Microbial and chemical assessment of food stuffs from street vendors in ahmednagar city

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Abstract

The Food Safety and Standards Authority Of India (FSSAI) has been established under Food Safety and Standards Act 2006, which consolidated various acts. FSSAI has been created for laying down science based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption. The important objectives behind regulation of Food Act is to collect and collate data regarding food consumption, incidence and prevalence of biological risk, contaminants in food, residues of various contaminants in food products, identification of emerging risks and introduction of rapid alert system. In Ahmednagar City, large number of people consumes PaniPuri sold by street vendors. PaniPuri provides the risk of food poisoning due to microbial contamination and thus causes threat to the human health. With this aim, studies on microbial and chemical analysis of PaniPurifrom street vendors has been subjected for analysis. Three samples from most crowdy places in Ahmednagar City has been undertaken for present studies. Alongwith Microbial analysis,heavy metals Pb(mg/kg), As(mg/kg), Hg(mg/kg), Sn(mg/kg), Cd(mg/kg), Cu(mg/kg) have also been detected. All collected samples of Pani-Puri water which are collected from different vendors in Ahmednagar City are excellent as Total Coliforms and Esherichia Coli are absent. Trace metals like Pb, As, Hg, Sn, Cd and Cu are present within permissible limits as per FSSAI Specifications 2011.

Introduction

Local authorities, International organizations and consumer associations are nowadays increasingly aware of socio-economic importance of street food and also risks associated with it. The main concern is food safety, although other problems do exist, including sanitation (accumulation of waste on streets and blocked drains), congestion obstructing pedestrians (occupancy of pavements by hawkers and traffic accidents). In Ahmednagar City, large number of people consumes PaniPuri sold by street vendors. PaniPuri provides the risk of food poisoning due to microbial contamination and thus causes threat to the human health. Although, many consumers claim to consider hygiene while selecting their street food provider, they are also unaware of associated health risks.

Microorganisms do not exist only in water, air and soil, but also in fecal matter and thus may become major source of food contamination. Food hygiene serves to ensure the safety and sanitary and good quality of food.Nowadays, street foods have become one of the most common risks associated with outbreaks of food- borne diseases. Several documented cases of food poisoning outbreaks due to street food have been reported. 691 food poisoning outbreaks and 49 deaths from 1983 to 1992 in Shangdong Province (China) (Lianghui, 1993) are found due to street food poisoning. In 1988, 14 deaths were reported in Malaysia because of food-borne diseases related to street foods. In the same year 300 people became ill in Hong Kong after consumption of street vended foods. In 1981 a cholera epidemic in Pune, India was linked to consumption of street vended juice, whilst an outbreak of cholera in Singapore in 1987 was attributed to the consumption of street foods (FAO, 1990). By considering above problem as a severe one and epidemic diseases spreading in Ahmednagar City, present studies have been decided to conduct for street vendors selling Pani- Puri as a case study.

SCOPE OF THE PRESENT WORK

The aim of this study is to ascertain bacterial isolate and determine total counts of bacterial species responsible for the contamination of the street vending food in crowdy places of Ahmednagar. This prospective study was conducted among street vending food at two main sub-regions of Ahmednagar city. The samples of high demanded street food ,PaniPuri water has been collected in the month of July- August 2018 and July- August 2019, one region per year, in rainy season. Thus the main objectives of the present studies are as follows:

To improve the conditions in which food product is prepared and sold including shelf life.

To test and control water quality which are mainly responsible for posing the risk of contamination.

To assess the quality of Pani-Puri water in Ahmednagar, for its bacterial content , especially E. Coli, and Total Coliforms.

To determine metal contamination in Pani-Puri water in Ahmednagar.

To raise the vendor awareness of sanitation and food hygiene.

Ultimately, the street foods consumers would know what has been added to the foods allowing them to make informed decisions about what they eat.

Materials and Methodolgy

Sample Collection and Description:

Street foods are popular in developing countries where they provide affordable sustenance for a broad spectrum of consumers including the urban poor.

SAMPLING: The food samples were purchased and transported to the laboratory in the sterile bottles, packed in sterile plastic bags and analyzed for bacterial contamination.The mean bacterial counts in these foods expressed to log10 CFU/ml, along with bacterial contamination, heavy metals Pb(mg/kg), As(mg/kg), Hg(mg/kg), Sn(mg/kg), Cd(mg/kg), Cu(mg/kg) have also been detected.

Samples of street vended foods in the two chosen heavily crowded regions in the Ahmednagar city were collected to assess their general microbiological quality and safety. 03 samples of most popular types of street foods - of PaniPuri in some samples blended with mint leaves and green chutney - were collected. The samples of high demanded street food, PaniPuri water has been collected in the month of a July- August 2019, in rainy season. Upon collection, the samples were initially kept chilled in a cooler box packed with dry ice for a maximum of twelve hours. The samples were collected in sterile bottles and were sealed and labeled (place and date and time of sample collection) and then kept chilled until they were frozen as was described above. Total coliforms, most probable number of coliforms and the microbiological safety was assessed through determination of the presence and counts of Escherichia coli. The food samples were

collected from vendors selected using the same random sampling method described above to select the vendors for the food safety knowledge and attitudes study. Once purchased, a composite sample was collected using disinfected bottles and placed into sterile polyethylene bags and were analysed.

