



## BACTERIOLOGICAL ESTIMATION OF DRINKING WATER FROM WESTERN PART OF MORDABAD (U.P)

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### ABSTRACT

**Introduction:** Water is the precious gift of God on the earth. Life exists on the earth because of the availability of water. Itself being tasteless, odorless and colorless, it adds taste, color and nice smell in the life of living beings on the earth. Coliform bacteria are commonly found in soil. On vegetation and in surface water they also live in the intestinal of warm-blooded animals and human. Some Coliform bacterial strain can survive in soil and water for long period of time **Aim:** Bacteriological estimation of drinking water from western part of Moradabad (U.P.) **Materials and methods:** The study was conducted in department of microbiology Teerthanker Mahaveer Medical College and Research Centre. **Result:** A total of 50 drinking water sample were tested by MPN method. Out of 50 samples 39 test sample were found positive (78%) and 11 test sample were found negative (22%) **Conclusion:-** On the basis of the result obtained the bacteriological quality of drinking water from different sites and sources of Moradabad. contaminated with Coliform.

**KEYWORDS:** Water culture, Coliform bacteria.

### INTRODUCTION

Earth is the only known planet in this universe where life is possible only because of the ability of water and oxygen. Water is most important necessity of life for all the living beings on the earth. Without water no one can exist even for day.<sup>[1]</sup> Only 19% of the rural populations have access to safe drinking water supplies. The provision of safe and adequate water supply for the population has far reaching effects on health productivity and quality of life as well as on the socio-economic development of the nation.<sup>[2]</sup> Coliform bacteria are commonly found in soil on vegetation and in surface water. They also live in the intestine of warm-blooded animals and humans. Some Coliform bacteria strains can survive in soil and water for long periods of time. Coliform bacteria will not likely causes illness.<sup>[3]</sup> The study was aim to isolate and identify coliform contamination in drinking water different sites and sources western part of Moradabad (U.P.).

### MATERIALS AND METHODS

Total of 50 drinking water samples were taken from western part of Moradabad (U.P.) from different sites and sources. Sample collection by 70% ethanol soaked

cotton-wool used to sterilize the tip of tap from which sample were collected the tap, hand pump allowed to run for two minutes than sterile 250ml screw capped glass bottle were carefully uncapped than filled with the water and bottle recapped carefully.<sup>[2,4]</sup> Collection time source name and site name noted on the water sample bottle. Sterile bottles use for collection of water sample and transported for testing immediately to the department of medical microbiology laboratory by ice cold containers within 50 min of collection.<sup>[3,5]</sup>

### Determination & Identification of Coliform

For determination and identification for presences of Coliform bacteria in water sample different steps were adopted.<sup>[9]</sup>

- **Presumptive Coliform count by Multiple Tube Method.**
- **Confirmation of Coliform by Biochemical test**

### Presumptive Coliform count-Multiple Tube Test

The presumptive is called because the reaction observe may occasionally due to the presence of some other organisms and the presumption that reaction due to

Coliform organisms has to confirmed. The number of coli form organisms estimate is usually made by adding varying quantities of water (0.1 to 50ml) to single strength MacConkey Broth and double strength MacConkey Broth containing sterile glass bottle/tubes containing Durham's tube (for indication of gas production). Coliform count obtained by use of the five test tube assay of the Most Probable Number (MPN) technique.<sup>[6]</sup>

#### Confirmation of Coliform by Biochemical tests

The positive are carried out for confirmation by biochemicals. Water sample determined by using the Confirmation test by MPN per100ml. The biochemical uses for the conformation of Coliform are as follows:- Indole test, Methyl red, Voges Proskauer, Citrate and Urease test.<sup>[6,7]</sup>

#### RESULTS

A total of 50 drinking water, sample were collected from the different sources, and sites western part of Moradabad. Out of 50 samples evaluated in which 78% water sample were found to be contaminated (positive) with a various Coliform and 22% found negative ( table number 1.) The study show high, percentage (78%) of Coliform contamination, of drinking water with a single

or multiple Coliform bacteria. The various water sources are like hand pump, colony water supply, government hand pump, and tube well. Water sample collected from different, sites like Budhi Vihar and Pakwara had highest degree of coliform bacterial contamination which is followed by Bagharpur and Dharmkantha (table number 2.) Various Coliform bacteria such as E.coli, Klebsiella Spp, Citrobacter spp. Pseudomonas Spp, and Enterobacter areogens had been isolated from the water samples. Among all, E.coli is the most common, and accounts for (33.33%) which is followed by Klebsiella Spp (10.25%), Pseudomonas Spp (5.12%), Enterobacter Spp (2.56%) and Citrobacter, is (2.56%) respectively (table number 3).

It has been found that out of 39 positive water sample 17.94% satisfactory, 38.46% suspicious and 43.58% unsatisfactory ( table number 4).

