

Analysis of Practices of Street Food Vendors and Sensory Assessment of Street Foods (Fast Foods And Juices) in Allahabad City,(U.p) India



Engineering

KEYWORDS : Street vended foods, microbiological quality, Duo-Trio test, Triangle test,

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ABSTRACT

The present investigation aimed to study the practices of street food vendors and the quality assessment of street foods and juices served by food vendors in Allahabad City, (U.P.) India. The data were gathered from 30 food vendors using semi structured questionnaires. The results showed that the street food sector is dominated by males, and 66% of them attended primary school. 66.6% vendors were mobile and none of them possessed health certificate. Major cause of contamination was dusty roads and vehicles passing. 86% vendors didn't use any protective clothing. 83% vendors had short nails. While 66% handled money without washing hands. 50% vendors washed utensils and hand with clean water and none of the vendors used disinfecting soln. Sensory assessment was also done comprising of duo trio test and triangle test. Reference samples were Tropicana juice and Mc Aloo Tikki from Mc Donalds. These findings demonstrate that the ready-to-eat food vended in Allahabad City constitute an important potential hazard to human health. Provision of health education to the vendors and enforcing implementation of appropriate hygienic practices would improve food quality.

1. INTRODUCTION

In many cities and towns of developing countries, street food vending is a large source of employment (Choudhury et al., 2011), and contributes significantly to households incomes (Lucca and Torres, 2006; Biswas et al., 2010; Feglo and Sakyi, 2012). Street foods are defined by the FAO as ready-to-eat (RTE) food and beverages prepared and or sold by vendors and handlers especially in streets and other similar places for immediate consumption or consumption at a later stage without further processing or preparation.

Urbanization and population growth, especially in developing countries, are expected to continue into the next century and street-vended foods, which are largely but not exclusively an urban phenomenon will expand accordingly (WHO 1996). Vendors are often poorly educated, unlicensed, untrained in food hygiene, and they work under crude unsanitary conditions with little or no knowledge about the causes of food borne Disease (Barro et al 2007). Vending sites located alongside busy roads with heavy vehicular traffic, which increase air borne particles, or beside waste disposal sites adds to the contamination. (Gwande et al 2013).

Most of the foods are not well protected from flies, which may carry food borne pathogens. Safe food storage temperatures are rarely applied to street foods. Potential health risks are associated with contamination of food by E.coli, Salmonella typhi, Pseudomonas species, Staphylococcus aureus and Proteus species during preparation, post cooking and other handling stages (Honoshiro et al 2004; Ghosh et al 2007). Even though people are aware that food borne diseases could occur due to consumption of street food, the majority disregards these health hazards. (Bryan 1998).

The attempt was made to analyze of street-vended foods like Bread pakoda and kachodi sold by street vendors for microbial contaminations. The non hygienic quality of most popular types of street vended foods which was sold based on the

consumer demand. There is an urgent need to follow the control measures by food vendors to improve microbial quality of street vended foods.

2. MATERIALS AND METHODS

2.1 Analysis of hygienic practices

30 street food vendors operating in the major streets, of Allahabad City were randomly selected for the interview to elicit information on their personal hygiene and environmental sanitation. The hygiene practices were determined using a semi-structured questionnaire and an observational study. The following data were gathered: (i) gender, age, education level, health certificate, training; (ii) Hygiene and sanitary status; (iii) food handling processes; (iv) training on food hygiene and safety; (v) personal hygiene; (vii) washing practices.

2.2 Sample collection

A sampling technique was used to select a sample size of thirty (30) street food vendors from the population of all food vendors in Allahabad city. Both stationary and mobile food vendors were included.

2.3 Sensory Analysis

Sensory quality attributes and nutritive value of food items play an important role in consumer satisfaction and they influence further consumption. Sensory rating by panelists and physical measurements of properties are useful methods in the evaluation of quality of the product. (Čolarić et al., 2005)

2.3.1 Duo-Trio test

The panelists were given 3 coded samples of which 2 were identical and 1 was different. One sample is identified as reference sample and was given presented first followed by the 2 coded samples. It is statistically slightly less powerful than the triangle test but is reported to be easier to perform by the subjects (ISO, 2004a; Meilgaard, Civille, & Carr, 2006).

