمار وسعف ستة أنواع من أشجار النخيل(الديري والبريم والحلاوي والبرحي والخستاوي والجسب) في عدة مواقع في مدينة الديوانية خلال صيف 2005.كذلك تم جمع نماذج من أوراق شجرة السدرZizyphus النامية في مناطق مختلفة الكثافة المرورية والسكنية لغرض تقييم تراكم عنصر الرصاص و الهيدروكاربونات البترولية والتي مصدرها عوادم السيارات ومولدات الطاقة الكهربائية.

جففت نماذج الثمار والأوراق وطحنت واستخلص الرصاص بالهظم بالحامض وقدر باستخدام مطيافية الامتصاص الذري اللهبي بينما تم تقدير الهيدروكاربونات البترولية بطريقة مطيافية الفلورة. إن تركيز الهيدروكاربونات في سعف النخيل كانت ضمن المدى0.7-3.3ملغم/كغم وفي الثمار0.4-2.1ملغم/كغم بينما في شجرة السدركانت القيم متدرجة من0.5ملغم/كغم الى1.8ملغم/كغم. وجد من النتائج المستحصل عليها بان اعلى قيمة للرصاص في أوراق شجرة السدر سجلت في مركز المدينة والكراج الموحد وكانت بحدود 24.3و24.5 ملغم/كغم على التوالي وان تركيز الرصاص في الثمار و سعف النخيل كان في المدى 2.2-26.3و10.4-35.1ملغم/كغم على التوالي.تم مقارنة العينات مع نماذج جمعت من مناطق تقع خارج مدينة الديوانية.

LEVELS OF LEAD AND HYDROCARBONS IN THE FRUITS AND LEAVES OF TREES IN DIWANIYA CITY

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ABSTRACT

Samples from fruits and leaves of six date palm cultivars (Dairi, Braim, Khistawi, Hillawi, Braim, and Chasib) were collected from Diwaniya city during summer 2005.Also, leaves of Zizyphus trees growing on roadsides from different traffic density and peopled region of Diwaniya City have been investigated to evaluate the accumulation of lead and petroleum hydrocarbons from motor vehicles exhaust and electrical generators.etc....

The samples of leaves and fruits were dried and the lead was extracted by degiston with HNO_3 and the concentration was determined by flame atomic absorption spectroscopy (FAAS) .Petroleum hydrocarbons were determined spectroflourometrically.The concentration of petroleum hydrocarbons in the leaves of date palm was found in the range 0.7-3.3mg/kg, and in fruits 0.4-2.1mg/kg, while in the zizyphus trees it varied from 0.5mg/kg to 1.8 mg/kg. It was found that the highest concentration of lead in leaves of zizyphus trees was found in the city center and the centeral garage which reached 24.3 and 24.5mg/kg respectively.The concentrations of lead in the fruits and leaves samples of date palm fell in the range (2.2 -26.3)and(10.4 - 35.1)mg/kg respectively. The results were compared with some samples from remote areas (outskirts of Al-Diwaniya city).

Introduction

Hydrocarbons are a common and natural occurrence in our environment and varying concentrations in ground waters, effluent waters, soils and air .

The main sources of air hydrocarbons are the several activities which emits unburned hydrocarbons like electrical power stations, accidents, petroleum wells fires, automobile engines exhaust, dump burning, aircraft...etc. These activities are a result of technologial development.Pollution also results from materials which depend on the location, time, session, climate and environmental conditions.

Generally, the air pollutants include nitrogen oxides, sulfur oxides, chlorinated hydrocarbons, carbon oxides, trace elements, dust, hydrocarbons,..etc. Some of these materials tend to accumulate over surfaces like leaves and fruits of trees, and water sources. Air pollutants may cause harmful risks on environment (ozone damage) or many effects on human health (by eating, drinking, or breathing) and have some effects on animals and plants. But the biodiesel fuel (ethanol)produce exhaust emissions of total petroleum hydrocarbons TPH, CO_x, NO_x, and 93% lower (ethanol) than diesel fuel [1].

The problem of air pollution in Iraq has intensely increased through the few recent years as a result of the importing of millions of old vehicles and using millions of gasoline and diesel electrical power generators to supply the increasing needs for electricity.

There are many which studies dealt with the accumulation of air pollution especially air particulate [2-4], trace elements [5-7], and hydrocarbons [8-11] . For these reasons, leaves and fruits of date palm and leaves of Zizyphus trees were chosen as surface model of accumulation to evaluate the (TPH) and lead concentration.

Materials and Methods

1-Materials: All the chemicals were used without further purification. Concentrated nitric acids, n-hexane, methanol, benzene, sodium sulphate were supplied by B.D.H.All solvents used were spectrograde.

2-Apparatus: Shimadzu atomic absorption spectrophotometer(Buck model Scientific 210 UGP) was used to determining the lead concentration. Shimadzu flourometer(model 6200) was obtained to determination of total petroleum hydrocarbons.

