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Extraction of Metals in Water Pollution via Analysis Method

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Abstract

This research used analysis of metals that found in river of different regions and depths. PH, electrical conductivity (EC), total dissolved salts (TDS) studied, nitrate ion determined by spectrophotometric method but chloride, carbonate, bicarbonate, magnesium and Calcium determined by titration method. Sodium, Potassium ions detection by Flame Photometer. The concentrations of ions that used in this paper (5-100)ppm for nitrates in river,(2.5-70)ppm in tap water. the calcium and magnesium founded (50-125),(150-250) ppm respectively in river,(50-93),(177.5-238.5) mg /L in tap water.(64.7-147.6) ppm for chlorides in river,(72.01-98.4) in tap water.(5-8),(4-28) ppm for carbonate and bicarbonate in river ppm in tap water.(142-345),(3-10) ppm for Sodium with Potassium respectively for river,(92-167)),(l .44-5) ppm in tap water.PH values that used was(5.59-8.94), EC (0.54-1.02) gs/cm and TDS (225.13-564.6) ppm. Many parameters were evaluated as a result of this research in order to determine the water quality. The value of the river has resulted in contamination in these areas. The water in the river was high in alkanes, causing pollution. As a result of these actions, the quality of water may be harmed momentarily or permanently.

Keywords: UV- Spectrophotometry, PH- meter, Electro Conductivity, Flame photometry and Titration.

1. Introduction

This paper used some of the sources of pollution, as well as their effects on the local community, the response to date and recommendations. The goal of this study is to advocate for legislation that will ensure the Tigris River's long-term viability [1]. Baghdad is city in Iraq., affected the bacteriological quality of the Tigris River in Baghdad especially down river at Dora site, as a result of pollute the material sewage to the river [2]. In monitoring methods, chemical, physical, and biological factors are used sampled and analyzed to determine the regulating elements that influence water quality fluctuations to sort out governing factors for the water quality variations. Controlling provides information about the state of water quality for a specific time and set of goals. Traditional methods of evaluating water quality typically relied on a comparison of experimentally discovered parameters with a set of established criteria. For many cases, controlling allows proper identification of contamination sources with face. Overall views of the spatial and temporal patterns in overall water quality in a watershed are not relevant [3]. The most major advantage of this method is that it determines the overall health or status of the system in question, in addition to gathering critical information and data. In this approach, the index can be used to compare water quality to a desired state (as specified by water quality objectives) and to determine the extent to which human activity has an impact on water quality [4]. The Tigris River is one among the rivers affected by conservative contaminants. Many research has been conducted in order to determine these effects [5]. In order to assess key factors affecting water quality in the years 2017–2018, several multivariate statistical approaches were used, including the basic Ingredient (PC) test, discriminant analysis (DA), and multiple linear regression analysis (MLRA) [7]. As a result of these actions, the quality of the water may be harmed momentarily or permanently. Water may be temporarily or permanently impaired in quality as a result of these actions. Water pollution arising from the presence of foreign substances (organic, inorganic, bacteriological orradiological) which tends to degrade the quality of water [8]. The recent investigation found that untreated sewage discharge and other industrial, agricultural, and home activities have severely contaminated the Tigris River's water. The research suggested quick action be steps done to reduce the residential area's constant discharge of sewage and

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rubbish into the Tigris River Baghdad's institutional and commercial activities [9].

A series of hydro chemical tests were performed to determine the impact of major cations and anions, total dissolved solids (TDS), electrical conductivity (EC), and hydrogen potential (pH) on water quality [8]. In most cases, water quality indices are determined in two steps. The selected water quality criteria are translated into sub index values using different units of measurement.The values of these sub-indices are then added together to provide a water quality index value. Many researchers looked at various water quality indexes [9, 10, 11, 12, and 13]. This study's objective is to measure the Tigris River's physicochemical characteristics within Baghdad, Iraq, from February 2017 to February 2018, in order to assess the river's water quality. From upreach, reach, and downreach, four sites were chosen. In the field, measurements were made of air and water temperature, pH, electrical conductivity, salinity, and water flow. The Tigris River ecosystem's pollution was determined by laboratory measurements of total dissolved substances (TDS), total suspended substances (TSS), turbidity, nutrients (nitrite, nitrate, and phosphate), biochemical oxygen demand (BOD), chemical oxygen demand (COD), dissolved oxygen (DO), organic matter, and total organic carbon (TOC). The findings demonstrate that all parameters vary in both seasons (dry and rainy), which It caused the water's quality to decline.

