Bacteriological Examination of
MCD Drinking Water with Reference to Coliforms

S. Darakshan, S.P. Wani and V. Raghavan

Food Research and Analysis Center (FRAC), Delhi, India.

Most probable number (MPN) test was done to detect the coliforms in water samples collected from North, South, East, West and Central Delhi. The study revealed that the number of coliforms was very high (_1600) in water samples collected from North, South and East .The bacteria were identified as *Escherichia coli*. Bacteriological examination of water samples collected from different sources showed that the MCD water of North, South and East Delhi was found to be contaminated while as MCD Water of West and Central Delhi was safe for Drinking Purpose.

Key words: Drinking water, Coliform, MPN test.

Water pollution causes a number of diseases like diarrhea, jaundice, typhoid, etc**.** According to rough estimates, more than 15 million deaths worldwide result annually from waterborne infections (Atlas and Bertha 1997). During the past two decades, the quality of drinking water has undergone radical changes (Kahayan and Rajkumer, 1991; Kudesia, 1990). The surface water sources, in general, are not acceptable for drinking purpose as these are often loaded by various organic, inorganic and biological constituents (Kumar *et al*, 1996; Dahiya's and Kaur, 1999).

The safety of drinking water can be monitored in a number of ways because the constituents of drinking water (such as chemicals and microbes) which can compromise human health can be measured directly. The reason for monitoring drinking water quality is to determine whether the water supply system is being operated correctly, implying that the water is safe for drinking or not. Indicator microorganisms survive better and longer than the pathogens with a uniform and stable properties and may easily be detected by standard laboratory techniques.

Water borne diseases continue to be one of the major health problems especially in developing nations. The high prevalence of diseases such as diarrhea, typhoid fever, cholera and bacillary dysentery among the populace has been traced to the consumption of unsafe water and unhygienic drinking water production practices Mead *et al*., 1999). The most dangerous form of water\pollution occurs when faecal contaminants enter the water supply. Pathogenes such as *Salmonella* species, *Shigella* species, *Vibrio cholerae* and *E. coli* being shed in human and animal faeces ultimately find their way into water supply through seepage of improperly treated sewage into ground water (DiPaola,

* To whom all correspondence should be addressed.

1998).The coliform group consists of several genera of bacteria in the family Enterobacteriaceae that includes animals *E.coli*. *E.coli* is regarded as the most sensitive indicator of faecal pollution. The large numbers of *E. coli* present in the gut of humans and other warm-blooded animals and the fact that they are not generally present in other environments support their continued use as the most sensitive indicator of faecal pollution available (Edberg *et al*., 2000).

The present study was designed to detect the coliform and to assess the quality of water supplied by Municipal Corporation of Delhi.

MATERIAL AND METHODS

Water samples were collected from North (Azadpur), South (Hazrat Nizamudin), East (Laxmi Nagar), West (Patel Nagar) and Chanakiya Puri) Central Delhi. The water was collected in sterile autoclaved bottles from each source and was preserved at a temperature between 0 – 100C. The examination of coliform organisms and microbiological studies were followed as per. the methods given by APHA (1998), WHO (1996), Fresenives(1988), Makereth (1963), Bonde (1977) and Patralaekh (1991). The MPN was estimated by determining the number of tubes in each group that showed gas following the incubation period following the method of APHA (1998).

RESULTS AND DISCUSSION

Most probable number (MPN) of coliform in case of water sample collected from North, South and East was estimated to be very high and was not Potable while in case of West and Central Delhi it was Potable (Table 1). No coliform was detected from municipal tap water of West and Central Delhi (Table 1). Biochemical studies revealed that that the bacteria were indole positive, methyl red positive, VP negative and citrate negative. Biochemical properties of bacteria clearly revealed the presence of *E. coli* in the water sample collected from North, East and South Delhi. According to Central Pollution Control Board, India, total coliforms organism MPN/100 ml shall be 50 or less in drinking water source without conventional treatment but after disinfection (water class-A). Thus it shows failure of terminal disinfection by MCD. The consumption of drinking water contaminated with pathogenic microbes of faecal origin is a significant risk to human health in the developing world, Over 3 million deaths per year is attributed to water-borne diarrheal diseases, especially among infants and young children in poor communities in Africa, Asia and South America (Anon, 1997). Proper management is immediately required to maintain the water quality in North, East and South Delhi.

Table 1. Completed test showing gas production in fresh lactose broth, staining character of bacteria and indication of portability for each water sample

Water Source	Lactose Broth	EMB Plate	Reaction/Morphology	MPN	Potable	Non-potable
North Delhi	+	+	Gram-negative, rod-shaped bacilli	400	No	Yes
East Delhi	+	+	Gram-negative, rod-shaped bacilli	900	No	Yes
West Delhi	-	-	-	-	Yes	No
South Delhi	+	+	Gram-negative, rod-shaped bacilli	300	No	Yes
Central Delhi	-	-	-	-	Yes	No

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