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Implications and Prospects of Indicator Bacteria in Ganga River, Uttar Pradesh, India

Vinay Singh Baghel* and A.K. Verma

Department of Environmental Microbiology
Babasaheb Bhimrao Ambedkar University
Lucknow – 226025 (U.P) India
E-mail: baghelbbau@gmail.com

Abstract—*Ganga River flows through Uttar Pradesh, India. In Uttar Pradesh Three Important Places which are Kanpur, Prayagraj & Varanasi has been considered important in view of various vectors and It is considered that anthropogenic activities are higher at these places and In this paper Microbiological assessment of three important places of Uttar Pradesh has been done and tried to have establish co relation with anthropogenic activities and Microbial Diversity and implication of indicator bacteria.*

Introduction

Water is one of the most important of all natural resources known on earth. It is important to all living organisms, most ecological systems, human health, food production and economic development (Postel et al., 1996).The safety of drinking water is an ongoing concern within the global level. Traditionally, the safety of potable water supplies has been controlled by disinfection, usually by chlorination and coliform population estimates. However, it has been reported that coliform-free potable water may not necessarily be free of pathogens (Sim et al., 1987). Microorganism are widely distributed in nature, and their abundance and diversity may be used as an indicator for the suitability of water (Baghel et al., 2005a). According to WHO report, about 80% diseases worldwide are associated with contaminated water. In all pathogenic agents, bacteria play the major role in contamination of water. The most common bacteria in water are coliform, faecal coliform, *E. coli*, Streptococcus faecalis, *Stayphylococcus aureus, Pseudomonas aeroginosa, Clostridium walchi, Vibrio cholroe, Vibrio parahaemolyticus, Salmonella* and *Shiegella, Acromonas hxdrophiea* and *Klebsiella.*

Material & Methods

Water Samples were collected from Study Sites in sterile glass bottles and transferred aseptically to the Environmental Microbiology Department of Babasaheb Bhimrao Ambedkar University Lucknow. The water Quality was determined by the standard Most Probable Number (MPN) method (Aneja, 2007). Coliforms were detected by inoculation of Sample into tube containing MacConkey broth at 37°C for 48h. The positive tubes were subcultured into Brilliant Green Bile Lactose Broth (BGBL) and incubated at 45°C. Gas production indicates the presence of Faecal coli form after 48h of incubation. Nutrient Agar was used to calculate cfu/ml. It is determined by the formula. (APHA, 1992) Cfu/ml= Number of colonies*dilution factor Volume of culture plate Dilution factor =1/dilution), that is the reciprocal Of dilution is called as Dilution factor.

Results & Discussions

Total coliform count scenario at Kanpur has been discussed here. The coliform count of all sampling sites varies from 110 org/100ml to910org/100ml. From the result it is clearly evident that all sites at Kanpur are having high count of total coliform. Among all sites the coliform count was highest at parmath ghat and lowest at ganga barrage. It is clear inference that coliform contamination is highest at parmath ghat.Highest count of total coliform can be views in two ways first it presence and secondly the microorganisms and disease assosciated with its presence. Detailed study is required to explore risks associated with these high presence of total coliform which is in process and hopefully we come from positive results in coming year.(Fig 1)

Total coliform count scenario at Allahabad has been discussed here. The coliform count of all sampling sites varies from 110 org/100ml to 1600 org/100ml. From the result it is clearly evident that all sites at Allahabad are having high count of total coliform. Among all sites the coliform count was highest at mankameshwar ghat and lowest at Sangam ghat. It is clear inference that coliform contamination is highest at mankameshwar ghat. Highest count of total coliform can be views in two ways first it presence and secondly the microorganisms and disease assosciated with its presence. Detailed study is required to explore risks associated with these high presence of total coliform which is in process. (Fig 2) Total coliform count scenari at Varanasi has been discussed here. The coliform count of all sampling sites varies from 110 org/100ml to 1600 org/100ml. From the result it is clearly evident that all sites at Varanasi are having high count of total coliform. Among all sites the coliform count was highest at Tulsi ghat and Varna ghat lowest at Assi ghat. It is clear inference that coliform contamination is highest at Tulsi ghat and Varna ghat. Highest count of total coliform can be views in two ways first it presence and secondly the microorganisms and disease associated with its presence. Detailed study is required to explore risks associated with these high presence of total coliform which is in process.(Fig.3)

