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Isolation and Identification of Pathogenic Bacteria from Euphrates River

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ABSTRACT: In this study, pathogenic bacteria were investigated in the waters of the Euphrates River
For this purpose, 27 water samples were collected from different areas along the Euphrates River between the Mayadin and Deir Ezzor regions(Mo Hassan - Al-Boolel - Al-Zubari - Boqros - Al-Mayadin - Mihkan - Al-Quriah - Al-Eshara – AL-Mareiea-) in sterile plastic containers, at a depth of 30 cm. And then cultivated on different cultural media and determine the pathogenic bacterial genera
The results showed the prevalence of intestinal bacteria by 86%, and the species *Enterobacter* topped the largest percentage among the isolated genera(19.1%).

Keywords: Euphrates, sterile, intestinal, *Enterobacter*.

I. Introduction

The study of the aquatic environment has received great interest from researchers Because water plays a major role in the lives of societies and is exposed to it adeterioration in their quality as a result of pollution, due to human practices Unsuitable, such as discharging agricultural, industrial and household pollutants into Water sources [1]
The water importance is in its necessity of entry into all processesn It is not possible for any organism. Its type or size is to live without it، water pollution in all its forms is one of the major problems at the global level 'are suffering Different regions of the world have their effects [2] These problems are exacerbated when the drinking water pipes are contaminated with sewage water, as this causes the spread of some epidemics and diseases such as typhus, bacterial dysentery and *cholera* [3] *Escherichca coli* and on the other hand *Shigella*, *Salmonella* and cause some micro-organisms opportunistic diseases, especially for those with weak immunity, such as the elderly, young adults, and people with intermediate immunity, such as *Klebsiella* and *Pseudomons* [4]. Studies and reports indicated that High infant mortality in developing countries due to diarrhea compared to developed countries due to pollution of water sources [5] Studies have focused on the bacterial flora of water by focusing on the pathogen from it, setting up bacteriological standards for sewage water and investigating

the sources of water pollution with bacteria [6] The polution sources of fecal indicators and pathogenic bacteria include waste waters from sewage treatment plants and drainage from septic tanks; runoff from agricultural fields or feedlots; effluents from food processing plants (especially meats and beverages); and stromwater runoff (which carries animal and bird droppings). The likelihood that fecal indicator bacteria added to the environment by these means will survive to be counted at a given water quality monitoring site is a function of the distance of the site from such sources, and also a function of the effect of all the environmental factors that influence bacterial survival [7-8-9].

Other pollutants contributed like household waste and pesticides Control of insects, chemical fertilizers and oil derivatives And the drainage of heavy water and biological pollutants such as bacteria And fungi, parasites, phytoplankton and zoonotic - if an increase Technical development, increasing population density and increasing human activities have caused Abuse of water sources, which negatively affects their physical, BIOLOGICAL and chemical properties [10]**.**

Heavy metals: this group includes toxic metal materials that do not cause death quickly [11]

-Biological pollution: among the most dangerous pollutants that affect the water are the bacteria that cause various diseases for humans and among these bacteria that cause diseases are cholera and typhoid [12].

2. Materials and methods

2.1. Materials

2.1.1. Samples :

27 water samples were collected from the Euphrates River between the areas of AL-Mayadin and Deir Ezzor in areas that included (Mo Hassan - Al-Boolel - Al-Zubari - Boqros - Al-Mayadin - Mihkan - Al-Quriah - Al-Eshara – AL-Mareiea-) **Figure 1.** between August and September 2019 in Al-Bukam. Samples were collected at a depth of 30 cm using sterile and sealed plastic bottles and transferred directly to the laboratory for the necessary tests.

Figure 1: Study area

2.1.2. Bacterial total count 0.1 ml of water sample was grown on Nutrient agar after performing a series of dilution with 3 replications The dishes were incubated at 37 ° C for 24 hours Or 48 hr after which the developing colonies were counted and multiplied by The reciprocal of the dilution factor and extracting the average numbers were also studied And recording the general specifications of this bacteria.

2.1.3. Isolation and purification of bacterial isolates:

The culture media (PCA, MC, EMB, SS, SDA) were prepared by using distilled water, sterilized in an autoclave (at 121°C for a quarter of an hour, after which the sterile media was cooled to 50-60°C then were poured into sterile Petri dishes of 9cm diameter and incubated in incubators within the appropriate time to ensure sterility.

total number of bacteria, fecal coliform coliforms, *Escherichia coli salmonella* and fungi. fungi dishes were incubated at 25°C for 3-4 days to give the final result in units (colony/100 ml). the culture was carried out on PCA Agar medium with tow duplicate. the average value was taken for them.

The presence of enterobacter faecalis was detected by the appearance of developing colonies on MC Agar medium. Escherichia coli grew with green-colored colonies with metallic luster on EMB Agar medium, while Salmonella appeared as black colonies on SS Agar medium. Presence of fungi was detected by growth on SDA Agar medium.

