

A STUDY OF MICROBES IN FRUIT JUICES, KIMS-AMALAPURAMNagaraja B¹, Nageswara Rao P²¹Associate Professor, Department of Microbiology, Konaseema Institute of Medical Sciences & Research Foundation.²Professor & HOD, Department of Microbiology, Konaseema Institute of Medical Sciences & Research Foundation.**ABSTRACT****INTRODUCTION**

Fruit and sugarcane juices are nutritious drinks with great taste and health benefits. Food borne illnesses associated with consumption of Fruit and sugarcane juices at several places in India and elsewhere. Fruit juices were served with added ice pieces. Hygienic standards are not maintained while transporting from the field to the place of extraction and preparation. Hence a rapid review of the fruit juices from street vendors has been undertaken along with sugarcane juice. Raw sugarcane juice is a refreshing juice in many parts of Andhra Pradesh. The present study is to assess the prevalence of different organisms from different fruit juices collected from street vendors.

METHODS

Fruit juices are collected namely sugarcane, sweet lemon, orange, grape apple, pineapple pomegranate. A total 100 samples of fruit juices were collected from road side from different vendors. 150 ml of each variety of fruit juices were collected from different vendors in screw capped bottles and subjected to microbial analysis, processed with in 30mts in the department of microbiology at KIMS by standard methods.

RESULTS

The analysed samples of fruit juices are found to be contaminated with different bacteria, Escherichia coli 30% Klebsiella pneumoniae 10% Staphylococcus aureus 20% Enterococcus faecalis 04% Pseudomonas aeruginosa 10% ASB 04% (aerobic spore bearers) Micrococci 02% Proteus 20% Salmonella. Shigella and Vibrios were not isolated.

CONCLUSION

It is high time that street vendors should have health education by volunteers, health workers from PHC (primary health centers) and people well versed with community medicine practice for implementation of standard hygienic protocols may reduce contamination of fruit and sugarcane juices The concerned health authorities need to ensure and insist to follow the protocols by the vendors and license holders to the vendors.

KEYWORDS

Food Borne Illness, Bacteriological Analysis, Escherichia Coli, Klebsiella, Proteus, Staphylococcus Aureus, Vended Fruit Juices, Bacterial Contamination.

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INTRODUCTION: Fruit juices are nutritious drinks with great taste and health benefits (SUAAD and EMAN 2008)¹ there are several reports of illness due to the food borne diseases associated with the consumption of fruit juices at several places around the globe (MOSUPYE and HOLY 2000, MUIINDE and KURA 2005, CHUMBER et al 2007)^{2,3,4} Fruit juices processed under hygienic conditions play an important role in inhibition of breast cancer, CHF and UTI (Saenz, Sepulveda 2001, HYSON 2011)^{5,6} Several factors can act as source of contamination of fruit juice such as use of unhygienic water for dilution, dressing with ice, prolonged

preservation without refrigeration, unhygienic surroundings often with swarming houseflies and fruit flies and air born dust. Such juices have been shown to harbour bacterial pathogens notably Esch. Coli, Salmonella Spp, Shigella and Staph. aureus (Buchmann et al 1999, Sandeep et al 2004, BARRO et al 2006)^{7,8,9} Water used for juice preparation can be major source of microbial contaminants including coliforms, faecal coliforms streptococci (Tasnim et al 2010).¹⁰ The quality of fruit juices is strictly being maintained in the developed countries while unfortunately, in many developing countries like INDIA, the street vendors are not much concerned about the safety and hygiene of fruit juices because lack of enforcement of law. Thus transmission of certain human diseases through juice and other drinks become serious problem (TASNIM et al 2010).¹⁰

In Amalapuram, there is high demand for both packed and fresh fruit juices especially in summer. Most of the restaurants and cafes serve juices as in apparently hygienic conditions, unfortunately in road side shops, recreational areas (parks) and busy market places, the quality of supplied

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juices remains questionable along the lines of evidences Prompt assessment of juices were undertaken to study the bacteriological contamination.

MATERIALS & METHODS: Fresh sugarcane and fruit juices collected from different street vendors from bus complex, near cinema halls, high school centres red & black bridge centers and at clock tower centers of Amalapuram.

Fruit juices are collected namely sweet lemon, orange, grape, apple, pineapple, pomegranate sugarcane, and mixed.

150 ml of each variety were collected separately in a Sterile Screw capped bottles from different vendors and processed with in 30mts in the department of microbiology. A Total 100 samples of different fruit juices were collected from road side vendors, during the period March to September 2014. Sugarcane juice was diluted 10 folds in phosphate buffered saline (PH-7.3) and bacterial count was determined by surface plating method on Blood agar and MacConkey agar For isolation of Salmonella & Shigella spp and other fruit juices 50ml inoculated into equal volume of double strength Selenite-F broth, double strength MacConkey agar and Mannitol–salt agar incubated at 37° C for 12 hours. sub cultured on DCA and CLED mediums.

Tentative identification of isolates was made by gram’s stain, motility oxidase test of isolated colonies and cultural characteristics on CLED medium-yellow-LF colonies, green colonies Proteus spp, greenish blue-pseudomonas, mucoid or yellow to whitish blue-klebsiella, deep yellow opaque colonies-staphylococcus aureus Conformation of bacterial pathogens made by conventional methods as per Mackie-McCartney practical medical microbiology. Deep yellow opaque colonies of staph aureus (Hi-media, manual 2003)¹¹ Conventional rapid kit methods to confirm pathogens (Collee et al 1996).¹²

RESULTS: The analyzed samples of fruit juices & sugar cane juice for found contaminated with different bacteria.