In contrast to other sites, reach locations (Al-Sarrafia Bridge and Al-Shuhada Bridge) revealed greater levels of contamination (Al-Muthanna Bridge and Al-Dora Bridge). This shows that the Tigris River, which runs through the center of Baghdad, is more polluted as a result of human activity [14]. Rivers can also be polluted as a result of increased exposure to numerous types of pollution. Domestic, agricultural, and industrial waste contamination [15].When the primary flow of a river changes due to river geometry, as well as intakes from tributaries, pollutant dispersion is influenced. The river Paraiba do Sul was chosen because it passes through two key Brazilian states, Rio de Janeiro and Sao Paulo cities, and provides water for a variety of uses, including agricultural, drinking, energy, sewage treatment, fishing, and so on. It was feasible to demonstrate how the geometry of a river's input rates alters the aim of the study that dispersion of pollutants along [16]. Pollution sources that affect the water's natural balance and provide quick solutions to pollution issues with easy andeffective in regards to price and water quality [17]. The aim of this study to determine the pollution of water when we found the excess of metals in this river.

2. Experimental

2. Experimental Part

2.1Study area

Water samples from different area in Tigris river in Baghdad City in sequence:-

I - River (Hospital Medical City).

2-River (Adhamiyah) - Tab water Adhamiyah,3- River (Abu-nu'as) - Tab water (Abo- nu'as).

4- River (Jadiriyah) - Tap water (Jadiriyah).

5- River (Doura) Tap water Doura.

6- River (Yousefah) - Tap water Yousefah.

7- Collected this samples according [18].

1. **Prepare the sample: -**

Different samples were taken from study area in plastic bottle of size 5L from different depths of river and a few drops of chloroform were added for each sample to store them, filter the samples by filter paper and keep it in refrigerator for measure.

2.2 Apparatus: -

UV- Visible Absorbance spectrophotometry measured the molecules absorption type DR3000 made company HACH, Flame Photometer 410 device type Cornining ,pHmeter Hana type Italian made and Conduct meter type Jenway..

2. Procedures

Nitrates: Nitrate ions were detected by taking 25mL of each sample and mixing in 2mL of 1N HCI solution, then diluting to 100ml with purified water and measuring at 206 nm wave lengths.

Chloridesions: are using the titration method, which involved taking 50ml from each sample and titrating it against silver nitrate (0. 1 N) prepered with potassium dichromate as an indicator to detect these ions.

Pottassium and Sodium: These ions were measured by taking different quantities of samples and measuring them using a flame photometer at wave lengths (592-758) nm for Pottassium and sodium, respectively.

Carbonate and bicarbonate:are determine the titration method, which involved extracting 100ml from each sample regions and titrating it against 0. I N HCL using phenolphthalein and methyl orange as indicators.

Calcium and magnesium: are using the titration method, which involved extracting 50ml from each sample taking and titrating with EDTA in the presence of Erochrom blak T and Meroxide to distinguish the presence of there metals.

Dryiny and sublimation were used to assess total dissolved salts (TDS).pH and electrical conductivity (EC) were determined using a pH meter.

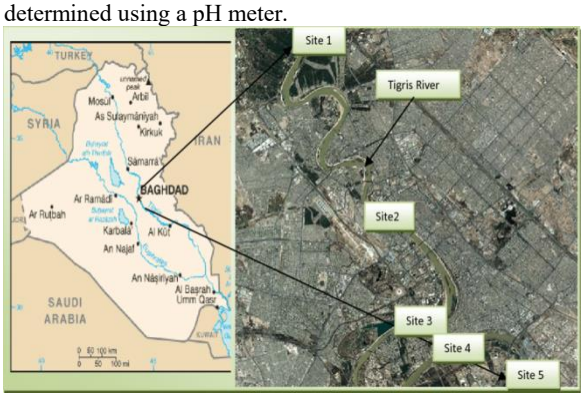

Fig 1: map showing the study site

4. Results

. Results and Discussion

This study depicts the physical and chemical changes in the water of the Tigris river's sectors in Baghdad's Tablel.