2.3.2 Triangle test

The panelists were given 3 coded samples of which 2 were identical and 1 was different. The samples were presented simultaneously. None of the samples is identified as standard. The panelist is required to identify the odd sample. Triangle tests are extensively used in food analysis to determine if differences between two products can be sensory detected. (Carbonell et al 2005)

3. RESULTS AND DISCUSSION

Street foods provide an affordable source of nutrients to most of the lower income sectors of the population who appreciate the food due to its taste, low price, and availability at the right time (FAO, 1988). However, street foods are frequently associated with diarrhoeal diseases due to improper handling and serving practices (WHO, 2002; Bhaskar et al., 2004; Barro et al., 2006). Therefore, the condition under which street food is prepared and vended raises many concerns for consumers' health. In most cases running water is not available at vending sites, and thus hand and dish washing are usually done in buckets and sometimes without soap. Wastewater and garbage are discarded nearby, providing nutrients for insects and rodents. Some of the foods are not well protected from flies or other organisms, which may carry food borne pathogens. Food and its ingredients are also exposed to contamination from unwashed hands and the materials used for wrapping such as leaves, old newspapers, and re-used polythene bags.

3.1 Profile of street food vendors of Allahabad city

The profile information of the vendors included in this study was their sex, age, education, type of vendors, site of food preparation and persons assisting during food preparation. The results are reported in Table 1 Data given in the table 1 indicates that majority of vendors (33%) aged between 21-30 years and (83.3%) of the vendors were male and only (16%) were female. A total of 5 vendors received no schooling, (66%) had received education up to primary level and (20%) vendors had education up to higher secondary level. Only 4 vendors i.e. (13.3%) had education up to Intermediate level. It was importance to know how the vendors acquired their cooking skills to establish their knowledge in handling street foods. Most (56.6%) of the vendors acquired cooking skills from observation, (20%) had formal teaching by their parents while (23.3%) gained the skills by trial and error (self-taught). According to FAO, (1997), food handlers should have the necessary knowledge and skills to enable them to handle food hygienically. Regarding the type of vendors that is mobile or stationary, majority of vendors (83.3%) were mobile while only (16%) of them were stationary. Also for possession of health certificate none of the vendors possessed health certificate from authorized dignitary. Finding and observations reflect that vendors prepared food at the stalls (100%) which were located by the roadside.

3.2 Hygiene and sanitary status of street food vendors

The surrounding environment of the food vending facilities was assessed by observation. All locations were exposed to at least one potential source of contaminants. Waste water drainage tunnels were (33%) in the proximity stalls to roads. Vehicles passing near by were (66%). Other potential sources of contaminants included dusty road (66%) and mud and sludge (16%). Vendors even had food preparation and serving areas near the drainage tunnels (33.3%) as potential contaminants. The other potential contaminants included houseflies with the highest occurrence at (56%) of all stalls. Besides raw material peelings also acted as source of contaminants

3.3 Food handling practices of street food vendors

Hygiene during handling and cooking of street foods was observed. Food handling practices that could affect the micro-

bial quality of street foods are indicated in Table 2. Among these practices food handling, serving of food, protective clothing and frequency of change of clothing was observed. Results showed that vendors (20%) cooked food during sale and (16.6%) of them cooked food on morning of sale. After preparing their foods they kept them and served them at ambient temperature. (26.6%) vendors covered the food which they sold while (13.3%) vendors kept their food uncovered and hence the food was exposed to flies and other contaminants. (33.3%) vendors reheated the food before selling to customers. (66.6%) vendors served food in plate and some served on newspaper with bare hands (13.3%). (50%) vendors used spoon. Handling with bare hands may result in cross contamination, here introduction of microbes on sage food (FAO, 1997).

3.4 Health and Personal hygiene practices of street food vendors

Data regarding personal hygiene of the vendors is reported in Table 3. Personal hygiene of the Vendors was observed. It was found that (83.3%) had short nails which were not polished and only (33.3%) of them had worn Jewellery. About (13.3%) of the vendors were smoking during food handling while (26.6%) vendors did coughing over the food. (66.6%) vendors handled money without washing hands during serving. Chewing of tobacco during food handling and preparation could lead to cross contamination of foods. Paulson D.S (1994) reported that outbreaks are generally caused by foods due to poor personal hygiene of the vendors and that have been mishandled or mistreated during preparation or storage.

3.5 Hand washing practices of street food vendors

It was revealed that no vendor was using disinfecting solution for washing hands. (52.3%) per cent of them use only water for hand washing, (33.3%) use soap and (14.2%) use detergent. Regarding reasons for hand washing maximum percentage of vendors (47.6%) and (19%) washed hands after using the toilets and handling garbage. Bhaskar et al. (2004) reported the defective personal hygienic can facilitate the transmission of pathogenic bacteria found in environment and on people's hands via food to humans. This was also supported by (Burt et al., 2003 and Black et al., 1989) who said that hands are important in the contamination and the dissemination of fecal oral transmitted bacteria.

