International Journal of Education and Science Research Review
ISSN 2348-6457
Volume-2, Issue-2
April- 2015
www.ijesrr.org
Email- editor@ijesrr.org

A Study to Assess the Bacterial Load of Food Served By Vendors in Karnal District

Garima Saxena
Assistant Professor
KVA DAV College, Karnal

ABSTRACT
The study was undertaken to assess the bacterial load of foods served by vendors at various areas of Karnal district. Some commonly served foods (channe, kulche, burger, tomato sauce, fruit juice, potato patty, chowmein, samosa, aloo tikki and water) were tested and E.coli was isolated from them. It was also isolated from possible sources of contamination (working area, serving area and wiping cloth). The total bacterial counts of food samples ranged between 3.3 x 10^5 CFU/gm to 8.9 x 10^8 CFU/gm whereas the gram negative counts ranged from 3.1 x 10^4 CFU/gm to 9.9 x 10^6 CFU/gm. The results of mean values of various food samples taken from vendors show higher values in case of water samples for both total bacterial and gram negative counts. E. It was observed that E.coli isolation from food samples was 75% whereas isolation from all sources of contamination was 88%.
Hygiene and cleanliness practices followed by 50 vendors were also surveyed in the study. In Karnal, the street food trade is mainly conducted by men aged 30-50 yrs. Most of the vendors had received no formal education; nevertheless they did possess some preliminary knowledge of hygiene practices to be followed in the preparation and sale of food items. Hand washing was the practice most commonly followed (60%).

KEY WORDS-: Bacterial load, E.coli

INTRODUCTION
Food is one of the basic physiological necessities. Health and well balanced diet is essential for good health. Contaminated food represents one of the greatest health risks to a population and is a leading cause of diseases, outbreaks and transmission. Food safety issues have been the most wanted intervention in the field of Nutrition all over the world. The common man is busy with life and most often rely on the easily available and cheap food items gathered from vendors hence are prone for the food borne diseases. Food sanitation rests directly upon the state of personal hygiene and habits of the personnel working in the food stalls.
The foods served by vendors are well appreciated by consumers because of their taste, low cost and ready availability for immediate consumption. Quality and safety are two common concerns cited with regards to these foods. The food served by vendors are prepared and either sold for immediate consumption or consumed later without further processing and preparation. Street food vendors usually take their products to their customers and therefore operate from public places and street corners where they find numerous clients. These locations usually do not meet food safety requirements. A large number of excremental diseases are spread through the consumption of these foods. Thus the hygienic aspects involved in the preparation, selling and consumption of these items are a major source of concern. Food borne illness is a major public health problem and an important cause of reduced economic growth. Hence, a study was undertaken to assess the bacterial load of food served by vendors in Karnal district.

METHODOLOGY

The objective of the present study is to determine the bacterial load of food samples served by the vendors in Karnal district and determine their hygiene standards.

Sample Collection

Ten food samples (channe, kulche, burger, tomato sauce, fruit juice, potato patty, chowmein, samosa, aloo tikki and water) were selected randomly. A questionnaire on hygiene practices carried out by the vendors was prepared and filled by interview method. The vendors were interviewed regarding the hygiene practices followed by them.

Determination of bacterial load of food samples

Samples of food, water and swab were aseptically collected from the food stalls in sterilized tubes and immediately brought to the laboratory for analysis. Standard plate count method was used to determine the total and gram negative counts of samples. The various media used were- Nutrient agar for the total bacterial count and Mac Conkey's agar for the gram negative count.

Isolation of E.coli

The swabs, food samples and water samples were streaked on Mac Conkey's agar and the non-mucoid lactose fermenting colonies were picked up and cultures purified by the plate streak method on EMB agar.

Identification of isolates

The purified cultures were identified on the basis of colony morphology, gram staining and specific biochemical tests. Classification of bacteria was done based on Bergey's
Manual of Determinative Bacteriology, 8th edition.

