

Ministry of Higher Education and scientific research

University of Qadisiya

College of Science

Department of Life sciences

(((Isolation of E.coli from domestic tanks water in Diwaniya city)))

**Research submitted to the faculty of science / Department of Life
sciences**

As part of the requirements of a Bachelor of Science in Life Sciences

By the student

Mohammed Nabil Jabar

Supervisor

Dr. Diyar Khlaif

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(وجعلنا من الماء كل شيء حي)

صدق الله العظيم

DEDICATION

To all who are dear in my life, and to all who care about me, To who loved her and her kindness helped me in making my way (my mother). To who planted me in life and drank me from his love (my father). To every sincere friend I lived with during the school days. To every teacher led me to the path of enlightenment and brought me to the path of happiness.

Acknowledgments

I extend my thanks, appreciation and gratitude to my supervisor for his efforts and guidance and guided me wholeheartedly to present my research.

With my sincere thanks to everyone who helped me to provide this research.

God grants success

The aim of the research

Investigation the contamination of domestic tanks whith *E.coli*.

Abstract

The research was conducted to detect E.coli In the water tanks in the city of Diwaniyah. For this purpose, seven samples from different locations were collected by clean and sterile glass bottles and transferred to the laboratory for examination. The results of the study indicated that the contamination of one of the samples by E. coli bacteria, while the rest of the samples were free of pollution.

Introduction

E. coli stands for **Escherichia coli**, a large and diverse group of bacteria that live in the lower intestines of humans and warm-blooded animals. Most strains of E.coli are not harmful, and are actually important components of a healthy human gut.[8]

Other types of E.coli are pathogenic, meaning they can cause illness.

The types of E. coli that can cause illness may be transmitted through contaminated water, food, or through contact with animals or people.[8]

They generally have the potential to grow at a temperature of 35-37 C and produce acid and gas after 24-48 hours, Gram negative rods, Lactose fermented rapidly, Facultative anaerobes, non-spore forming, Motile, Grow on MacConkey agar[1].

This group of bacteria live in multiple environments as well as live in the intestines of humans and animals. It can be found in waste and water rich in nutrients, soil and rotting vegetable parts. This may not be sufficient indication of the occurrence of a fecal contamination of water.

Its presence in drinking water indicates that the water purification processes are incomplete or that there is a case of contamination after treatment or entry of pollutants present on the surface of the pipes to the pipeline, which increases the probability of transmission of many diseases[11]

It has long been used as a guideline for assessing the quality of water within its conveyor pipes. And as a guide to the efficiency of processing processes, Fecal coliform bacteria are characterized by the ability to ferment lactose sugar at a temperature of 44-45 °C so named thermotolerant.

The presence of these bacteria in drinking water indicates a fecal contamination because this group lives in the intestines of humans and other animals with warm blood[9].

Reach to people as a result of water pollution with sewage water and is more prevalent in developing countries where clean drinking is not available to everyone, causing the highest level of diarrhea.

Many millions of cases a year die of them tens of thousands of them, mostly children under five years[2].

Symptoms of injury:

Diarrhea Continue for several days, drought, General weakness, loss of appetite or nausea[3].

Symptoms persist for 7-10 days.

Can cause:

Gastroenteritis, Bloody diarrhea, abdominal pain, Urinary tract infection[2].

May result in kidney failure in 2-7% of the injuries.

The incubation period lasts 3-4 days.

Risk factors for E. coli infection:

1. Age Young children and older people are more likely to develop E. coli and complications.
2. Weak Immune System People with impaired immune systems, are more likely to develop E. coli.
3. Eating certain foods There are foods that are a risk factor for E. coli, such as raw meat, unpasteurized milk, and raw milk cheese.
4. Low gastric acid level Gastric acid is a factor in the prevention of E. coli infection[4]

Prevention of E. coli:

There are no vaccines or medicines for the prevention of E. coli so you should avoid contaminated foods that may put you at risk of infection, such as: Take milk and pasteurized juices.

- Washing raw foods carefully.

- Washing cooking utensils:

You should wash cooking utensils well, use hot water and soap in washing .

- The separation of raw foods and the preservation of raw foods separate from the cutting boards of raw meat such as fruits and vegetables.

- Hand Wash:

You should wash your hands after preparing, eating or using the toilet or changing diapers. Also, make sure your child has washed his hand before eating and after using the toilet or contacting the animals[2].