3.6 Sensory analysis

Sensory ratings of food by panelists and physical measurements of properties are useful methods in the evaluation of quality (Čolarić et al., 2005). Sensory quality is a difficult concept to define, it should be comprehended as interaction between the product and the consumer. Taste, aroma, texture and appearance are generally considered to be among the most important sensory attributes. Taste is related to water-soluble compounds. Sweetness is mostly attributable to mono and disaccharides rather than to other compounds. Sour tastes are reliably linked up with organic acids and pH.

3.6.1 Sensory analysis of fruit juice

Coded samples

- A: Mixed fruit juice from Civil lines
- B: Mixed fruit juice from Rambagh
- R: Tropicana mixed fruit juice

Duo-Trio test for fruit juice

According to the panelists sample A was similar to reference sample while sample B was different. Results show that the taste and appearance of juice from Civil lines was somewhat similar to the reference sample i.e. Tropicana mixed fruit juice while the mixed fruit juice from Rambagh was different.

Triangle test for mixed fruit juice

In this test the 2 similar coded samples were A i.e. mixed fruit juice from Civil lines while the odd sample was R i.e. Tropicana mixed fruit juice. Panelist identified R sample as the odd sample.

3.6.2 Sensory analysis of Aloo chaat

Coded samples:

- A: Aloo chaat from Civil lines
B: Aloo Chaat from Rambagh
R: Mc Aloo Tikki from Mc Donald

Duo Trio test for Aloo chaat

According to the panelists sample A was similar to reference sample while sample B was different. Results show that the taste and appearance of Aloo chaat from Civil lines was somewhat similar to the reference sample i.e. Mc Aloo Tikki while the Aloo chaat from Rambagh was different.

Triangle test for mixed Aloo chaat

In this test the 2 similar coded samples were A i.e. Aloo chaat from Civil lines while the odd sample was R i.e. Mc Aloo Tikki. Panelist identified R sample as the odd sample.

4. CONCLUSION

From the study it is concluded that food contamination in Allahabad City is mainly due to poor water quality and hygiene during food preparation, washing of utensils, poor personal hygiene, preparation of food long before consumption, and crowded and dusty vending location. Vending sites located alongside busy roads with heavy vehicular traffic, which increase air borne particles, or beside waste disposal sites adds to the contamination. It is therefore, essential for the people who handle and prepare street foods, to be properly trained on safe food handling technique. Regular monitoring of the quality of foods for human consumption is recommended to avoid any future bacterial pathogen outbreak. Also with the help of sensory assessment consumer can be made aware of quality of the food product.

Table 1 Profile of street food vendors in Allahabad city (n=30)

Parameters	No. of vendors	Percentage
Level of education		
No schooling	5	16%
Primary school	20	66%
High school	6	20%
Intermediate	4	13%
Sex		
Male	25	83%
Female	5	16%
Age		
<20	3	10%
21-30	10	33%
31-40	8	26%
41-50	5	16%
>50	4	13%
Types of Vendors		
Mobile	20	66%
Stationary	10	33%
Health Certificate		
With	-	
Without	30	100%
Acquisition of knowledge of food preparation		
Observation	17	56%
Formal	6	20%
Other	7	23%

Table 2. Food handling practices of street food vendors (n=30)

Food handling practices	No. of vendors	Percentage
Food cooked during sale	6	20%
Food cooked on morning	5	16.6%
Food sold with covering	8	26.6%
Food sold with no covering	4	13.3%
Food exposed to flies	8	26.6%
Food reheated before sale	10	33.3%
Through washing of food to be cooked	10	33.3%
Use of safe water for cooking	11	36.6%
Serving of food		
Food served with spoon/fork	15	50%
Food served with bare hands	4	13.3%
Food served in plate	11	36.6%
Protective clothing		
Full apron	-	
Half apron	4	13%
Hair covering	-	
None	26	86%
Frequency of change		
Everyday	-	
Every 2days	-	
Every 3-4days	4	13%
Weekly	-	

Table 3 Health and Personal hygiene practices of street food vendors (n=30)

Personal hygiene	No of vendors	Percentage
Short and clean nails	25	83.3%
Hand free of sores	28	93.3%
Smoking while working	4	13.3%
Coughing over food	8	26.6%
Jewellery/bangles on arms	10	33.3%
Handling food and money without washing hands in between	20	66.6%
Ailments that temporarily prevented from cooking and serving		
Cough and cold	26	86%
Diarroeha	26	86%
Nausea	23	76%
Vomiting	22	73%
Sore eyes	26	86%
Stomach cramps	20	66%
Sick member of family	20	66%

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