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BACTERIOLOGY OF FRUIT JUICES AND SUGARCANE JUICES AT AMALAPURAM

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Abstract: There are reports of food borne illness associated with consumption of fruit juices at several places in India and elsewhere. Hence a rapid review of the fruit juices from street vendor has been under taken along with sugarcane juice Raw sugarcane juice is a refreshing juice in many parts of Andhra Pradesh. The juice is extracted by crushing sugarcane between roller drums of crushing mission and served with added ice pieces. Hygienic standards are not maintained while transporting from the field to the place of extraction and preparation of juice. The raw juices from the road side street vendors is consumed by road side customers including general public, shopping personals, tourists , students etc... Sugarcane juice serves as a good culture medium for bacteria Collected at summer, and early monsoon. The present study aimed at bacteriological analysis of the organisms in the fruit juices and sugarcane juice soled on the streets of the Amalapuram. Total 50 numbers of samples were collected from different fruit juices including sugarcane juice from street vendors of Amalapuram from October - 2013 to December - 2013 and analyzed and pathogens recorded

Keywords: Copper, Ferrous, Effects, Growth Rate, Biomass



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INTRODUCTION

Fruit juices are nutritious drinks with great taste and health benefits (SUAAD and EMAN 2008) 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, MUINDE and KURA 2005, CHUMBER et al 2007) fruit juices processed under hygienic conditions to play an important role inhibition of breast cancer, CHF and UTI (Saenz, Sepulveda 2001, HYSON 2011) 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 harbor bacterial pathogens notably Esch. Coli, salmonella Spp, shigella and staph aureus (buchmann et al 1999, sandeep et al 2004, BARRO et al 2006) Water used for juice preparation can be major source of microbial contaminants including coliforms, faecal coliforms streptococci (tasnim et al 2010). 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)

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

Materials & Methods

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

Fruit juices collected namely sweet lemon, orange, grape, apple, pineapple, palmgranate sugarcane, mango and mixed juices

Total 50 samples different fruit juices were collected from road side vendors at different places. Samples containing 25 ml of each juice separately in a sterile container and transported to the laboratory \samples are processed within one hour of collection for analysis 1ml of sample 10 times diluted with sterile distilled water. Diluted sample 0,5 ml was inoculated in 4,5ml macconkey broth and incubated 4-5 hours.

The microbial growth observed for turbidity in broth was then sub cultured on to CLED medium

For the isolation of organisms and fruit & sugarcane juice (25ml) was inoculated in to equal volumes of double strength of macconkey & selenite F broth and incubated at 37⁰ C for 12 hours. Subculture was done on deoxycholate citrate agar. 25 ml of sugarcane juice was inoculated to equal volume of double strength alkaline peptone water (P^H- 8.6), incubated at 37⁰ C for 6 hours and subcultured on thiosulphate citrate bile sucrose agar.

Turbidity observed in macconky' broth for enteropathogenic and manitol salt agar for staph spp, cetrimide agar for pseudomonas, selinite F broth-entero coccus fecalis then sub cultured on CLED medium at 37 °C 24 hours. Tentative identification of isolates were made by gram's stain, motility oxidase test of isolated colonies and cultural characterstics 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 and Mc Cartney dated Deep yellow opaque colonies of staph aureus(himedia, manual 2003) Conventional rapid kit methods to confirm pathogens(collee et al 1996)

KEY WORDS- vendared fruit juices, bacterial contamination, hygiene food saftety

Results

The analyzed samples of fruit juices& sugar cane juice for found contaminated with different bacteria. Salmonella, Shigella and Vibrios were not isolated. No hygienic standards were observed either during transport of fruit 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.

I. Bacteriological analysis of fruit & sugarcane juices

Bacteria isolated	No. of samples contaminated
<i>Escherichia coli</i>	15 (30%)
<i>Klebsiella pneumonia</i>	05 (10%)
<i>Staphylococcus aureus</i>	10 (20%)
<i>Enterococcus faecalis</i>	02 (4%)
<i>Pseudomonas auroginosa</i>	05 (10%)
<i>A.S.B (Aerobic spore beares)</i>	02 (4%)

<i>Micrococci</i>	01 (2%)
<i>Proteus</i>	10 (20%)

2. DIFFERENT FRUIT JUICES & SUGERCANE JUICES PROCESSED

Sweet lemon	15(30%)
Orange	5(10%)
Grape	1(2%)
Apple	5(10%)
Fineapple	12(24%)
Palmgranate	3(6%)
Sugar cane	6(12%)
Mango	1(2%)
Mixed	2(4%)

The above table shows different bacteria isolated from different juices highest being sweet lemon 15(30%) followed by fine apple 12(24%) sugar cane 6(12%) orange 5 (10%) apple 5(10%) palmgranate 3 (6%) mixed 2(4%) grape 1 (2%) and mango 1(2%)

3 BACTERIAL PATHOGENS ISOLATED FROM DIFFERENT JUICES

Fruit juice	<i>Esch coli</i>	<i>Klebs</i>	<i>Proteus</i>	<i>Entero</i>	<i>Pseud</i>	<i>Staph. A</i>	<i>Asb</i>	<i>Micro</i>
Sweet lemon	3 (6%)	1(2%)	2(4%)	-	-	2(4%)	-	-
Orange	2 (4%)	-	-	-	-	-	-	-
Grape	2 (4%)	1 (2%)	2 (4%)	-	2 (4%)	1 (2%)	-	-
Apple	1 (2%)	-	1 (2%)	-	-	-	1 (2%)	-
Pineapple	1 (2%)	-	1 (2%)	-	--	2(4%)	-	-
Suger cane	2(4%)	1 (2%)	2(4%)	1 (2%)	1 (2%)	2(4%)	1 (2%)	-
Palm granite	1(2%)	-	-	-	-	-	-	1(2%)
Mixed	3(6%)	2(4%)	2(4%)	1(2%)	2(4%)	3(6%)	-	-

DISCUSSION

In developing countries like INDIA, fruit juices, meals snacks sold by street vendors are widely consumed by millions of common people. These street food and fruit juices are appreciated by consumers because of taste, low price and availability at right time (FAO, 1988 Ohiokpehai, 2003)

Street vendors mostly ignorant of good hygienic practices(GHP) and causes diarrhoeal diseases (Mensah et al 2002)which can increase the risk of street food contamination(Bhaskar et al 2004) 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)

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 foods by pathogenic bacteria as well as subsequent contamination by vendors during preparation, handling and cross contamination (Mosupye and van holy, 2000)

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 50 samples analyzed out of 50 samples 47 samples are contaminated with pathogenic bacteria highest contamination is found to be Escherichia coli(30%) fallowed by staphylococcus aureus (20%) proteus(20%)Klebsiella pneumonia (10%) pseudomonas auroginosa (10%) streptococcus fecalis 2(4%)

Maximum contamination is recorded in Escherichia coli similar findings were also recorded by (subbannayya et al 2007) 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) 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 food workers and absence of good hygienic practices (Tambekar et al 2007)

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 concern 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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