Because of the high dissolved salts and carbon dioxide gas released in the research locations, high pH values were discovered, resulting in an increase in basic characteristics. [19]. study found that EC values ranged from 0.54 to 1.02 us/cm, which were considered high when compared to International Specification [20]. 1.02us/cm was reported as the highest value in the study areas, and it was discovered that these high EC values were due to high salt levels in the study areas. [21]. The TDS was estimated in the study areas, showing that the lowest value is 440ppm and highest value is 220 ppm, the lowest value in Douro tap, while the highest value in hospital medical city river and this will be outside the allowed boundaries and classified as water and make water unfit for drinking because increase the concentration of chloride, magnesium, and calcium. Determination of nitrate study, the range value (5-100) ppm, notice the high value of nitration in Adhamiyah tap because the areas infested agriculture land which is used by the fertilizer nitrogen for the purpose of increasing agriculture production and thus enter the fertilizer into the river to increase the nitrate level in river, but lower concentration in these area because lower agriculture area. [22].

Also studied concentration of chloride ion, the high value 127.6ppm in Yousefah tap, and the lower value is 52.06 ppm in Doura tap, attributed the cause for this increase in the proportion of the salts in the soil as a result of evaporation and the flow of these salts to the river, because increase TDS ₃causing the increase of concentration chloride. [23].

The air is considered as the major source of Carbonate and bicarbonate, in addition to minerals and carbonate rocks, the rate of concentration carbonate (5-8) ppm, but bicarbonate (4-28) ppm, the high value were recorded in Jadiriyah river, the lowest value in Jadiriyah tap and Adhamiyah tap; the high value in carbonate and bicarbonate led to increase the PH and attach basic medium [24]. The concentration of magnesium and calcium for water sample had been studied showing the range value (150-250, 50-125) ppm respectively [25]. Notice the decrease value in hospital medical city river and al-jadiriyah river, because gradually due to consumption by the aquaticuture while there increase in al-Doura tap and Abo-nu'as river, because sedimentary rocks and the lack of aquatic life consumed, increase the calcium and magnesium lead to increase the basicity. [26]. Because of the presence of halite rock, the sodium and potassium concentration ranged between (92-167, 1.44-5) ppm, with the upper value of sodium concentration in Adhamiyah river. Because the clay soil that the particular source potassium is decreasing, the potassium concentration is lower for international specifications. [27]. The classification of river water in the research region is aided by the results of CA methods, and it is possible to reduce the number of sampling sites and the related monitoring expenditures without losing much data or information. This outcome was consistent with the findings of numerous investigations done in other rivers (28-30). values of Ca, Mg, Na, Cl, SO4, TH, BOD, and NO3 in the dry season were higher than the values in the wet season, while the measured concentration values of TDS, EC, K, and HCO3 in the wet season were higher than the values in

Table (1): Value of chemical and physical changes of Tigris River in Baghdad city in April month

Region	EC us/cm	PH	TDS ppm	coc	HC03-	CLppm	N03ppm	K+ ppm	Na+ ppm	Ca Ppm	Mg ppm
Yousefah river			478.8	7	11		0.14	7	187	69	253
Yousefah tap			526.79	4	12		0.1	6	188	87	235
Doura river	0.78	8.6	343.1	7	12		0.29	5.1	335	82	233
Doura tap	0.46	7.5	226.3	10	13	53.03	0.34	4.2	189	65	
Jadiriyah river	0.77	7.1	426.5	7	29	82.2	0.58	1.8	132	62	258
Jadiriyah tap			474.2	3	10	86.6	0.3	1.52	144	81	242
Abo-nu'as river			396.5	5	17	82.7	1.68	3	139	80	264
Abo-nu'as tap			438.2	7	21	85.1	2.06	2.6	149	78	244.5
Hospital medical city never	1.07	6.92	573.32	6	10	93.4	4.33	9	149	147	206
Adhamiyahnver	0.62	9.1	307.2	4	4	72.44	0.17	5	293	87	241
Adhamiyah tap	0.51	8.1	277.2	10	17	78.76	9.27	4.6	190	87	245

5.Conclusions

This will aid in identifying sampling spots or sections along the river with high levels of impairment, which will help with conventional enforcement and pollution management actions. Except for HCO3, At all selected stations along the Tigris River, the measured concentration the dry season.

6.Acknowledgments

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