Statistical Analysis

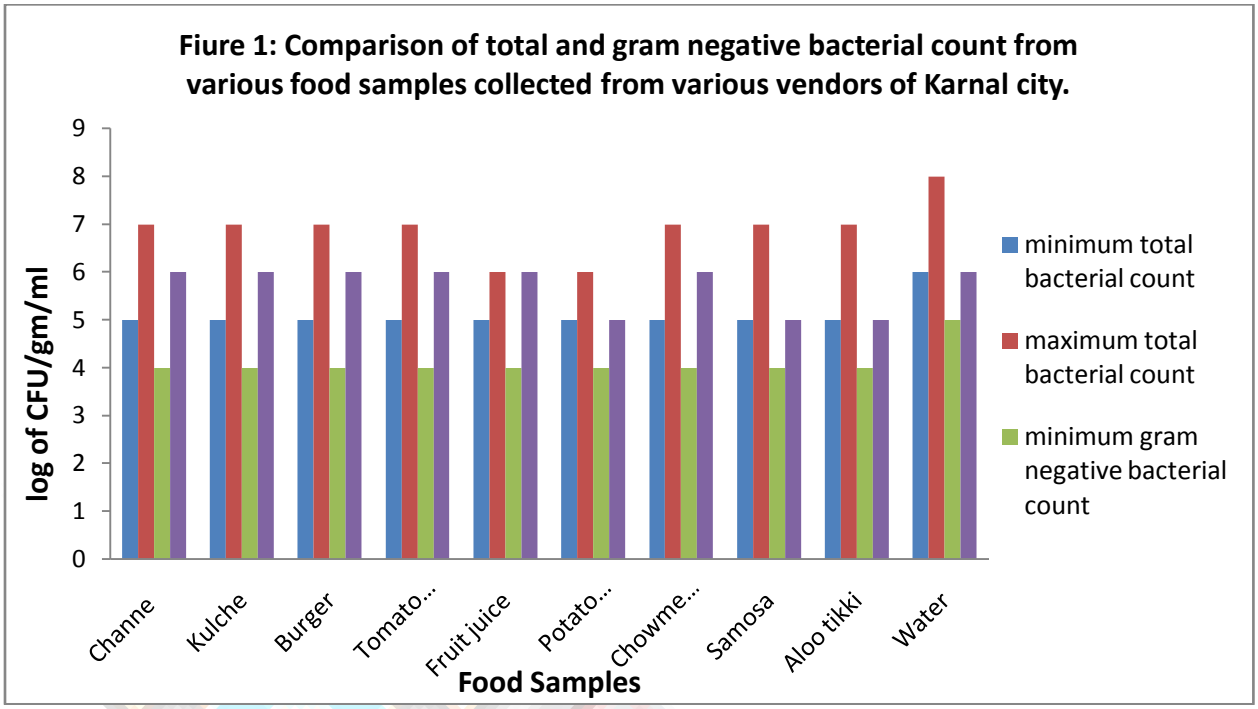
Mean values of bacterial counts of various food samples were calculated to analyze the most and least contaminated food.

RESULT

Hygienic quality of food served by vendors has become an important public health issue and a great concern to everyone. The present study was undertaken to investigate the microbiological quality of food served by vendors at various places of Karnal district. Samples of various foods served and swab samples of working, serving area and wiping cloths used by the vendors were procured at random. Ten samples were collected for each food sample, the total number being 100. Ten swab samples were collected for working area, 10 for serving area and 5 for wiping cloth. A total of 25 swab samples were collected from different vendors.

Bacterial Load of Food Samples

All the samples were subjected to testing for their total and gram negative counts. The total counts were higher than gram negative counts. Figure 1 illustrates the comparison of the total and gram negative counts from various food samples collected from various vendors of Karnal district. The total bacterial count of food samples ranged between 3.3×10^5 CFU/gm to 8.9×10^8 CFU/ml. The gram negative count of the food samples ranged from 3.2×10^4 CFU/gm to 9.9×10^6 CFU/ml.



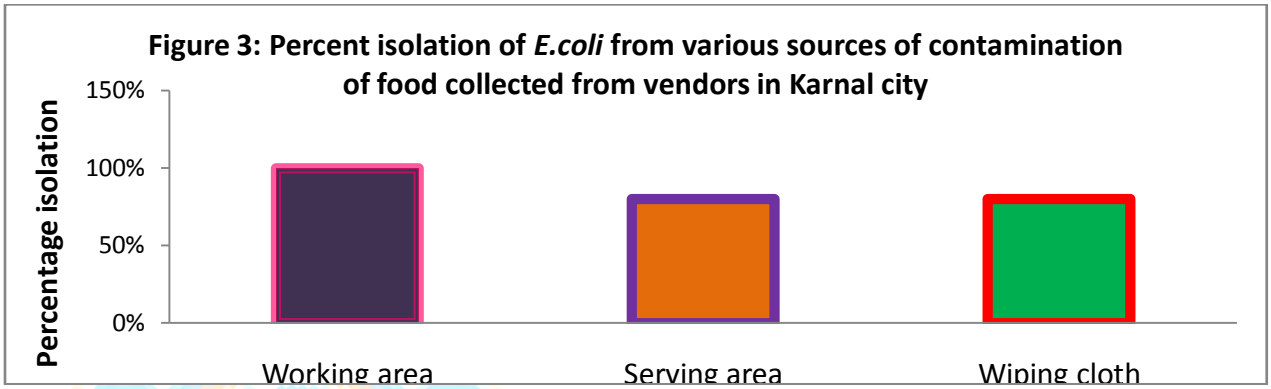
Isolation of E.coli

Table 2 indicates the E.coli isolation from different food samples taken from various vendors. A total of 100 food samples were collected from various vendors out of which 75 samples showed the isolation of E.coli. The maximum numbers of E.coli isolates were observed in Tomato sauce and Samosa, in which all the 10 samples showed E.coli isolation.

Table 2: Number of E.coli isolated from various food samples collected from food shops of Bus Stands.

