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Pollution of lead between autumn 2017 and summer 2018 to some selected locations of basrah government southern of Iraq

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Abstract
In this study, the effect of lead pollution is studied together with deciding its locations in the surface water in some areas in the South of Iraq (Basrah governorate) particularly in the upper areas of the Arab gulf and in its northern part. Following are seven locations of the study: Qurna, Madina, Deir, Ashar, Abo Al–Khasib, Zubair and Um Qasir. The effect of the lead concentration on surface water and depth sediments 2017–2018 quarterly. Standardized methods have been followed in analysing the surface water just to determine the percentage of lead pollution. The highest concentrations values are recorded in Al – Zubair (4.2 ppm) for surface water and Abo Al – Khasib (6.53 ppm) for the underground sediments. The lowest concentrations values are recorded in Qurna (0.5 ppm) while no values are recorded in Madina for the depth sediments.

Keywords: pollution, lead, Basrah government, south of Iraq, surface water

Introduction

The problem of pollution began to appear at the global level in the sixties of the past century and is today at the forefront of issues that have captured a great deal of interest of governments in the world, and pollution does not recognize the political borders of countries or geographical considerations because the rapid and devastating spread as a result of the activity of economic development by the human, Such as intensified industrialization and the excessive use of natural resources, which led to pollution of air, water and soil, i.e. the destruction of the ecosystem and life on earth at a rate that, over the centuries, man could not cure, resist or mitigate [2, 1]. Trace elements are among the environmental pollutants that can be defined by those inorganic elements present in very small quantities estimated in parts of a million in water and sediments, which are heavy elements having a high quality density greater than (5 g / cm^3) and these elements have negative effects on life for their high toxicity And their low effectiveness compared to the basic elements of life and survival for a long time in the environment for non-degradation to the simplest. [3] Several studies have been conducted to estimate trace elements in water samples, sediments and organisms in Iraq's river waters, To assess the probability of contamination of these metals and to identify the locations of the greatest pollution [4-6]. Lead is considered one of the most dangerous heavy elements with toxic effect on humans and even the lower concentrations of it. There is a lead element in the air, water, food and also in the soil and in water reservoirs And in the waters of the rivers that supply us with drinking water [7]. In the seas and oceans, the source of lead comes from estuaries, which are also (80%) of their sources coming from the air deposition and the direct discharge of waste. The water adjacent to coastal cities, especially at estuaries Rivers [8]. The combustion of lead-containing gasoline by transport vehicles is one of the main sources of environmental pollution by the lead element. Lead compounds are emitted with the resulting gases and are deposited due to heavy weight, causing contamination of areas near of crowded streets, including soil, water, plants, food and human body [9]. Other sources of lead pollution in Iraq are its entry into the manufacture of batteries, printing and dyeing, which also contributed to pollution, but to a lesser extent than to cars. [10] The World Health Organization (WHO) has determined that the maximum allowable concentration of lead in drinking water is 100µg/L, while the European Society has considered 50µg/L the highest permissible level [11]. Lead contaminants that reach of surface water through several sources such as oil contaminants, sewage, precipitation, dirt tanks, human discharges and inorganic soil materials [12].

The main objective of this study is to determine the lead contamination rates in the aquatic environment (surface water and sediment deposits) in areas of southern Iraq in particular for the period between 2017-2018.

The study area

The area of study is part of southern Iraq (Basrah governorate in particular especially) in the top of the Arabian Gulf at its northern summit, covering seven different regions geographically and economically as shown in Figure 1, namely Qurna, Al Madina, Deir, Abo Alkaseeb, Zubair, Umm Qasr. The concentration of lead in surface and sedimentary deposits for the period 2017-2018 has been studied on a quarterly basis and changes in the components of these waters have been considered due to seasonal variations, navigation and water withdrawal conditions [13].