500 ml of Samples of Pani-Puri water were collected in the evening time of around 6.30pm, from different vendors are as described below. The timing of sample collection is selected as of evening because such type of food is sold only during evening timings.

Sample1--NaviPeth Main Market; Ahmednagar

Sample--2.Delhi Gate, Ahmednagar

Sample –3 Mahalaxmi Garden, Bhutkarwadi, Ahmednagar

Methodology

Sampling has been done in dense populated area of Ahmednagar city as a Central Part of the city. From each zone six representative samples of Pani-Puri are collected. All of these samples are collected from crowdy market places from well-known vendors. These samples are analyzed for chemical analysis and for bacteriological analysis. Chemical analysis was carried out for trace metal determination such as Lead as Pb, Arsenic as As, Mercury as Hg, Tin as Sn, Cadmium as Cd, and Copper as Cu. Bacteriological analysis was carried out for most commonly found contaminating species of Escherichia Coli and Total Coliforms. All the samples were sent for testing to Anacon Laboratories Pvt. Ltd., Nagpur; a NABL and CPCB, Delhi recognized laboratory; and the methodology used for analysis is in house validated method. Results obtained are compared with standards laid down as per FSSAI Specifications 2011.

Results and Discussion

According to the policies to motivate the safety of street vended foods (WHO, 1996), it has been made mandatory to study systems of local street foods and to impart education of consumers as well as training of food handlers to spread food safety knowledge. However, the understanding and attitudes of consumers about street food safety also have an important role towards this problem, through their decisions of what to consume and from whom to purchase. Therefore, it is obvious that performing this study on food safety knowledge not only for street vendors but also for consumers at the same time in a certain location is necessary. All the collected samples of PaniPuri water from different 03 street vendors, are analyzed by standard methods ANqR 49 as per laid down by Food Safety and Standards Authority of India, FSSAI. Total Coliforms and Escherichia Coli are determined by standard methods as per IS 5401 Part 1: 2012 and IS 5887 Part 1 : 1976, respectively. Results obtained are as follows given in Table 1 and Table 2.

TABLE -1

CHEMICAL TEST RESULTS OF FOOD SAMPLES FROM CENTRAL REGION Of AHMEDNAGAR CITY

Test Parameter	Sample1	Sample2	Sample3	Test Method	FSSAI Specification
Pb(mg/kg)	<0.5	<0.5	<0.5	ANqR 49	Max 2.5
As(mg/kg)	<0.5	<0.5	<0.5	ANqR 49	Max 1.1
Hg(mg/kg)	<0.5	<0.5	<0.5	ANqR 49	Max 1.0
Sn(mg/kg)	<0.5	<0.5	<0.5	ANqR 49	Max 250
Cd(mg/kg)	<0.5	<0.5	<0.5	ANqR 49	Max 1.5
Cu(mg/kg)	<0.5	<0.5	<0.5	ANqR 49	Max 30.0

< - Indicates detection limit of the Instrument / Method and shall be considered as Absent.

BDL – Indicates Below Detection Limit

DL – Indicates Detection Limit of the Instrument/ Method and shall be considered as Absent.

TABLE 2

BACTERIOLOGICAL TEST RESULTS OF FOOD SAMPLES FROM CENTRAL REGION Of AHMEDNAGAR CITY

Test Parameter	Sample1	Sample2	Sample3
Eschrichia Coli/ml	Absent	Absent	Absent
Total Coliform cfu/ml	BDL (DL-1)	BDL (DL-1)	BDL (DL-1)

< - Indicates detection limit of the Instrument / Method and shall be considered as Absent.

BDL – Indicates Below Detection Limit

DL – Indicates Detection Limit of the Instrument/ Method and shall be considered as Absent

CONCLUSION

Urbanization and rapid growth in the populations of developing countries is serving as a major drive for the large expansion of the production and popularity street vended foods.It is found that all collected samples of Pani-Puri water which are collected from different vendors in Ahmednagar City are excellent as Total Coliforms and Esherichia Coli are absent. Trace metals like Pb, As, Hg, Sn, Cd and Cu are present within permissible limits as per FSSAI Specifications 2011. This indicates that hygienic conditions are properly maintained and there is control on contamination. In Ahmednagar City, since 2015-16, a non-governmental organization First Hygiene Ltd.; is working hard for creating awareness for food hygiene by providing food safety materials for food handling to street vendors as well as in restaurants. It is also administering quality of food sold by many vendors in the city. Present project has shown good quality of food products must be the effect of working strategies and objectives of non- governmental organization, First Hygiene Ltd, working in city.

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