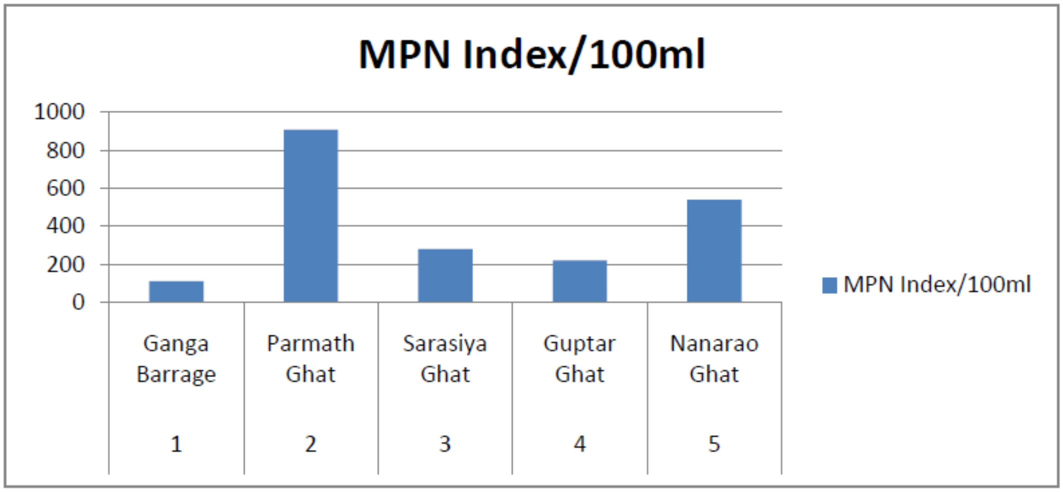

Fig. 1: Total coliform count scenario at Kanpur

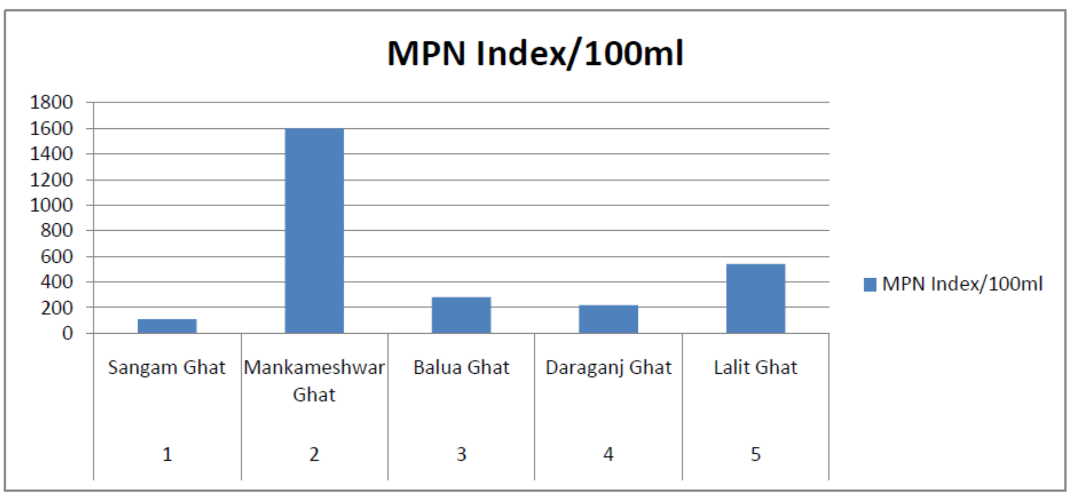

Fig. 2: Total coliform count scenario at Allahabad

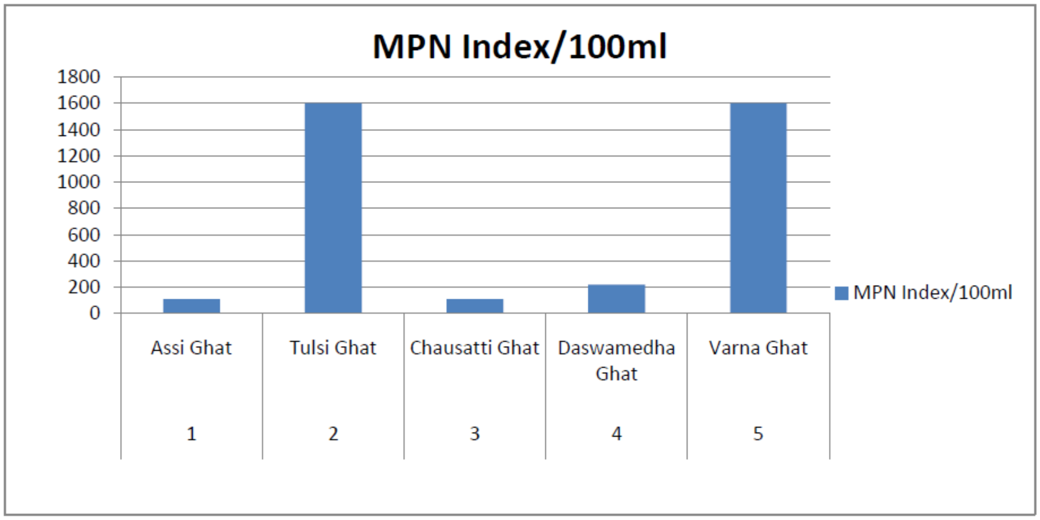

Fig. 3: Total coliform count scenario at Varanasi

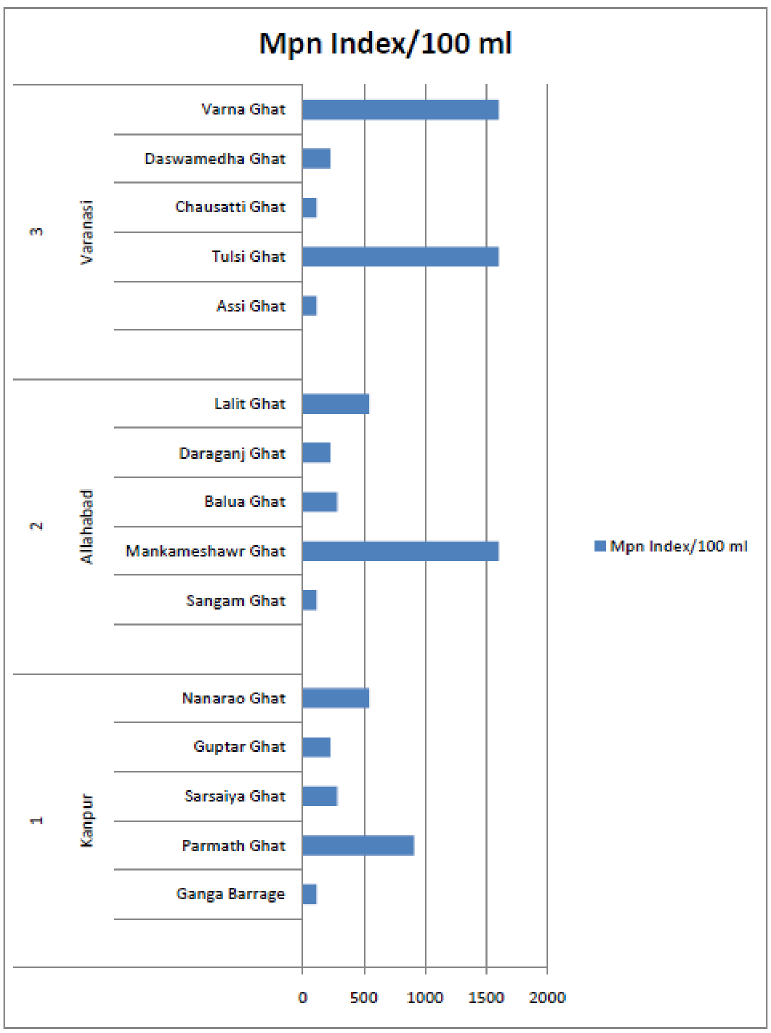

Fig. 4: Showing the MPN index of total coliform present in study area

E. coli is the only member of the coliform group that unquestionably is an inhabitant of intestinal tract, hence it has come to be the definitive organism for demonstrating fecal pollution of water. E. coli meets the criteria of valid fecal indicator. Results from recent epidemiological studies (Cabelli et al., 1976) show a higher statistical relationship between presence of E. coli and incidence of gastrointestinal illness. It has been shown that the frequency of Salmonella detection in water is related to the density of Thermotolerant coliforms (Galdreich, 1970; Van Donsel and Geldriech, 1971). It is observe the presence of total coliform nearly at all study sites. Presence of these Indicator Bacteria can be seen by two ways one its presence and secondly other microbial flora presence. Detailed study and research is needed to have co-relation between all these factors and possible remedy. (Fig.4)

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