Food Samples	**Total No. of food samples**	**No. of E.coli isolated**
Channe	10	8
Kulche	10	6
Burger	10	7
Tomato sauce	10	10
Fruit juice	10	8
Potato patty	10	5
Chowmein	10	6
Samosa	10	10
Aloo tikki	10	7
Water	10	8
Total	**100**	**75**
Percentage		**75%**

The percentage of E.coli isolation from possible sources of contamination i.e. working area, serving area and wiping cloth are depicted in Figure 3. An overall isolation percentage of E.coli from sources of contamination was 88%.



Data Analysis

The results show higher mean values in case of water samples for both total and gram negative counts. The trend of food contamination in decreasing order is as follows-:

For total bacterial count -:

Water > Channe > Kulche > Tomato sauce > Fruit juice > Burger > Aloo tikki > Chowmein > Samosa > Potato patty.

For gram negative counts-:

Water > Channe > Kulche > Tomato sauce > Burger > Fruit juice > Chowmein > Aloo tikki > Samosa > Potato patty.

Hygiene Practices Followed By the Employees of Food Shops of Chandigarh Bus Stands

The food vendors of Karnal district were interviewed regarding cleaning and hygienic practices followed by them. Table 3 shows that 35 out of 50 vendors received no education and 12 of them (24%) have primary education. Among the 50 vendors, 30 (60%) street vendors used to wash their hands more than three times in a day. None of them wear head covers while cooking and serving food. Sixteen out of 50 vendors (32%) wear neat and clean clothes. 54% vendors use dustbin covered with lid. None of them use incinerator for disposal of leftover food and garbage, whereas 72% of them use plates or lids to cover the food and water before and after consumption.

Table 3: Hygiene practices followed by vendors of Karnal district

Parameter	Frequency (n=50)	Percentage
Education		
Primary School	12	24%
Secondary School	03	6%
No education	35	70%
Personal Hygiene		
Hands washed less than three times daily	17	34%
Hand washed more than three times daily	30	60%
Hands not washed throughout the day	3	6%
Clean clothes	16	32%
Fingernails cut	12	24%
Head covered	-	-
Covering food and water	36	72%

SUMMARY

The present study revealed bacterial contamination of foods served by the vendors. Samples of water in our study showed the highest counts and a high rate of E.coli isolation was noticed from all the food and swab samples. Isolation of E.coli is greater in the sample of tomato sauce and samosa. Other aspects related to the food vendors in the district like age, educational status and the hygienic aspects related to the food preparation, serving were also reviewed.

All the food items were sold in open air with high risk of exposure to flies and dust. The container in which the food was served was also important. In most instances, the paper used to serve the food was generally newsprint of questionable origin, which increased the risk of contamination. The study indicates the need for stricter implementation of food sanitation practices for the vendors. A number of factors were identified that could reduce the risk of contamination. Cooking food in an enclosure, use of a clean serving stage, reheating food before sale, serving with a spoon/fork, selling food in containers and health education of vendors were some of them.

REFRENCES

1. Altekruse, S.F., Cohen, M.L. and Swerdlow, D.L.(1997). Centre for disease control and prevention and control, 3(3):285-294.
2. Banarsidas, B.(2002).Food poisoning. In: Park's Text Book of Preventive and Social Medicine. Park K. Ed. 17th edition. Jabalpur,181-184.
3. Buchanan, R.E. and Gibbon, N.E. Bergey's Manual of determinative Bacteriology, 8th Ed. Baltimore, 1974, 121,210-215.
4. Burt,M.B., Bolel,C. and Finkel,M.(2003). Safety of vendor prepared foods: Evaluation of ten processing mobiles food vendors I Manhatten. Public Health Report, 51(2):114-116.
5. Chukuezi,C.O.(2010). Food safety and hygiene practices of street food vendors in Owerri, Nigeria. Studies in sociology or science,1(1):50-57.
6. Choudhary,M.,Mahanta,L.,Goswami,J.,Mazumdar,M. and Pegoo,B.(2009).Socio economic profile and food safety knowledge and practice of street food vendors in the city of Guwahati,Assam. Journal Food Control, 22(2): 196-203.
7. Clarence, S.Y., Obinna, C.N. and Shalom, N.C.(2009) Assessment of bacteriological quality of ready to eat food (Meat pie) in Benin City metropolis, Nigeria. African Journal of Microbiology; 3(6): 390-395.
8. Frazier,W.C. and Westhoff,D.C.(2005).Food Microbiology. Tata McGraw- Hill PublishingCo.Ltd.,NewDelhi, ISBN:0-07-4621 01-7,pp: 173-185.
9. Kakar,D.A. and Udipi,S.A.(2000). Microbiological qualities of different varieties of chutneys sold in Mumbai city. Journal of Food Science Technology, 37:509-511.
10. Misra, A.K. and Kulia, R.K. (1989). Bacteriological quality of market milk. Indian Dairyman, N.D.R.I., Karnal, 41: 487-489.
11. WHO.(2001).Essential safety requirements for street vended food. (Revised Edition)