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## Evaluation Of Prevalence Of E.coli In Street Vended Golgappa Stalls Of Bhilai, Chhattisgarh

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### **ABSTRACT:**

**INTRODUCTION:** India is famous for their unique street food and millions of people consume a wide variety of ready to eat street foods and beverages. In developing countries like India Street food contributes to 40 % of daily diet of population. As most of city people depend on these types of food are often more interested in its convenience rather than its safety, quality and hygiene. These Golgappa water is said to harbor many bacteria leading to infection and diseases. We studied the presence of E.coli in this golgappa water and evaluated the harmful effects to the consumers.

**MATERIAL and METHODS:** The sample taken from various Golgappa stalls sample was homogenized and then inoculated on the culture media. Serial dilution and plating methods was employed for the evaluation of E. coli. For this 1ml of golgappa water sample was mixed with 9ml of sterile water and serial dilutions up to 10 dilutions were made. From the last dilution, sample was collected with sterile inoculating loop and the samples were placed on the surface of sterile culture media using lawn culture method. The culture media used was Mac-Conkey media and Eosin Methylene Blue. The swab charged with sample was rubbed on the surface of the media so as to spread the inoculum evenly and equally on all over the plate. These plates were then incubated at 37° C for 24 hours. After 24 hours, the plates were taken out and result was noted by evaluating colony morphology, staining and biochemical tests.

**RESULT:** Colony of E. coli shows green metallic sheen colony with dark center. EMB agar plates were found positive with bluish mucoid colonies. Gram stain was done on the organisms found on the culture plate. After performing Gram Stain, the samples were found negative with rod shaped reddish to pink colored bacilli. The total viable count and total coliform count, in the samples collected from street vended Golgappa water were  $3.5 \times 10^8$  CFU/ml,  $5.3 \times 10^8$  CFU/ml respectively. The presence of E. coli was 100%, Staphylococcus aureus 62%, Bacillus cereus 53%, Salmonella 44%, Shigella of 26%, Streptococcus fecalis 24%, respectively from the street vended golgappa water. The counts of Staphylococcus aureus was  $6.2 \times 10^8$ , Bacillus cereus of  $5.3 \times 10^8$ , Salmonella of  $3.6 \times 10^2$ , Shigella of 2.6% and Streptococcus fecalis  $2.2 \times 10^3$  cfu/ml respectively from the samples collected from street vended golgappa water.

**DISCUSSION:** The golgappa water provides favourable media for growth of E. coli but at the same time high spicy content formed the basis of low concentration of bacteria. The presence of coliforms shows the danger of fecal pollution and consequent hazards of contracting disease through pathogenic organisms. Moreover, E. coli is also responsible for causing a number of other health disorders: urinary tract infections, pulmonary infections,

abscesses, skin, wound infection, etc. On the EMB plate metallic sheen colored colonies, in gram staining, presence of gram negative bacteria and the biochemical test shows the presence of E. coli bacteria in all the samples. Hence this study concluded that typical Enteropathogenic E. coli strain is a leading cause of infantile diarrhea in the consumers. The results of the present findings clearly demonstrated that, the road side ready fresh golgappa water did not meet public health standards and many kinds of enteropathogenic bacterias were found like, Escherichia coli. Such foods lead to hazardous effects to the consumers.

**Key words-** E.coli, enteropathogens, infections, hygiene

## **INTRODUCTION** –

India is famous for their unique street food and millions of people consume a wide variety of ready to eat street foods and beverages. In developing countries like India Street food contributes to 40 % of daily diet of population<sup>1</sup>. As most of city people depend on these types of food are often more interested in its convenience rather than its safety, quality and hygiene. All types of foods are sold by street food vendors; they also provide variety and choice to customers. Consumption of this type of foods potentially increases the risk of food borne diseases caused by contamination by various pathogens<sup>2,3</sup>.

Golgappa which is known as panipuri or patasha at many places and is served in many variation, either filled with matar or potato or both. It is made of either of wheat flour or semolina. These Golgappas are served with water that has mango powder, cumin seed powder, green coriander leaves, Pudina leaves etc. These golgappas are round and rolled like puri. While serving, a hole is made and then filled with masala water and consumed as soon as prepared<sup>4</sup>. It gets contaminated while handling and distributing because of the poor sanitary practices and poor personal hygiene of the shopkeeper or vendors unhygienic management of foods, improper washing of dishes and vegetables adds on to the contamination and thus the infection is carried on to the consumer<sup>5</sup>.

These Golgappa water is said to harbor many bacteria leading to infection and diseases<sup>6</sup>. We studied the presence of E.coli in this golgappa water and evaluated the harmful effects to the consumers<sup>7</sup>.

Street vended golgappas are sold in almost all cities of India. These are served by street vendors in our surrounding areas also. Due to several report of illness because of golgappa water in our surrounding environment, a study was undertaken to assess the safety of street vended Golgappas particularly as possible sources of bacterial pathogens.

## **MATERIALS and METHODS** -

The study covered different areas of Smriti Nagar, Bhilai, Chhattisgarh. Eight samples of Golgappa water from eight random vendors, where the number of consumers were seen to be plenty, were collected. A pre – approval for the study were taken from the vendor. The sample was collected in sterile container and transported aseptically to microbiology laboratory at Rungta College of Dental Sciences and Research, Bhilai.