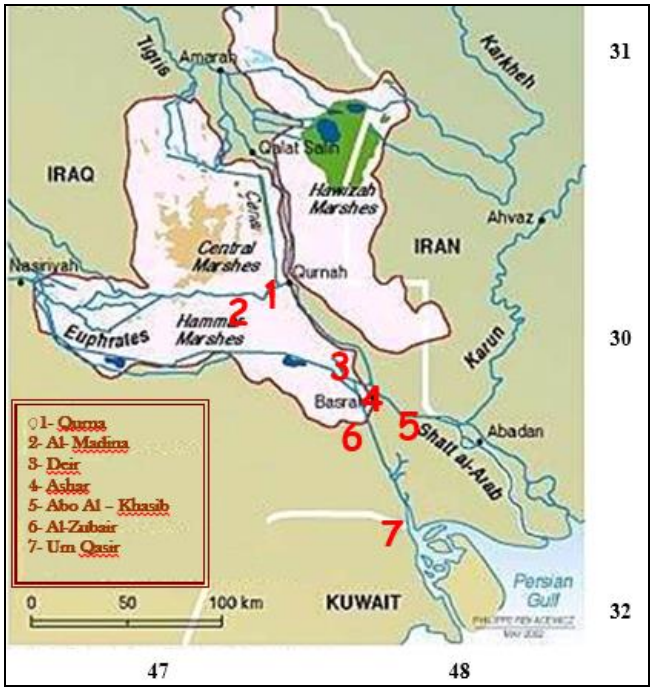

Fig 1: map of southern Iraq, showing the seven sampling sites

Working Methods

Surface water samples were collected for each area's studied during the autumn of 2017 to the summer of 2018. Water samples for the study sites selected by plastic containers (1.5 litters) were pre-rinsed with diluted hydrochloric acid and then distilled water. And with the chloroform as a preservative of the samples, then, the samples were taken to the laboratory by a container filled with ice. The impurities and suspended sediments in the water samples were separated by centrifugation type (D - 7200 tuttingen), 4000 cycles / min, and stored in a cool place at 18 ° C until tests are carried out. The lead pollution ratio was measured using standard methods of surface water analysis as in the past reference [14]. The samples of the water sediments deposits were stored in clean plastic bags, prepared for this purpose (half a kilogram) per bag, dried, then grinded and passed on a sieve (2 mm) and then measured lead concentration using the same method mentioned.

Results and Discussion

Table (1) shows the concentration of lead in the surface water of the study areas, which covered most of Basrah governorate. The study showed the highest concentration of lead (4.31 mg / L) in Zubair area (location 6), while the lowest recorded value (0.56 mg / L) in the Qurna area (location 1). Figure (2) and (3) shows lead concentration levels in the study areas throughout the study period from autumn 2017 to summer 2018, where the lead concentration is observed for most of the sites during the summer while the low concentrations are recorded in autumn 2017 and winter 2018, Usually with some dust and sand storms resulting from the increase in wind speed, which causes the raising of minutes of dust and precipitation and the borne pollutants, including trace elements and therefore the increase in the lead in the soil, which is offset by the increase in the lead in the neighbouring water due to air pollution is the cause of soil pollution and surface water, Where some studies have shown that there are three main processes that control the chemical composition of river water, namely the quality of atmospheric precipitation in the region, the soil prevailing near the river basin, the process of evaporation and chemical precipitation [15].

Table 1: Concentration rate of lead in surface water studied in southern Iraq during the period 2017-2018

Rate of Lead Constration in (mg/L)	Study Area
0.56	Qurna
0.90	Al-Madaina
2.49	Al-Dear
3.99	Al-Ashar
3.97	Abo Al-Kaseeb
4.31	Zubaeer
1.38	Umm Qaser

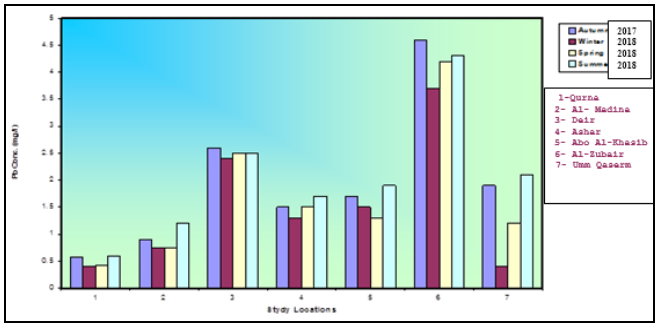

Fig 2: Levels of lead concentration in surface water (mg / L) during the seasons study and for all selected areas.

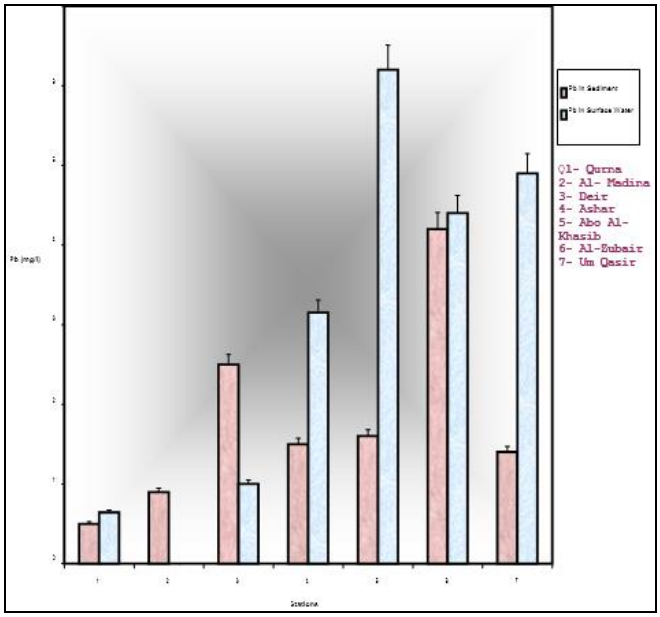

Fig 3: Levels of lead concentration in surface water, and sedimentary sediments (mg / l) during the seasons study and for all selected areas.

Conclusion

The highest concentration of lead in this study was recorded in most of the study sites outside and away from the center of the governorate, where the surface spread and the absence of large natural barriers such as buildings and civil facilities where the movement of dust and precipitation other than the areas where there are many natural and industrial fenders, Areas to the dense movement of boats and ships in parts of their rivers due to the activity of commercial traffic and fishing operations, leaving a high proportion of lead compounds, which is included in the

installation of fuel used in the management of these vehicles, and that all areas Are busy areas with many vehicular traffic, indicating that their fuel may be the primary and primary cause of increased lead rates in the environment.

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