The practical part

Materials and methods of work :

1-Glass bottles

2-Tubes

3-Incubator

4-Autoclave

5-Sensitive balance

6-MacConkey agar

7-Loop

8-Bensen lamp

9-Pipettes

Samples:

Samples were collected from different sites including the following sites:

Location(1) Located in the center of alshamiya district

Location(2) It is located near the alShamiya water station

Location(3) It is located near the Nasifah area

Location(4) Located in the alsalahia area

Location(5) Located in the Located in the alSwanieh area

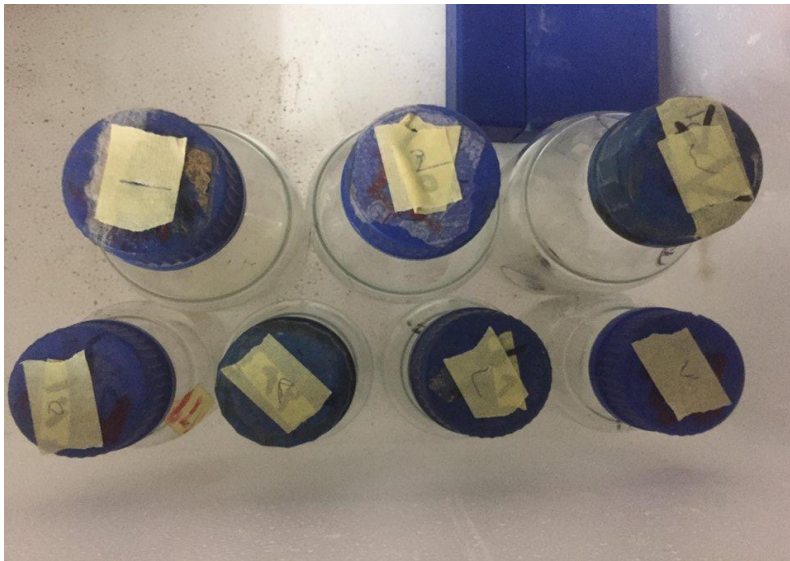
Location(6) Located in aleaskari district

Locatoin(7) Located in Al Saray neighborhood

Collection of samples was recommended(WHO,1985)

Sample incubation:

Samples were taken from different areas by clean and sterile bottles and transported in refrigerated containers to the laboratory in less than 5 hours



Culture media:

Use MacConkey agar (selective and differential media)

Selective because contains bile salts and crystal violet that inhibited the growth of Gram positive bacteria and some fastidious Gram negative bacteria.

Differential because contains lactose as source of carbon and pH indicator neutral red that differential between lactose fermenter and non lactose fermenter[6] .

Growth conditions:

The optimal conditions for growth are a temperature of 37° C, with a range of 7.22 to 45,56°C.

The optimum pH for growth is 6.0 to 8.0. However, growth can occur as low as pH 4.3 and as high as 9 to 10 pH (Banwart, 1983; Mitscherlich and Marth, 1984).

The method of work:

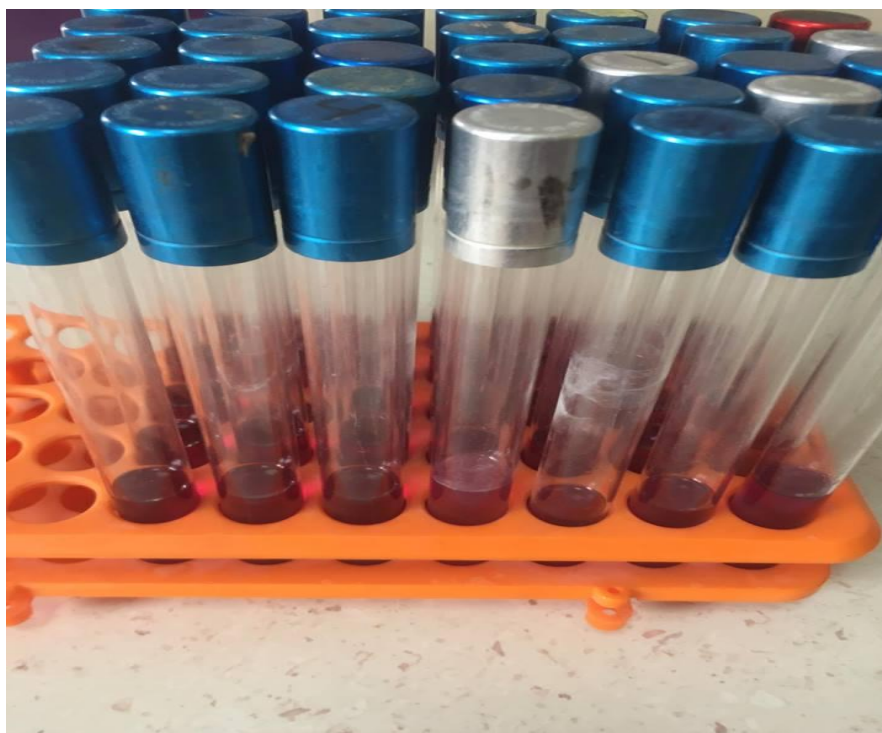
After the preparation of the implant medium, 10 ml of the medium was added to the tubes which would be used for transplantation. The tubes were then vaccination with 1 ml of samples and incubated at 37 ° C for 24 h [7].

