A base line study of determination and distribution of Total petroleum hydrocarbon in Euphrates river in Nasiriya city

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Abstract:

A base line study of the distribution of total petroleum hydrocarbon in Euphrates river in Nasiriyah city have been determined spectrofluorometrically. the present work entitled sampling water from Euphrates river between AL Btha and Sug AL Shuik. Their concentration were found to vary between (0.08-1.26 μ g/l) (Basra oil equivalents).the results suggest that the total petroleum hydrocarbon present in this area originated from low diverse sources. The hydrocarbon amounts tend to be highest in January (1.26 μ g/l) a lowest in July (0.08 μ g/l).

Introduction:

Water pollution is considered as the most complex problem because of its wide defects and its close relationship to human and its diffusion(1). Hydrocarbon are one of the main subject of pollutants for water, have several sources which can classified either as anthropogenic or biogenic. Major sources of petroleum hydrocarbon enter into water by many routs of various activities such as oil refineries offshore oil production , transportation and tanker accidents(2).Moreover, river runoff, urban runoff , municipal wastes and inland industrial wastes were also found signification input of petroleum hydrocarbon and derivative entering the environment.

Euphrates is the most important river and sources of fresh water in the arid surrounding of Nasiriya city.

The objective of the present study are to determine the original distribution of total petroleum hydrocarbon in Euphrates river and to evaluate the role Euphrates river as a sources of oil pollution for the shatt Al-Arab river.

In order to accomplish these aims, four sampling sites were selected to represent different region of Euphrates river. A reference stations was chosen at the Euphrates river Al Batha areas included in the present survey and their positions are show (figure 1) . The sampling program carried out over seven month (July 2002 – January
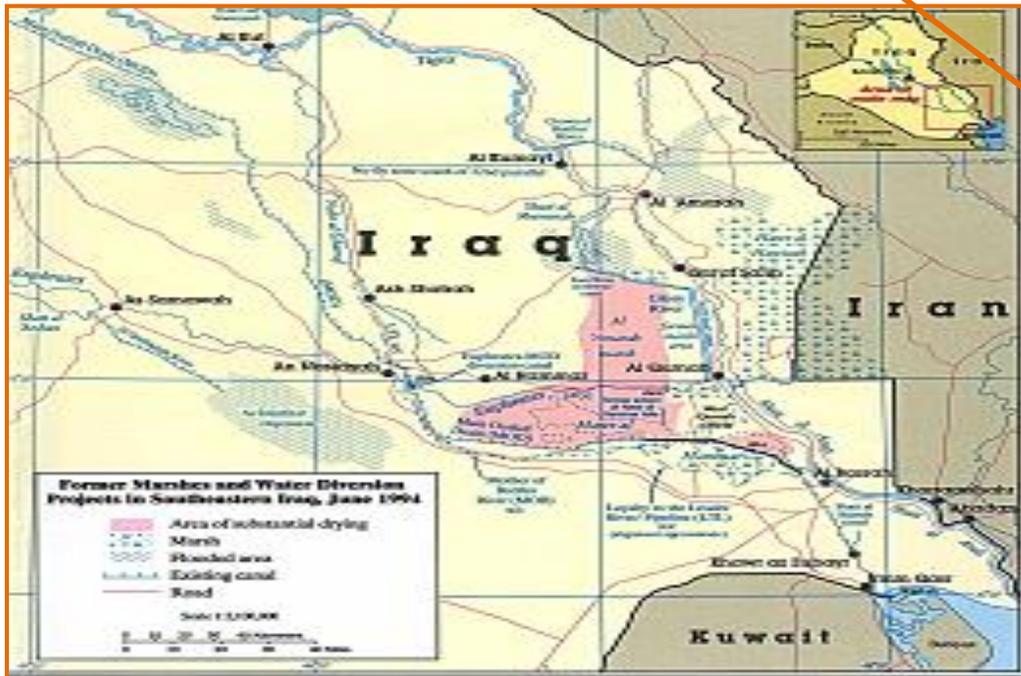
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Fig (1) Map of Euphrates river showing the position of stations

Materials and Methods:-

Subsurface (1m water samples have been collected from all stations utilizing the sampling devise recommended by (3).The lipophilic organic matter of the water samples was extracted on board with the addition of (20) ml of spectrograde n-hexane and vigorous shaking of the bottle for (5) min. Anhydrous sodium sulphate was added to extract to remove trances of water.