Each sample was homogenized and then inoculated on the culture media. Serial dilution and plating methods was employed for the evaluation of E. coli. For this 1ml of golgappa water sample was mixed with 9ml of sterile water and serial dilutions up to 10 dilutions were made. From the last dilution, sample was collected with sterile inoculating loop and the samples were placed on the surface of sterile culture media using lawn culture method<sup>8</sup>. The culture media used was Mac-Conkey media and Eosin Methylene Blue which was sterilized using autoclave at 121° C for 15 minutes at 15 lbs pressure. The Petri plates used were sterilized at 160° C for 1 Hour. The swab charged with sample was rubbed on the surface of the media so as to spread the inoculum evenly and equally on all over the plate. These plates were then incubated at 37° C for 24 hours<sup>9,10,11</sup>. After 24 hours, the plates were taken out and result was noted by evaluating colony morphology, staining and biochemical tests.

## **RESULT-**

### **Identification and Observation -**

All the isolates were identified by colony morphology, Gram Staining. They were further identified by specific Biochemical tests i.e. IMViC test. The IMViC tests done consists of four different tests: (1) Indole production; (2) Methyl - Red; (3) Voges Proskauer; (4) Citrate utilization<sup>12</sup>.

**Colony morphology** - Colony of E. coli shows green metallic sheen colony with dark center. EMB agar plates were found positive with bluish mucoid colonies<sup>13,14,15</sup>.

**Gram Staining** -. Gram stain was done on the organisms found on the culture plate. After performing Gram Stain, the samples were found negative with rod shaped reddish to pink colored bacilli<sup>16</sup>.

Gram Reaction - Negative

Morphology - Rod shaped

Arrangement - Single

### **Biochemical Reaction –**

- 1) All the lactose fermentation tubes were found positive with the production of acid (yellow colour) and gas after 24 - 48 hours of incubation.
- 2) The sample tubes developed cherry red colour in the reagent "layer", showing presence of E. coli in Indole test.
- 3) The sample tubes developed red colour that shows a positive Methyl Red test but no colour change in VP test, showing presence of Escherichia coli.
- 4) In Simmon's Citrate slant there is no growth and there is no change in the colour of the medium (i.e. green) i.e. the samples are citrate negative hence confirms the presence of E. coli<sup>17</sup>.

### **COLONY FORMING UNIT and MOST PROBABLE NUMBER-**

Most Probable Number is method to estimate the concentration of viable microorganisms. The result of the present study shows that golgappa water collected from vendors was found to be contaminated. The MPN count of coliform bacteria in golgappa water was found in the range of I I 0 to 160, that is higher as per the described limit of WHO. Golgappa water collected was found to be under the category of polluted<sup>18</sup>.

The total viable count and total coliform count, in the samples collected from street vended Golgappa water were  $3.5 \times 10^8$  CFU/ml,  $5.3 \times 10^8$  CFU/ml respectively.

The presence of E. coli was 100%, Staphylococcus aureus 62%, Bacillus cereus 53%, Salmonella 44%, Shigella of 26%, Streptococcus fecalis 24%, respectively from the street vended golgappa water. The counts of Staphylococcus aureus was  $6.2 \times 10^8$ , Bacillus cereus of  $5.3 \times 10^8$ , Salmonella of  $3.6 \times 10^2$ , Shigella of 2.6% and Streptococcus fecalis  $2.2 \times 10^3$  cfu/ml respectively from the samples collected from street vended golgappa water.

## **DISCUSSION** –

The golgappa water provides favourable media for growth of *E. coli* but at the same time high spicy content formed the basis of low concentration of bacteria. The presence of coliforms shows the danger of fecal pollution and consequent hazards of contracting disease through pathogenic organisms<sup>19</sup>. Moreover, *E. coli* is also responsible for causing a number of other health disorders: urinary tract infections, pulmonary infections, abscesses, skin, wound infection, etc<sup>4,20</sup>. On the EMB plate metallic sheen colored colonies, in gram staining, presence of gram negative bacteria and the biochemical test shows the presence of *E. coli* bacteria in all the samples. Hence this study concluded that typical Enteropathogenic *E. coli* strain is a leading cause of infantile diarrhea in the consumers.

The results of the present findings clearly demonstrated that, the road side ready fresh golgappa water did not meet public health standards and many kinds of enteropathogenic bacterias were found like, *Escherichia coli*. Such foods lead to hazardous effects to the consumers.

The contamination in golgappa is high because of the conditions under which it is prepared and sold. In most cases fresh running water is not available at vending sites and thus hand and dish washing are usually done in stagnant waters in buckets and sometimes without soap which results in contamination<sup>21</sup>. Vendors usually prepare and serve the food with bare and unwashed hands which is one of the most potable sources of contamination<sup>2,22</sup>. Waste water and garbage are discarded nearby in addition to unhygienic food handling that increases the risk of contamination. The street food is not very much protected from flies, which may possibly get contaminated with food borne pathogens.

The microbiological quality of golgappa water sold in and around, Smriti Nagar, Bhilai, is of bad quality. Due to the incidence of varieties of pathogens, consumers should be careful while consuming golgappa water and other street foods from shops and places where proper hygienic conditions of the environment and personal hygiene are not followed.

## **CONCLUSION** -

Poor personal hygiene of the vendors and improper handling and storage practices were found to be the key factors that contributed to the contamination of golgappa<sup>23</sup>. Hence, concerned authorities should impart health education to vendors to improve their hygienic conditions during the preparation, handling, storing and serving. Poor hygienic practices leading to food contamination during handling, storage and food preparation are associated with the lower education level of street-vendors<sup>24,25</sup>. We noted a significant association between the literacy rate of the vendors and contamination of golgappa water<sup>26</sup>.

Government agencies must adopt measures to educate the vendors about food safety and hygienic practices and enforce adequate guidelines for juice preparations, especially street vended golgappa water.

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