

Short Communication

Bacteriological examination of drinking water in Burdwan, India with reference to coliforms

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Most probable number (MPN) test was done to detect the coliform in water samples collected from mobile vendors, sweet shops and tap water supplied from Burdwan municipality. The study revealed that the number of coliforms was very high (≥ 1600) in water samples collected from mobile vendors. The bacteria were identified as *Escherichia coli*. Bacteriological examination of water samples collected from different sources showed that the water of mobile vendors and sweet shops of Burdwan market area was not potable while the municipal tap water was found to be safe for drinking.

Key words: Drinking water, coliform, MPN test.

INTRODUCTION

Water pollution causes a number of diseases like diarrhoea, 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 (Katayal 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.

The coliform group consists of several genera of bacteria in the family Enterobacteriaceae that includes animals *E. coli*. *E. coli* is a normal inhabitant of the intestinal tract of humans and other warm blooded and is thus regarded as the faecal type of coliform (Atlas and Bertha, 1997). *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). Burdwan is a district of the state West Bengal. It has a station on the East Indian railway, 107 Km N.W. from Calcutta.

The present study was designed to detect the coliform and to assess the quality of drinking water and also the quality of water supplied by mobile fast-food sellers, and sweet shops of Burdwan market.

MATERIALS AND METHODS

Water samples were collected from mobile vendors, sweet shops and municipal tap water of Burdwan. The water (20 ml) was collected in sterile autoclaved bottles from each source and was preserved at a temperature between 0 – 10°C. The examination of coliform organisms and microbiological studies were followed as per

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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
Mobile vendor	+	+	Gram-negative, rod-shaped bacilli	≥1600	No	Yes
Sweet shop	+	+	Gram-negative, rod-shaped bacilli	920	No	Yes
Municipal Tap	-	-	-	<2	Yes	No

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 mobile vendors was estimated to be very high (≥1600) and in case of water of sweet shops, it was 920 and not potable (Table 1). No coliform was detected from municipal tap water, supplied for drinking to the inhabitants of market area of Burdwan (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 mobile vendors and sweet shops. 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).

The consumption of drinking water contaminated with pathogenic microbes of faecal origin is a significant risk to human health in the developing world, especially in remote rural areas and peri-urban 'shanty' communities. Over 3 million deaths per year is attributed to water-borne diarrhoeal 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 mobile vendors and sweet shops of Burdwan.

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