3-Methods:

A-Determination of lead: Samples from fruits and leaves of six date palm cultivars of Dairi, Braim, Khistawi, Hillawi, Barhi, and Chasib were collected from several location at Diwaniya city according to the traffic density and high density population during summer 2005(Figure 1).500 gm of Fruit samples (Ratab Stage), dried at 50°C for 24 hours, then ground with a gitemortor, digested with 50%HNO_3, and filtered .The extract was reduced to a small volume, then the lead in the extract was determined by using flame atomic absorption spectroscopy (FAAS) by comparison with calibration curve.The lead in the leaves of date palm trees and zizyphus trees was determined by FAAS by collecting the old leaves(not new growth) from 2-3m tree high , then dried and ground.The powders were digested with 50% HNO_3.

B-Determination of TPH: To determine the accumulation of TPH on leaves and fruits of date palm and leaves of zizyphus trees, fresh leaves of 2-3m tree high were collected. An extraction procedure was adopted [8,9,12]. The collected leaves were dried at 50°C for 48 hours in case of date palm fruits and for 24 hours in case of leaves of zizyphus trees. A 100 gm of the dried samples in pre-extracted cellulose thimble were extracted in Soxhlet for 24 hours using 250 ml methanol: benzene (1:1ratio). The extracts were dried by anhydrous sodium sulphate. After filtration, the extracts were evaporated to dryness in the rotary

evaporator. The dry samples then dissolved in 10 ml of n-hexane and measurements were done to determine the TPH in the studied samples . The measurements of TPH in leaf samples were performed spectroflourometrically in the 360 nm.

The methanol: benzene mixture was replaced by n-hexane [13] due to the fact that the absorption overlaps of this mixture at 360 nm with studied samples. A crude petrolum was used as a reference.

Results and Discussion

Table 1 show the accumulation of TPH and lead in the leaves and fruits of date palm at all locations varied from 0.7mg/kg in Chasib (remote area) to 3.3 mg/kg in Chasib at the central garage. The low concentration of TPH was recorded in date palm leaves is expected at low-density traffic and agricultural regions,which can be attributed to its location away from pollution sources inside city which belong to vehicles and electrical generators, while high concentrations were observed in city center (3.3mg/kg). A same conclusions have been achieved earlier [8,9]. Table 2 lists the the concentrations of TPH in the zizyphus leaveswhich show a high value in high traffic density areas at city center (1.8 mg/kg) and 1.8mg/kg in the central garage. The lowest value recorded at remote area (0.5 mg/kg). Also, the attention should be paid to the fact that different trees have different abilities to accumulate of TPH from the environment [8]. Date palm leaves are characterized by high surface area in comparison with zizyphus trees which absorb higher quantities of TPH,this fact is valid of accumulation for trace elements.

It is important to notice that the concentration of TPH in the fruits and leaves of date palm and zizyphus trees can not be taken as index of pollution product only because the concentration of TPH is also complicated by the fact that these leaves and fruits also synthesis some hydrocarbons such as polycyclic aromatic hydrocarbons(PAH) and nitrated polycyclic hydrocarbons nitrites(PHN), both

are naturally formed in tree leaves and have benzene related compounds in thier crop [14,8].

