



Quality Analysis of Water from Potable Trolley Vendors by Using MPN Test in Vicinity of South Delhi Area

Insha Jan¹ and Shahnawaz Ahmad Wani^{2*}

¹Department of Paramedical Sciences, Jamia Hamdard (Hamdard University), Hamdard Nagar, New Delhi, India

²Department of Biosciences, Jamia Millia Islamia, New Delhi, India

*Corresponding Author: Shahnawaz Ahmad Wani, Department of Biosciences, Jamia Millia Islamia, New Delhi, India.

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Abstract

Water is most abundant chemical in the human body and plays important role in the regulation and transport of nutrients and toxic wastes. Safe Drinking water is used for all types of domestic purposes, including drinking, food preparation and hygiene. This study was conducted on drinking water sold by drinking water trolley vendors to assess the extent of bacterial contamination from collected water samples. 5 drinking water vendors were found in the premises of Jamia Hamdard. After performing coliform presumptive test, we found all the sample collected from trolley vendors were in the acceptable range. And only one sample that was collected from Loni Ghaziabad UP was in category C i.e. is unacceptable for drinking. Thus, conclude that water from trolley vendors is safe for drinking purposes and contain no contamination.

Keywords: MPT Test; Coliform Presumptive Test; Drinking Water; *E. coli* and *Clostridium perfringens*

Introduction

Water is most abundant chemical in the human body and plays important role in the regulation and transport of nutrients and toxic wastes. World health Organization has issued guidelines for drinking water. Safe drinking-water, as defined by the Guidelines, does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages. Safe Drinking water is used for all types of domestic purposes, including drinking, food preparation and hygiene.

Many major human diseases, for example typhoid fever, cholera and other diarrheal diseases, poliomyelitis and viral hepatitis A and E are water borne [1]. These pathogens reach water sources through fecal or sewage pollution [2]. It is essential to prevent such

contamination, treat the water suitably to remove or destroy microorganisms, and also to ensure the safety of such protected water supplies by regular bacteriological surveillance [3]. It is reported that natural water sources frequently contain some saprophytic bacteria, such as the *Pseudomonas*, *Serratia*, *flavobacterium* *Acinetobacter* and *Alcaligenes* species soil bacteria such as aerobic spore forming bacilli and those found on decaying vegetation, such as *Enterobacter* species in unpolluted water [4,5].

Water by excremental or sewage pollution poses a risk to human health due to presence of millions of pathogenic microorganisms. Bacteria that are found in the sewage water and excremental water includes enterococci, *E. coli*, and *Clostridium perfringens*. These pathogens are responsible for causing various diarrheal disease [6].

Keeping all this in mind the present study was aimed determine any fecal contamination of the water sample using (most probable number) MPN test of trolley vendors in areas of South Delhi near Jamia Hamdard.

Materials and Methods

This study was conducted in the Department of Paramedical, Jamia Hamdard. New Delhi.

Sample collection

This study was conducted on drinking water sold by drinking water trolley vendors to assess the extent of bacterial contamination from collected water samples. 5 drinking water vendors were found in the premises of Jamia Hamdard. All of the water samples were aseptically collected in sterilized bottles. All samples were immediately transported to the laboratory and proceed with in two hours. One of the water sample was collected from Loni Ghaziabad UP.

Determination of total Coliform

There are three principal tests for the detection of coliforms, such as presumptive test, confirmed test and completed test.

Presumptive test

The presumptive test looks for the presence of coliform in the water sample by inoculating lactose broth with the water sample. Commonly used medium MacConkey purple that contains the indicator bromocresol purple. An inverted Durham's tube is placed. The color of the medium is changes into yellow an on collection of gas in Durham's tube, bacteria are assumed to be coliform. Number of positive tubes are counted and referred to the standard chart to find MPN of total 100ml water sample.

Confirmed test

Confirmed test was done by transforming loopful of culture from the positive tube from the presumptive test into a tube of brilliant green lactose bile broth with Durham tubes. The tube was incubated at 37 degree for 24 - 48h for total coliform and 44.5 degree Celsius for 24 - 48h for coliform and observed for gas production.

Completed test

Completed test was carried out in accordance with (WHO, 2012) by streaking a loopful of broth from a positive tube into eo-

sin methylene blue (EMB) agar plate for pure colonies. The plates were incubated at 37 degree Celsius for 24 - 48 hours.

Results

In the present microbial analysis, we have counted total coliform after 48 hours. The five different water samples were tested, which were collected from different trolley vendors. We have coded them as WT1, WT2, WT3, WT4 and WT5. Our results show that water sample WT1 was not contaminated as shown in figure 1 and table 1; MPN/100 ml was 0 that comes under excellent category.



Figure 1: Show uncontaminated water samples.

Other samples WT2, WT3, WT4 and WT5 were little contaminated as their MPN/100 ml was in the range of 6, 2 and 1 respectively as shown in figure 2 and table 1, and it come under the category B which is under acceptable range.

Water sample WT6 was collected from boring tube well. We found MPN/100 ml was in the range of 18⁺ which indicates that this water sample was highly contaminated. As their MPN/100 ml range is 18⁺ as shown in figure 3 and table 1. So, this is under category C and is unacceptable for drinking.

Discussion and Conclusion

The present study was done to indicate the pollution condition of the water from trolley vendors which would have serious effects on human health. As per WHO. *Enteric* pathogens cannot normally multiple in water hence water is not its mode of trans-



Figure 2: Show contaminations in water sample.



Figure 3: Shows contamination in water sample.

Volume of samples in each bottle	50 ML	10 ML	
Number of bottles used	1	5	
Number of tubes giving positive reaction			MPN/100 ML
WT1	0	0	0
WT2	1	2	6
WT3	1	0	2
WT4	0	1	1
WT5	0	1	1
WT6	1	5	18*

Table 1: Shows MPN value for drinking water samples.

MPN	Category	Comments
0	A	Excellent
1-10	B	Acceptable
11-50	C	Unacceptable
>50	D	Gross contamination

Table 2: Grading as per category of water sample contamination.

mission to humans (WHO 1996). However, the presence of enterobacteria would be enough infective doses in people whose local or general defense mechanism are impaired to significantly low. The people likely to be at risk would be the very old or the very young as well as patients undergoing immunosuppressive therapy. Other immune compromised individuals suffering from AIDS would also be at risk also, water polluted by bacteria when permitted to contaminate food would lead to the multiplication of the pathogens to very large doses. The most common widespread danger associated with drinking water contaminated either directly or indirectly by sewage. Other water human animal excrements. To test the presence of bacteria presumptive coliform test was done. For the presumptive coliform test; the WHO guideline for both treated and untreated water sample is 0/100 ml, but in occasional untreated water samples (3) coliform/00 ml are allowed on the condition that these would not be found in consecutive water samples. In our study samples were collected from different vendors in Hamdard Nagar and one of the samples was collected from Loni Ghaziabad UP. In this study four samples were negative, MPN in range of 0, 6 and 2 respectively. MPN/100 ml showing low contamination. While sample from Loni Ghaziabad showed MPN in the range of 18*, MPN/100 ml showing high contamination. Chauhan., *et al.* has reported that deprived quality of water is sold in Delhi by roadside vendors. However, we conclude that water from trolley vendors is safe for drinking purposes and contain no contamination.

Conflict of Interest

No conflict of interest between the authors.

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