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The investigated Microbiological (Coliform)Among Different Drinking Water Sources in Kalar City

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Abstract: *In this study, 15 samples of drinking water from three different sources (tap water, dug well, and drilled well) in five places in Kalar city have been collected, and their microbiological (coliform) properties have been investigated. The microbiological test include test (MaCconkeyBroth) methodology to coliform for any different drinking water .The test results then compared with World health organization (W.H.O) limits for drinking water. But the test results tap water and drilled well water both of them were in accordance with the limits , but the dug well water there aren'tsuitable for drinking water according to World health organization (W.H.O) limits for drinking water. However, according to the microbiological coliform test results, it can be concluded that tap water has a lesser amount of contamination compared to drilled well water and dug well water, and drilled well water has less pollution than dug well water.*

Keywords: *Detection coliforms ,drinking water samples , Autoclave , Incubator , MaCconkey powder .*

I. Introduction

Coliform bacteria are microscopic organisms that originate in the intestinal tract of warmblooded animals and are also present in soil and vegetation. Total coliform bacteria are generally harmless; however, their presence in drinking water indicates the possibility that disease causingbacteria, viruses or parasites (pathogens) are also present in the water.

Bacterial pollution can result from runoff from woodlands, pastures and feedlots, septic tanks and sewage plants, and animals and wildfowl. Most coliform bacteria enter natural streams by direct deposition of waste in the water and runoff from areas with high concentrations of animals or humans. Domesticated animals contribute heavily to the bacterial population **(1)** ,in this study, 21 samples of drinking water from three different sources (tap water, dug well, and drilled well) in seven places in Kalar city have been collected and their physicochemical properties have been investigated, it can be concluded that tap water has a lesser amount of contamination compared to drilled well water and dug well water, and drilled well water has less pollution than dug well water **(2)** ,total Coliform do not necessarily indicate recent water contamination by fecal waste, however the presence or absence of these bacteria in treated water is often used to determine whether water disinfection is working properly**(3)** , The coliform group has been used extensively as an indicator of water quality and has historically led to the public healthprotection concept. The aim of this review is to examine methods currently in use or which can be proposed for the monitoringof coliforms in drinking water. Actually, the need for more rapid, sensitive and specific tests is essential in the water industry.Routine and widely accepted techniques are discussed, as are methods which have emerged from recent research developments.Approved traditional methods for coliform detection include the multiple-tube fermentation (MTF) technique and themembrane filter (MF) technique using different specific media and incubation conditions. These methods have limitations, however, such as duration of incubation, antagonistic organism interference, lack of specificity and poor detection of slow growingor viable but non-cultivable (VBNC) microorganisms. Nowadays, the simple and inexpensive membrane filter technique is the most widely used method for routine enumeration of coliforms in drinking water. The detection of coliforms based on specific enzymatic activity has improved the sensitivity of these methods**(4).**

II. Materials and methods

MacConkey Broth can be used for the enumeration of coliforms by theMPN technique, selecting positive tubes that show turbidity, a color change to red purple and gas production. Fifteen water samples were collected in one day at five different area in Kalar and stored in 100 mL labeled plastic bottles but For samples of chlorinated water the bottles must contain sodium thiosulphate (0.1 ml of a 1.8% solution per 100 ml capacity) to neutralize chlorine.

Each Five samples of them were collected from separately sources (drilled well, dug well, and tap water). Broth is prepared bydissolve 80 g of powder in 1 L of distilled water. And distributed in a series of five tubes fitted with Durham tube Sterilize in the autoclave at 121ºC for 15 minutes. After sample in the laboratorydirect five tube put the solution each 5ml for one tube and 10ml sample for each one, after that all the

tube put the incubator at 37 °C. After for 24 hour the tubes that show turbidity change to red purple in color and show gas production (bubble in the Durham tube) are considered positive.

III. Results and discussion

The main microbiological (coliform) properties of three different sources of drinking water in Kalar city were investigated with the aim of classification of the different water sources according to World health organization (W.H.O) values for drinking water. The test results obtained are presented in Tables below. Microbiological coliform test results for dug well water are shown in **Table 1**.

Table 1: Investigated microbiological coliform test results for dug well water

Sample no	area	Locality	coliform	Result	Iraqi standard limits
S1	Kalar	Old kalar	>16	Positive	**>1**
S2	Kalar	Shahidan	>16	Positive	**>1**
S3	Kalar	Sirwan	>16	Positive	**>1**
S4	Kalar	Bngrd	>16	Positive	**>1**
S5	Kalar	Kuljoyakan	>16	Positive	**>1**

Interpretation:In **table 1** shows that, there are collected dug well water sample among different area but same city after investigated microbiological (coliform) form in the laboratoryindicator all area according to with Iraqi standard limits the results in the water sample positive therefore according to Iraqi standard limitscame less than one but dug well water more than 16 however this water it's not suitable for drinking water. Microbiological properties were also investigated for some different samples of tap well water and drilled well water, and the test results are shown in **tables 2** and **3**.

Table 2: Investigated microbiological coliform test results for tap water

Sample no	area	Locality	coliform	Result	Iraqi standard limits
S1	Kalar	Azadi	0	Negative	**>1**
S2	Kalar	Sirwan	0	Negative	**>1**
S3	Kalar	Sherwana	0	Negative	**>1**
S4	Kalar	Shorsh	0	Negative	**>1**
S5	Kalar	Shahidan	0	Negative	**>1**

Interpretation:In **table 2** shows that, there are collected tap water sample among different area but same city after investigated microbiological (coliform) form in the laboratory indicator all area according to with Iraqi standard limits the results in the water sample negative ,therefore this tap water government filtered after that distributed people its suitable for drinking water .

Table 3: Investigated microbiological coliform test results of drilled well water

Sample no	Area	Locality	Coliform	Result	Iraqi standard limits
S1	Kalar	Goran	0	Negative	**>1**
S2	Kalar	Sarkawtn	0	Negative	**>1**
S3	Kalar	Xabat	0	Negative	**>1**
S4	Kalar	Shorish	0	Negative	**>1**
S5	Kalar	Sad malaka	0	Negative	**>1**

Interpretation: In **table 3**shows that, there are collected drilled well water sample among different area but same city after investigated microbiological (coliform) form in the laboratory indicator all area according to with Iraqi standard limits the results in the water sample negative ,therefore this drilled well water its suitable for drinking water .

Table 4:the result for the average of all waters.

Sample no	Tap Water	Drilled well water	Dug well water	Iraqi standard limits
S1	0	0	>16	**>1**
S2	0	0	>16	**>1**
S3	0	0	>16	**>1**
S4	0	0	>16	**>1**
S5	0	0	>16	**>1**

Interpretation: From **table 4** it can be seen that there are enormous differences among these sources of drinking water in Kalar city. However, there are minor different in all microbiological (coliform) test results. According o these results, the quality of sources can be classified from low to high as dug well water, drilled well water and tab water.

IV. Conclusions

-In conclusion , from the microbiological (coliform) test of the different drinking water samples in Kalar city have been investigated and the test results were in accordance with the world health organization (W.H.O) standards , at any how the results shows the water from(dug well water) are not suitable for drinking which few areas of kalar city are relaying on , but drilled well water is better for drinking on the other dug well water , the normal tap water which is been filtrated by government is much better among all their .

-In the light of other research we came to know that based on the chemical and physical water test. The tap water comes as first among all in terms of drinkability.

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