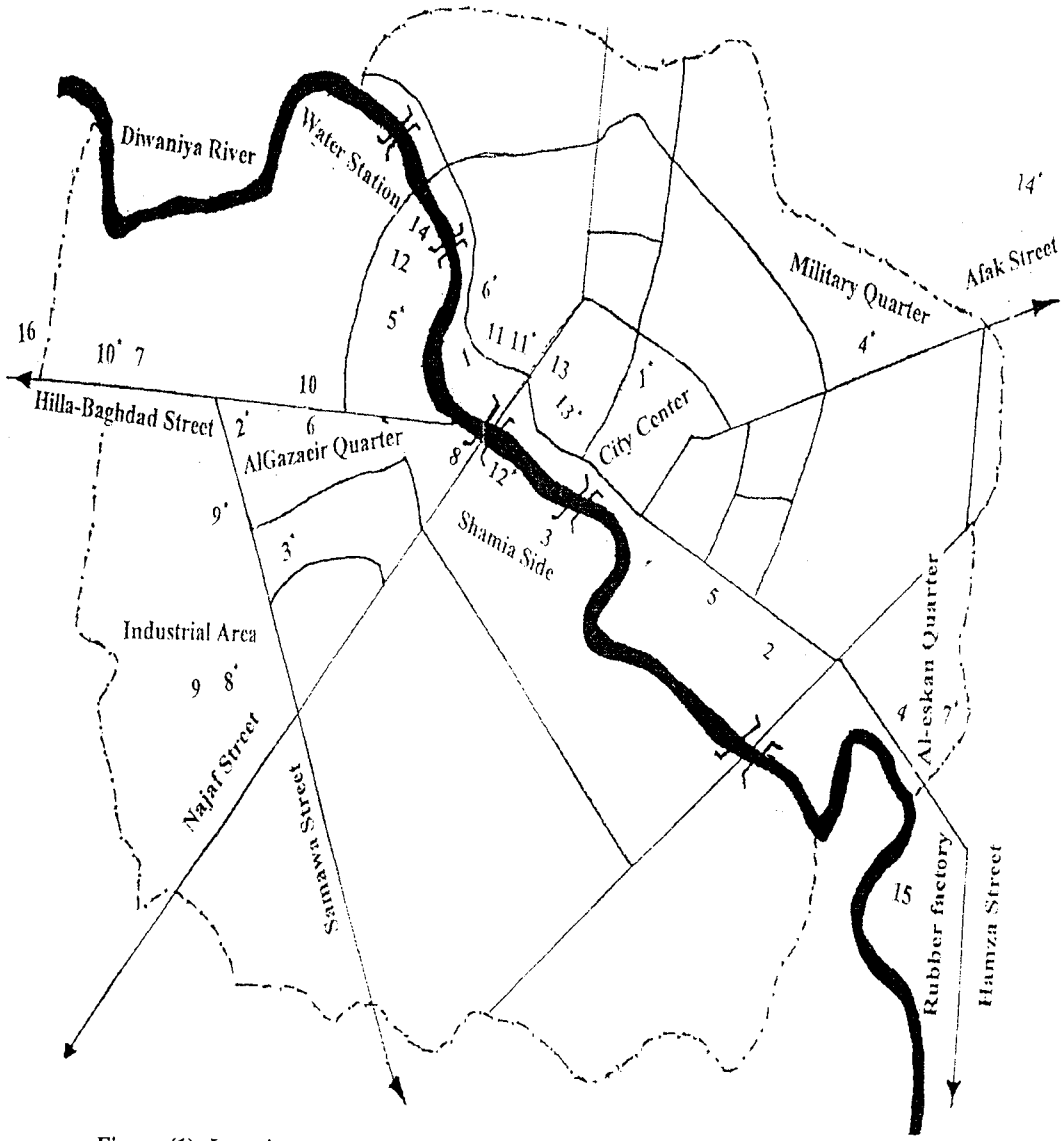

Figure (1): Location map of Diwaniya City showing positions of sampling trees.
*Samples of Zizy phus

In case of lead, Tables 1, and 2 show simillar regional variation in concentration to those of TPH.

On the bases of different recorded TPH and lead concentrations in differe date palm fruits and leaves and leaves of zizyphus trees, a possible relationshi may be observed betweenTPH and lead concentration.

Generally, the capacity of leaves of trees to accumulate TPH and lea beside the location and type of tree, depends on other factors such as age[15] atmospheric conditions(aie movement,moisture,and temperature)[16,17].

Table (1): Concentrations of TPH and lead in the date palm fruits and leaves in mg/kg.

No. of Location	Name of Location	Date palm	Lead		TPH	
			Leaves	Fruits	Leaves	Fruits
1	City Center	Dairi	35.1	25.2	3.3	2.1
2	Main Street	Chsib	25.4	19.4	2.9	2.0
3	Al-Gazaeir	Hillawi	28.2	20.2	3.21	1.8
4	Al-Askari	Dairi	18.2	15.6	0.9	1.2
5	Al-Zawra	Dairi	23.9	24.7	1.9	1.4
6	Uroba II	Khisatwi	22.3	15.7	2.1	1.9
7	Al-Eskan	Hillawi	21.4	20.3	1.8	1.4
8	C.Garage	Chasib	33.2	26.3	3.3	2.0
9	14Ramadan	Barhi	22.8	25.4	2.4	1.4
10	University	Chasib	26.4	22.6	1.5	0.8
11	Uroba I	Dairi	30.1	23.4	2.1	0.9
12	Shamia Side	Chasib	19.6	18.7	2.4	2.1
13	Al-Tahaddi	Khisatwi	25.2	20.2	3. 3	2.1
14	Control	Chasib	10.4	2.2	0.7	0.4

***The locations of samples are showed on locations map(Figure 1).**

Table (2): Concentrations of TPH and lead in leaves of zizyphus trees as mg/kg.

No. of location*	Name of location	Lead	TPH
1	Uroba I	14.2	1.4
2	Al-Wahda	14.4	1.2
3	City Center	24.3	1.8
4	Al-Eskan	13.3	1.1
5	Al-Wahda	14.4	1.2
6	Al-Gazaeir	8.4	0.9
7	University	8.4	0.9
8	Shamia side	21.5	1.4
9	Central Garage	24.5	1.8
10	Al-Gazaeir	21.7	1.6
11	Uroba I	14.7	1.3
12	Al-Zawra	15.4	1.6
13	Al-Tahaddi	22.4	1.7
14	Al-Zawra	14.3	1.1
15	Rubber Factory	7.7	1.2
16	Control	6.3	0.5

***The locations of samples are showed on locations map(Figure 1).**

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