

## COMPARATIVE STUDY OF MICROBIAL CONTAMINATION IN FRUIT JUICE IN LOCAL MARKET AT DEHRADUN

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**Abstract:** The aim of the present study is microbial analysis of freshly prepared orange juices sold in the markets of Dehradun (Uttarakhand). Bacterial count and yeast count has been done by spread plate method and pour plate method. Isolated strains were characterized on the basis of microscopy and certain biochemical tests. Orange juice at Suddhowala showed more microbial count as compared to Premnagar, Dehradun. Microscopy examination and biochemical tests confirmed that Orange juice collected at Suddhowala contained *Escherichia coli*, *Staphylococcus aureus*, *Saccharomyces cerevisiae* and *Penicillium sp.* but *Lactobacillus sp.*, *Salmonella sp.*, *Saccharomyces cerevisiae*, *Aspergillus niger* were isolated from Orange juice at Premnagar. Our results clearly, suggested that orange juice at local market contained various type of microbial contaminant and such type of orange juice is not good for health.

**Keywords:** Orange, *Saccharomyces cerevisiae*, *Penicillium sp.*, *Lactobacillus sp.*, *Salmonella sp.*, *Aspergillus niger*

### INTRODUCTION

India produces about 9 million tons of fruits every year growing at a rate of 12% per annum. The total market potential for fruit juices is 230 million liter including both packed and freshly made fruit juices (Keshari, 2010). Fruit juices are an important part of human diet due to its highly nutritious and offer a good taste (Tasnim *et al.*, 2010). These fruit juices are fat-free and contain naturally occurring phytonutrients contributing to better health (Franke *et al.*, 2005).

Contamination from raw materials and equipments, additional processing conditions, improper handling, prevalence of unhygienic conditions contributes substantially to the entry of bacterial pathogens in juices (Oliveira *et al.*, 2006). The type of microorganisms in fruit juice is greatly of microorganisms in the respective fruits. Fruits commonly carry mold, yeasts and bacteria (Hariyadi, 2013). Further, few reports suggested that food-borne illnesses is associated with the fruit juice consumption (Chumber *et al.*, 2007). Foodborne diseases are the illnesses contracted from eating contaminated food or beverages. These food borne diseases is harmful illness mainly affecting the gastrointestinal tract. Improper washing of fruits add bacteria to extracts leading to contamination. Further, In addition, use of contaminated water, unhygienic surroundings often with swarming houseflies, airborne dust and environment can act as sources of contamination. Such juices have shown to be potential sources of various bacterial pathogens such as *Salmonella*, *E. coli*, *Shigella*, and *S. aureus* (Buchmann *et al.*, 1999, Sandeep *et al.*, 2002, Barro *et al.*, 2006).

So, aim of present study is comparative study of microbial contamination in fruit juices in local market at Dehradun.

### MATERIAL AND METHODS

**Collection of fruit juice:** Local market juice samples were purchased from Premnagar and Suddhowala at Dehradun city. These samples were collected in sterile screw cap containers and transported under refrigeration to laboratory where they were immediately examined for microbiological analysis.

**Isolation and Microbial counting of contamination in orange juice:** 1 ml of juice sample was serially diluted were placed on nutrient agar plates and potato Dextrose Agar by spread plate method and pour plate methods. The experiment was carried out in triplicates for each of the sample. The NAM plates were then incubated at 37°C for 24 hours and PDA plates were incubated at 26°C for 7 days. The total colony counts were determined on plate count agar (PCA) by spread plate method for bacteria and plates were incubated at 37°C and the colonies were counted after 48 hours of incubation.

**Purification of microorganism from juice:** Microorganisms were purified on Nutrient agar medium or Sabouraud dextrose agar medium at 37°C and at 26°C respectively for bacteria and fungi.

**Characterization of microorganisms:** Isolated strains were characterized on the basis of biochemical tests (Holt *et al.*, 1994).

### RESULTS AND DISCUSSION

Although fruit juices are potential for human health, but over their hygiene, safety and quality much concerns have been raised in present scenario. In local market as well as in home people only think about the nutritional benefits but not quality of the juice.

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Orange juice at suddhowala showed more microbial count as compared to premnagar, Dehradun. Total viable count of microorganisms in orange juice was variable in suddhowala and premnagar. In, suddhowala total viable count was 420 bacteria, 240 yeast and 60 mold but less total viable count of microorganism in orange juice which was collected at premnagar i.e. 200 bacteria, 145 yeast and 50 mold (Table 1). These strains were characterized on the basis of microscopy and biochemical tests. Results suggested that Orange juice collected at Suddhowala contained *Escherichia coli*, *Staphylococcus aureus*, *Saccharomyces cerevisiae* and *Penicillium sp.* but *Lactobacillus sp.*, *Salmonella sp.*, *Saccharomyces cerevisiae*, *Aspergillus niger* were isolated from Orange juice at Premnagar. Similarly, Aneja *et al.* (2014) examined 30 juice samples and isolated twenty-five microbial species including 9 bacterial isolates, 5 yeast isolates, and 11 mould isolates. *Aspergillus flavus* and

*Rhodotorula mucilaginosa* were observed in the maximum number of juice samples. Among bacteria *Bacillus cereus* and *Serratia* were dominant. *Escherichia coli* and *Staphylococcus aureus* were detected in few samples (Aneja *et al.*, 2014). Similarly, other report confirmed that Fruit juice contained various microorganisms (Raybaudi-Massilia *et al.*, 2009, Castillo *et al.*, 2016, Ogado *et al.*, 2016, Nma *et al.* 2017, Beuchat (1996), Beuchat, 2002), Brayant, 2007).

## CONCLUSION

Our results suggested that orange juice at local market contained various type of microbial contaminant. Such local juice shop keeper does not maintain hygienic condition and such contaminated orange juice can be harmful for human.

**Table 1.** Total viable count of freshly collected orange juice

Local Market at Dehradun		Microbial Count/ml		
Fruit juice	Place of sample collection	Bacteria	Yeast	Mold
Orange juice	Suddhowala	420	240	60
Orange juice	Premnagar	200	145	50

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