Fruit juice	Esch. coli	Klebs	Staph. A	Pseud	Proteus	Entero	ASB	Micro
Grape	4(8%)	2(4%)	2(4%)	4(8%)	4(8%)	-	-	-
Pineapple	2(4%)	-	4(8%)	-	2(4%)	-	-	-
Sugarcane	4(8%)	2(4%)	4(8%)	2(4%)	4(8%)	2(4%)	2(4%)	-
Apple	2(4%)	-	-	-	2(4%)	-	2(4%)	-
Orange	4(8%)	-	-	-	-	-	-	-
Sweet lemon	6(12%)	2(4%)	4(8%)	-	4(8%)	-	-	-
Palm granite	2(4%)	-	-	-	-	-	-	-
Mixed	6(12%)	4(8%)	6(12%)	4(8%)	4(8%)	2(4%)	-	2(4%)
Bacterial pathogens isolated from different juices								

DISCUSSION: In developing countries like INDIA, fruit juices, sold by street vendors are widely consumed by millions of common people. These fruit juices are appreciated by consumers because of taste, low price and availability at right time. (FAO, 1988 Ohiokpehai, 2003)^{13,14}

Street vendors mostly ignorant of good hygienic practices (GHP) and causes diarrhoeal diseases (Mensah et al 2002)¹⁵ which can increase the risk of street food

Salmonella, Shigella and Vibrios were not isolated. No hygienic standards were observed either during transport of fruit juices or during extraction of sugarcane juice. The glasses used for serving were washed by immersing in the same bucket of water. No disposable glasses are used.

The present study revealed bacterial contamination of fruit & sugarcane juice.

Bacteria Isolated	No. of Samples Contaminated
Escherichia coli	30(30%)
Klebsiella pneumonia	10(20%)
Staphylococcus aureus	20(40%)
Enterococcus faecalis	04(8%)
Pseudomonas aeruginosa	10(20%)
A.S.B (Aerobic spore bearers)	04(8%)
Micrococci	02(4%)
Proteus	20(40%)
Bacteriological analysis of fruit & sugarcane juices	

Grape	04(8%)
Pine apple	14(28%)
Sugarcane	15(30%)
Apple	08(16%)
Orange	10(20%)
Sweet lemon	30(60%)
Pomegranate	04(8%)
Mixed	15(30%)
Different fruit juices & sugarcane juices processed	

The above table shows different bacteria isolated from different juices highest being sweet lemon 30(60%) followed by sugarcane 15(30%) mixed 15(30%) pineapple 14(28%) orange 10(20%) apple 8(16%) grape 04(8%) and pomegranate 04(8%).

contamination (Bhaskar et al 2004)¹⁶ Therefore, the conditions of street food preparation and vending rise many concerns for consumer’s health due to improper handling and serving practices (WHO, 2002; Barro et al 2006; Bello et al 2013).^{9,17,18}

In most cases, running water is not available at vending sites; hands and utensils washing are usually done in one or more buckets, and sometimes without soap. Some of the

juices are not efficiently protected against flies, which may carry food borne pathogens.

There are health risks associated with initial contamination of juices by pathogenic bacteria as well as subsequent contamination by vendors during preparation, handling and cross contamination (Mosupye, 2000).²

From the above table it is observed that presence of *Escherichia coli* and other coliforms and enterococci indicate faecal contamination of fruit juices.

Staphylococcus aureus is a entero toxin producer can cause food poisoning. It is fact that all the samples analyzed were found to be contaminated with different bacteria is matter of concern. Bacterial contamination of sugarcane juice may occur at different stages such as by contamination of sugarcane, roller drum crushers, collecting vessels, ice added to the juice, hands of the personnel and the filter. Apart from that sugarcane juice attract flies from drainage contaminate juice.

The present study aims hygienic status of street vended juices, bacterial contamination and their impact in street food contamination.

Total number of 100 samples analyzed out of 100 samples 94 samples are contaminated with pathogenic bacteria highest contamination is found to be *Escherichia coli* (30%) followed by *staphylococcus aureus* (40%) *Proteus* (40%) *Klebsiella pneumonia* (20%) *Pseudomonas aeruginosa* (20%) *streptococcus faecalis* (8%).

Maximum contamination is recorded in *Escherichia coli* similar findings were also recorded by (Subbannayya et al 2007)¹⁹ *Staphylococcus* spp secondary due to contamination via handling, this may be due to poor personal and domestic hygiene indicating lack of knowledge of hygienic practices and safety of food products (Tambekar et al 2009, BELLO et al 2013)^{18,20} in street vended juices and indicating possible risk of infection involved with drinking of such juices The main source of contamination might be through contaminated water supplies, utensils washed by contaminated water or water used for dilution of juices, inadequate hand washing by vendors and absence of good hygienic practices (Tambekar et al 2007).²⁰

CONCLUSION: It is high time that street vendors should have health education by volunteers, health workers from primary health centers and people well versed with community medicine practice for implementation of standard hygienic protocols may reduce contamination of fruit and sugarcane juices.

The concerned health authorities like Medical officer in charge of Amalapuram Municipality to ensure and insist to follow the protocols by the vendors and license holders to the vendors.

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