Bacterial identification:

The method of diagnosis was based on observation of changing the color of the medium used by the presence of gas with the change of color medium from red or violet to yellow and this is evidence of contamination with coliform bacteria [5].

Bacterial culture:

Thirty-five tubes were planted on MacConkey agar, where the implant was performed by tubes. Five tubes were implanted per sample and incubated at 37 ° C for 24 h [7].



Results and discussion

After incubation at 37 ° C for 24 hours, the following results were observed and according to the table below:

samples	positive	negative
Namber(1)	0	5
Namber(2)	0	5
Namber(3)	3	2
Namber(4)	0	5
Namber(5)	2	3
Namber(6)	0	5
Namber(7)	0	5

The table shows the appearance of 3 positive tubes in sample 3 and the appearance of 2 positive tubes in sample 5.

Five container tubes were then vaccinated on Makonaki Agar from positive samples that appeared and incubated at 44 ° C for 24 hours.

The results are as shown below:

samples		positive	negative
Namber(3)	1	0	1
	2	0	1
	3	1	0
Namber(5)	1	0	1
	2	0	1

The table shows the appearance of E. coli in sample 3.

Where at 44 ° C temperatures only grow E. coli from the group coliform
Either The rest of the species do not grow in this degree[5].



Conclusions:

The presence of bacterial evidence of water pollution in the reservoirs and their exit from the international and Iraqi determinants.

Recommendations:

- 1-Expanding the use of sand filters for their excellent role in reducing pollutants and their effect In reducing the numbers and types of microorganisms in treated water.
- 2- Application of international standards for the use of alum and chlorine in drinking water treatment units
- 3- Support the work of all the filter stations in Iraq with advanced treatments and raise the level of competence and experience of staff working in these stations

References

- 1-Mossel, D.A.A., Corry, J. E., Struijk, C.B., and Baird, R. 1995. Essentials of the Microbiology. John Wiley and Son. New York, NY.
- 2-Centers for Disease Control (CDC). 1993. Multistate outbreak of Escherichia coli O157:H7 infections from hamburgers -- Western United States, 1992-1993. MMWR.
- 3-Dupont, H.L., Formal, S.B., Hornick, R.B., Snyder, M.J., Libonati, D.G., Sheahan, LaBrec, E.H., and Kalas, J.P. 1971. Pathogenesis of Escherichia coli diarrhea.
- 4-FDA. 1993. HACCP. Regulatory Food Applications in Retail Food Establishments. Dept. of Health and Human Services. Division of Human Resource Development. HFC-60. Rockville, MD.
- 5 - Collee , J. G. , Fraser , A. G. , Marmion , B. P. and Simmons , A. (1996). Practical Medical Microbiology . 14th -ed . Churchill Livingstone , U.S.A .
- 6- Brook GF, Bute J S , Morse S A . Jawetz , Melnick and Adelbergs , 2001. Medical Microbiology 22nd .Ed . Lage Medical Books McGraw-Hill Newyork chicago. Sanfrancisco.
- 7-World Health Organization (WHO). (1996). Guidelines for drinking water quality. 2nd -ed. Vol. 1. Geneva.
- 8-Anderson , D.A. and Sobiesk , R.J. (1980) . Microbiology of water and sewage . Introduction to Microbiology . The C.ZV.Mosby company.
- 9-Doyle, M.P. and Padhye, V.S. 1989. Escherichia coli. In Foodborne Bacterial Pathogens. Doyle, M.P., Ed. Marcel Dekker, Inc. New York, NY.
- 10- World Health Organization (WHO). (1995). Guidelines for drinking water quality. 2 nd -ed. Vol. 2. Geneva.
- 11- Anderson , D.A. and Sobiesk , R.J. (1980) . Microbiology of water and sewage . Introduction to Microbiology . The C.ZV.Mosby company .

المستخلص

أجري البحث لغرض الكشف عن بكتريا *E.coli* في خزانات المياه في مدينة الديوانية ولهذا الغرض تم جمع سبع عينات من مواقع مختلفة بواسطة قناني زجاجية نظيفة ومعقمة وتم نقلها الى المختبر لغرض فحصها . اشارت نتائج البحث الى وجود تلوث لاحدى العينات بواسطة بكتريا *E.coli* اما باقي العينات كانت خالية من التلوث .