



AMBIENT APPRAISAL

Bacteriological Quality of Water Used by Street Food Vendors in Jabalpur City of Central India

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Study Area: Jabalpur, India

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Abstract

Water and foodborne illness are a serious health hazard related to the consumption of street foods worldwide. Among all the potential risk factor, inappropriate use of water for the preparation of street food and drinking increased the risk of water and foodborne illness. The main aim of the study to examine the total coliform count of water used by street food vendors for preparation and drinking purpose. Total 36 water samples were examined for the total coliform count. A water sample collected from street food vendors of four zones of Jabalpur city during summer, rainy and winter season with the help of coliform count Flexi plates procured from Hi media laboratory. The total coliform count of water was found highest in the rainy season (1175.1 ± 413.7) followed by summer (566.1 ± 285.5) and winter (70.7 ± 32.3) respectively. Bacterial isolates identified in the present study were *Escherichia coli*, *Klebsiella pneumonia* and *Salmonella Serotype enteritidis*. It was seen that the quality of water used by vendors was not meet the guidelines of WHO and BIS.

Introduction:

Food and water are the most potent vehicles for the transmission of microbial hazards. Water and foodborne illness is a major public health problem associated with the consumption of street vended foods (Bhowmik, 2010, Biswas *et al.*, 2010 and Tabashsum *et al.*, 2013). Water and foodborne illness or diseases commonly caused by either toxin in microbes or by the human body's reaction to microbes. Illness associated with the consumption of street vended foods often arises from lack of clean water for direct consumption, food preparation, washing utensils and personal hygiene. Inappropriate used of water by street vendors also increased the risk of contamination as a result of water for customer consumption or for the preparation of food and beverages is often kept in containers that are uncovered, dirty or difficult to clean and repeated used of same dirty water to wash utensils. Presence of coliform bacteria mainly *E. coli*, *Salmonella*, *Klebsiella pneumonia* etc. in water increasing the risk of gastrointestinal disease. Moreover, street foods are frequently associated with many waters and foodborne illness like diarrhoea, hepatitis, typhoid etc. disease due to improper handling and use of

dirty water (Mali *et al.*, 2019). The global burden of infectious diarrhoea involves 3-5 billion cases and nearly 1.5 million deaths annually, mainly in young children, due to diarrhoeal disease caused by contaminated food and water (NCDC, 2017). Street food are very popular among consumer, because of their taste, low price and ready to eat availability (FAO, 2011). The street food vendors are generally illiterate and not aware about health, personal hygiene, sanitation and microbial aspect of water used in the preparation and drinking purpose. Jabalpur is one of the smart cities and it became a street food hub in recent times that open the door of water and foodborne illness so, it is considered worthwhile to embark upon water quality used by street food vendors in Jabalpur city.

Methodology:

Total 36 water sample collected in sterilize container from street food vendors from four zones (Zone A, B, C and D) of Jabalpur city during summer, rainy and winter season. Plate count method was used for the total coliform count of water. For this 1 ml of water sample was placed into the coliform count Flexi plates (procured from Hi media laboratory) and incubate the plates 44°C for 24 hours. After

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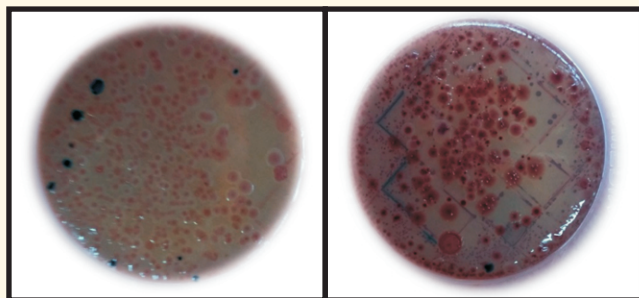
incubation, the number of colonies was counted which have been appeared on the surface medium. This number was expressed as CFU/ml. Detection of bacteria done with the help of culture characteristics as mentioned in the technical data of hi-media coliform count plates.

Organism	Colour of colony
<i>Escherichia coli</i>	Bluish purple
<i>Klebsiella pneumoniae</i> -	Red to maroon
<i>S. Serotype enteritidis</i>	Red to maroon

Results and Discussion:

The total coliform count (CFU/ml) of water used for cooking and drinking by street food outlets in Jabalpur city depicted in Table-1. Result disclosed that mean coliform count of water used by street food outlets was 604 ± 538.1 ranged between 43 ± 34.7 to 1429.3 ± 161 .

In summer, rainy and winter season the total coliform count of water was 106 ± 7 , 618.6 ± 102.8 and 43 ± 34.7 in zone A; 675.3 ± 90.3 , 1429.3 ± 161 and 95.6 ± 14.2 in zone B; 759.3 ± 104.6 , 1389.3 ± 377.9 and 63.3 ± 33.1 in zone C and 724 ± 23.8 , 1263.3 ± 346.6 and 81 ± 30.5 in zone D respectively. The total coliform count of water was found highest in the rainy season (1175.1 ± 413.7) followed by summer (566.1 ± 285.5) and winter (70.7 ± 32.3) respectively. (Fig.-1) Findings also exposed that water used by street food outlets in all four zones of Jabalpur city had high total coliform count. The highest coliform count was found in zone C (737.7 ± 607.1) followed by zone B (733.4 ± 586.4), zone D (689.4 ± 541.4) and zone A (255.8 ± 278.8) respectively ($p < 0.05$). Bacterial isolates identified in the present study were *E. coli*, *Klebsiella pneumoniae* and *S. Serotype enteritidis* (Fig.-2, Flexi plate no. 1 & 2)

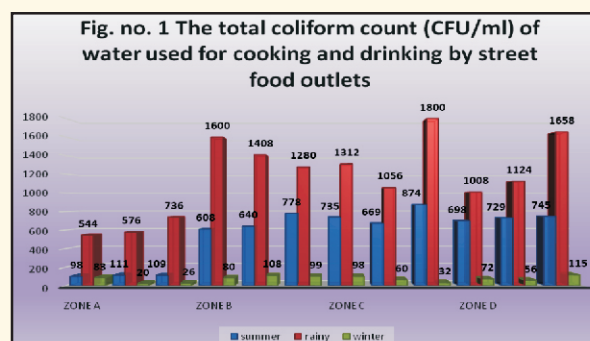


Flexi Plate-1: Blue colour- *E. coli*, pink- *Klebsiella pneumoniae*

Flexi Plate-2: Blue colour- *E. coli*, Red colour- *S. serotype enteritidis*

As per the World Health Organisation (2000) recommendation, coliform might be used as a water quality indicator and if such bacteria are not detectable, the water can be stated to be portable water. As per the Bureau of Indian Standards (2012), total coliform bacteria should not be detectable in 100 ml of the drinking water sample, which was found much higher in the present study. It might be due to the fact that running water facility is not available in most of the vending site, as they generally collect water from the

nearby area of the vending site or is carried from the home and stored water in buckets for the entire day. The same



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