The morphological and biochemical characteristics were also studied in order to determine the species to which they belong, according to systimatic Birgys manual 2005 as:

- Catalase test
- Oxidase test
- Citrate test
- DNase test
- Methyl red
- Hydrogen sulfide production
- Indole test
- Urease test
- Voges-Proskauer (VP) test [13-14].

2.1.4.Chemical analysis

2.1.4.1. Biochemical oxygen demand (BOD):

The value of BOD_5 was determined by the manometric method-the pressure sensor method.

3. Result and dissection:

3.1. Samples :

It is noted from the results ore mentioned in Table 1

3.1.2. Bacterial total count:

the bacterial number of samples was different between areas and was (11×10^3-61×10^3)

The results revealed presence of high numbers of indicator organisms in Euphrates river water beginning. These increases are explained by the presence of an organic source of pollution, as well as high temperatures, which will increase their activity and reproduction.The results revealed presence of high numbers of fecal coliform and fecal enterococci in all samples

Table 1: Bacterial analysis according to areas

Compound	Sample s	bacterial number	BOD mg/L
Mo Hassan	3	17×10^3	2
Al-Boolel	3	11×10^3	1.5
Al-Zubari	3	32×10^3	5
Boqros	3	37×10^3	9
Al-Mayadin	3	61×10^3	18
Mihkan	3	41×10^3	12
Al-Quriah	3	33×10^3	8
Al-Eshara	3	47×10^3	16
AL-Mareiea	3	28×10^3	3

3.1.3. Isolation and purification of bacterial isolates:

178 bacterial isolates were isolated and diagnosed from the waters of the Euphrates River within the study areas and during the study period.

It was found that the isolated bacteria of the intestinal family constituted the highest percentage of 86 % of the total diagnosed isolates, and these genera are: *Enterobacter, Klebsiella pneumonia, Salmonella* spp, *Shigella spp, E.coli, Proteus mirabilis*

The other species made up 14% *and included Bacillus and Pseudomonas bacteria* (table 2)

Table 2: Bacterial species from the waters of the Euphrates

Bacterial sp	isolates number	%
Enterobacter spp	34	19.1
Escherichia. coli	30	16.8
Proteus. Mirabilis	15	8.4
Shigella spp	22	12.3
Salmonella spp	25	14
Klebsiella. Pneumoniae	27	15.1
Pseudomonas spp	14	7.8
Bacillus spp	11	6.1
Total	178	

The results of isolation and diagnosis of bacteria isolated from the waters of the Euphrates River within the study area showed that their numbers were high as the results showed that the most common species isolated during the study period was the Enterobacter (34) isolates with 19.1% followed by *Escherichia Coli* (30) isolates with 16.8%.
This reinforces and confirms the presence of recent fecal contamination of water from human and animal sources. Proteus mirabilis was also isolated., Salmonella spp. and Shikla *Shigella spp*. These species presence in the water, is very harmful to human health and is considered an invasive bacterium in the water that comes from residential wastewater.

The result of the current study is in agreement with the result of the study of Al Douri (2000) of the Tigris River within the Salah al-Din city [15].

3.1.4.Chemical analysis

3.1.4.1. Biochemical oxygen demand (BOD):

The reason for the variation in the BOD values is due to the difference in the flow rate of the river in different regions in addition to the difference in the percentage of pollution in different areas and the difference in the percentage of substances released in the riverbed according to the regions Table 1.

4. Conclusion:

Domestic, industrial and agricultural wastewater has a direct impact on the natural waters of a river or lake, when this effect reaches an extent that makes this water unsuitable for its intended use as the water becomes polluted. That is why we recommend reducing the ways of pollution by improving and treating wastewater in all its forms and others before dumping it directly into river courses.

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عزل وتحديد هوية الأنواع الجرثومية المسببة للأمراض السائدة في نهر الفرات

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الخلاصة:

في هذه الدراسة تم فحص البكتيريا المسببة للأمراض في مياه نهر الفرات ولهذا الغرض تم جمع 27 عينة مياه من مناطق مختلفة على طول نهر الفرات بين منطقتي الميادين ودير الزور (مو حسن – البوليل – الزباري – بقرص – الميادين – محكان – القورية – العشارة – المريعية) في عبوات بلاستيكية معقمة على عمق 30 سم. ثم يتم زراعتها على أوساط ثقافية مختلفة وتحديد الأجناس البكتيرية الممرضة.

أظهرت النتائج انتشار الجراثيم المعوية بنسبة 86٪، وتصدر جنس *Enterobacter* المعوية النسبة الأكبر بين الأجناس المعزولة (19.1٪).

كلمات مفتاحيه: الفرات – معقم – المعوية – *Enterobacter*

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