**Table. 1: Percentage% of total positive & negative sample.**

Total sample	50	Percentage %
Positive sample	39	78%
Negative sample	11	22%

**Table. 2. Showing site wise distribution of positive and negative samples (n=50).**

Site of sample	Total number of sample	Number of positive sample	Number of negative sample
Pakwara	3	3	0
Supertech	3	2	1
Gaagan	2	1	1
Budhi Vihar	6	5	1
Railway colony	5	4	1
Harthala	2	2	0
Maansarowar	1	1	0
Khusalpur	3	2	1
Pilikhothi	1	0	1
Lodhipur	4	3	1
Madhubani	4	3	1
Bagharpur	5	4	1
Dharmkantha	5	4	1
Mehlakpur	2	2	0
Majholi	4	3	1
Total	50	39	11

**Table. 3: Showing frequency of distribution of isolated organism n = 39.**

Site of sample	E.coli	Klebsiella	Pseudomonas	Citrobacter	Enterobacter aerogens	Mix organism
Pakwara	1	0	1	0	0	1
Supertech	1	0	0	0	0	1
Gaagan	1	0	0	0	0	0
Budhi Vihar	2	1	0	0	0	2
Railway colony	1	1	0	0	0	2
Harthala	1	0	0	0	0	1
Mansarowar	1	0	0	0	0	0
khusalpur	1	0	0	0	0	1
Pilikhothi	0	0	0	0	0	0
Lodhipur	0	1	0	0	0	2

Madhubani	0	0	0	1	1	1
Bagharpur	1	0	1	0	0	2
Dharamkata	1	1	0	0	0	2
Mehlakpur	1	0	0	0	0	2
Majholi	1	0	0	0	0	1
Total positive sample	13(33.33%)	4(10.25%)	2(5.12%)	1(2.56%)	1(2.56%)	18(46.15%)

**Table. 4: Showing grading of contamination in drinking water sample n=39.**

Sites of water sample	Positive samples	Satisfactory samples	Suspicious samples	Unsatisfactory samples
Pakwara	3	1	1	1
Supertech	2	0	1	1
Gaagan	1	0	0	1
Budhi Vihar	5	0	2	3
Railway colony	4	1	2	1
Harthala	2	0	1	1
Maansarowar	1	0	0	1
Khusalpur	2	1	0	1
Pillikhothi	0	0	0	0
Lodipur	3	0	2	1
Madhubani	3	1	1	1
Bagharpur	4	1	2	1
Dharmkanta	4	1	1	2
Mehlakpur	2	0	1	1
Majholi	3	1	1	1
Total	39	7 (17.94%)	15 (38.46%)	17 (43.58%)

## DISCUSSION

In the study, a total 50 drinking water sample collected from different sites and different sources from western part of Moradabad. Out of 50 samples evaluated in which 39(78%) water sample were found to be contaminated (positive) with a various Coliform and 11 (22%) found negative no Coliform. Pakwara and Budhi vihar estimated to be very high Coliform while the water sample collected from other sites of Moradabad is found relatively low as compared to water sample of Pakwara and Budhi vihar except the Gaagan and Pillikhothi, where no Coliform bacteria was detected. Finding observed in the study shows that all drinking water sources are contaminated with Coliform bacteria.

In a study by Kumar *et al.* taken a total of 116 drinking water samples, from Government hand pump 32 samples(28%), Municipal tap water 58 samples(50%) and Water cooler 26 samples (22%) collected from different sources Percentage occurrence of the isolates was Klebsiella spp. (15%), along with Pseudomonas aeruginosa (25%), Escherichia coli (28%). In the study it was observed E.coli is most common. The similar finding was observed in the study.<sup>[8]</sup>

The study was conducted by Malhotra *et al.* On 1,317 drinking water samples from various water sources in Amritsar district in northern India. All the samples were analyzed to assess bacteriological quality of water for presumptive Coliform count by the multiple tube tests. A total of 42.9% (565/1,317) samples from various sources were found to be unfit for human consumption. Of the total 565 unsatisfactory samples, 253 were from

submersible pumps, 197 were from taps of piped supply (domestic/public), 79 were from hand pumps, and 36 were from various other sources A significantly high level of contamination was observed in samples collected from submersible pumps (47.6%) and water tanks (47.3%), as these sources of water are more exposed and liable to contamination. In this study was observed water different water sources are contaminated similar finding have been reported in our study.<sup>[10]</sup>

## CONCLUSION

On the basis of the result obtained the bacteriological quality of drinking water from different sites and sources of Moradabad is highly contaminated with various Coliform bacteria so need to be disinfected properly by using various disinfectant such as chlorination of water hypochlorides solution or any other disinfectant should be adopted time to time. We would like to recommend the proper sanitary survey, design and implementation of water and sanitations project regular disinfections, maintenances and supervision of water sources for drinking should be planned and conducted because that is important for public health.

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