The dried extract were concerted to (10) ml with a rotary evaporator final extracts in hexane were determinate by UV-flourescencespectro- scopy.(Shimaduzu RF-450 spectrofluorometer).

The conditions of the instrumentals use were fixed. The excitation wave length was (3100 nm and emission wave length was (365) nm for UV-F analysis. Samples were dissolved in hexane therefore recording by blank solution. Concentration of series of Basra light crude as a references were also determinate and the calibration curves were established foe each series.

Results and Discussion

The level of total petroleum hydrocarbon in Euphrates river is listed in (table 1).Regional average values of these data are presented in (table 2) while their average seasonal variation are presented in (table 3)

The concentration of total petroleum hydrocarbon in Euphrates river water samples were found to vary from 0.08 to 1.26µg/l(Basra crude oil equivalents).A comparison of these values with those reported for some other world rivers and estuaries is presented in(table 4)(4)

Our data indicate that the level of oil hydrocarbon observed in Euphrates river water lie below the rang of values reported for comparable areas. From the results presented here the highest concentration are always observed at station 2 ,while the lowest were at station 1,this indicate that Euphrates river oil pollution has possibly discharge and urban runoff and electricity generation station may be consider as the most significant sources of oil entering Euphrates river.

The Euphrates river water temperature undergoes seasonal variation .The temperature is most important factor governing the removal petroleum hydrocarbon from the water (5,6,7).Beside the direct effect of temperature on the evaporation of petroleum hydrocarbon from water, temperature increase favors processes of bacterial degradation(8.9) therefore the higher concentration of petroleum hydrocarbon observed in the Euphrates river during winter and lower during summer (table 3).

Table (1) Concentration of petroleum hydrocarbon observed in the Euphrates river water

Date of samp. collection	Site.no.	Water temp. 0C	No .of sample	Con. range (µ g/l)	(µ g/l) average
16.7.2002	1	30	3	0.05-0.1	0.08
	2		3	0.57-0.96	0.75
	3		3	0.22-0.36	0.30
	4		3	0.16-0.32	O,24
	Rf		3	-	Nd
13.10.2002	1	17	3	0.08-0.15	0.11
	2		3	0.84-1.05	0.93
	3		3	0.34-0.44	0.40
	4		3	0.20-0.34	0.28
	Rf		3	-	Nd
14.1.2003	1	14	3	0.1-0.18	0.14
	2		3	1.05-1.44	1.26
	3		3	0.44-0.62	0.57
	4		3	0.28-0.46	0.38
	Rf		3	-	Nd

Table (2) Regional average values of total petroleum hydrocarbon in Euphrates river

Station no.	Average concentration (µg/l)
1	0.11
2	0.95
3	0.41
4	0.3
Rf	Nd

Table(3) Seasonal average values of total petroleum hydrocarbons in Euphrates river

Station no.	July2002(ng/l)	October2002(µg/l)	January2003(µg/l)
1	0.08	0.11	0.14
2	0.75	0.93	1.26
3	0.30	0.40	0.54
4	0.24	0.28	0.38
Rf	Nd	Nd	Nd

Table(4) Comparison of values of Dissolved PAH in Euphrates river with others values in the world

Location	Concentration(μg/l)
South Georgia	0.12-1.19
Turkish near shore	0.50-3.50
Bermuda	137.46
Shatt Al-Arab	3.08-14.37
Euphrates river in Nasiriya city	0.08-1.26 (present study)

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<p dir="rtl" align="center">دراسة أولية لقياس وتوزيع الهيدروكاربونات النفطية الكلية لمياه نهر الفرات في مدينة الناصرية</p>

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<p dir="rtl">الخلاصة:ـ</p>

<p dir="rtl">تم تعيين توزيع الهيدروكاربونات النفطية الكلية كدراسة اولية في مياه نهر الفرات في مدينة الناصرية باستخدام التحليل الفلورومتري.تم اخذ نماذج المياه بين منطقة البطحاء ومنطقة سوق الشيوخ.وجد ان تركيز الهيروكاربونات النفطية الكلية كانت بين (0.08-1.26 μg/l)(مكافيء نفط البصرة).النتائج تقترح ان الهيدروكاربونات النفطية الكلية تتولد من مصادر مختلفة واطئة ان الهيدروكاربونات كانت عالية في شهر كانون الاول(1.26μg/l) وواطئة في شهر تموز (0.08μg/l).</p>