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Research Article

Microbiological Quality Assessment of Locally Produced Ice Balls

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Abstract

Ice balls are a famous ice product with sweetened syrup. From making ice in an ice factory to making ice balls, this ice gets exposed to many direct or indirect contact with microorganisms and contaminants. Multiple studies have proved that ice balls mainly serve as a potential source of several diseases. Contaminants got into the ice during manufacturing, storage, packaging, and dispensing of the ice. The most likely cause of ice contamination is poor handling and storage practices. Water that is used in the manufacturing of ice is mainly found to be contaminated with coliforms and sweetened syrup, which is not properly stored and thus contaminated through the fields. Pathogens like *Escherichia coli*, *Salmonella* spp., and *Klebsiella* spp., fungal strains like *Aspergillus* spp., *Candida* spp., *Fusarium* spp., *etc*., entered ice balls and caused gastrointestinal and other severe diseases, sometimes leading to death. Due to its severity, this study was conducted to assess the microbiological quality of locally produced ice balls sold in Wardha city. The sanitary conditions of the sites were also investigated.

Keywords: Contaminated, Pathogens, Disease, Ice balls, Infections.

1. Introduction

Foodborne sickness, particularly diarrheal disease, is a major concern in underdeveloped countries[1]. Pathogenic bacteria such as *Salmonella enterica*, entero-haemorrhagic *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus*, and *Listeria monocytogenes*, as well as viruses and fungal strains like *Aspergillus* spp., *Candida*, *Fusarium* etc cause this sickness. Despite several surveillance investigations, various types of foodborne bacteria have been detected from Thai raw food products[2-4] and several cases of outbreaks have been reported[5, 6].

During the summer, 'Ice Gola' is a popular street meal that is easily accessible. It is readily available in front of schools and along other roadsides, where it has caused widespread contamination and human intestinal diseases. Ice balls are made with crumpled ice, coated with colored syrup, and served in the shape of ball on a stick[7]. Ice balls, like other hawker fare, were served from pushcarts on the streets, where access to clean water and adequate food storage facilities were lacking[8]. To create a mouthwatering ice treat, you can use whatever flavor you choose or combine many flavors into a single Gola. This is a really tasty dessert dish that is made using ice and flavor-infused syrup. It is perfect for the intense summer heat.

Adulteration is the process of adding subpar ingredients or materials to a superior product, reducing its originality, nature, and taste as well as its color, smell, and nutritional value and endangering the consumers' health in the process. The last victim of these malpractices is a customer who unintentionally consumes contaminated food, which can result in major health issues like allergies and gastrointestinal disorders[9, 10]. The usage of tainted ice has been linked to many outbreaks of sickness, as per center for disease control and prevention. The selling of items like cold beverages and sweets, ice cream, and cut fruits that were contaminated with water and ice was primarily responsible for the spread of water-borne gastro-intestinal illnesses including cholera and typhoid[11]. The risk of infection was increased by manually preparing and eating ice balls[12]. Selling ice balls became less feasible as standards for food safety and hawker cleanliness evolved. Eaten in a bowl with a spoon, ice kachang gained popularity[8, 13, 14]. People may try to acquire water from anyplace during the summer months because of the heat and potential water shortage. Because of this, purification systems may be compromised, increasing the risk of water contamination from numerous bacteria that can cause water-borne sicknesses such typhoid, cholera, dysentery and diarrhoea. Other variables that contribute to the development of acute diarrhoea include eating ice cream, playing ice hockey, and consuming unclean food outside[15]. This study was carried out to evaluate the microbiological quality of locally made ice balls marketed in Wardha city because of its harshness.

2. Materials and Methods

After being gathered from various locations in Wardha City, 48 ice ball samples were placed in sterile stomacher bags and shipped in a thermally insulated package. H_2S media, which are frequently used to screen drinking water for faecal contamination, were prepared[16]. This study established a link between hydrogen-reducing microbes and the prevalence of coliform in drinking water. Before testing, the samples were left at room temperature for about ten minutes to partially defrost. The microbiological analysis started four hours post-sampling. The test relied on finding H_2S-producing bacteria in the water, such as intestinal anaerobes, *Proteus*, *Salmonella*, *Citrobacter*, and *Klebsiella*. 20 ml of frozen gola sample were added to bottles with pre-sterilized H_2S media in order to conduct the test.

Total no. of collected samples	Non- contaminated samples	Contaminated samples	Contaminated samples		
			E. coli	*Salmonella* spp.	*Citrobacter* spp.
48	**00**	**48**	**19**	**12**	**17**

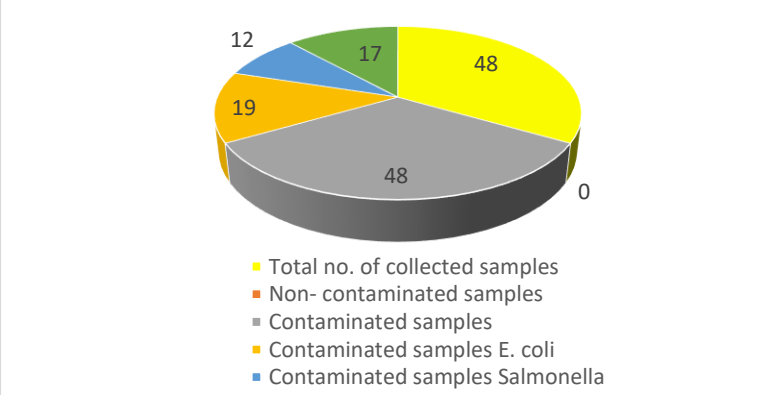

Fig 1: Microbiological analysis of Ice balls

The color shifted to black after incubation for 24 to 48 hours at 28 to 30 °C. This suggests faecal contamination in the samples, which is one of the main causes of many human disorders.

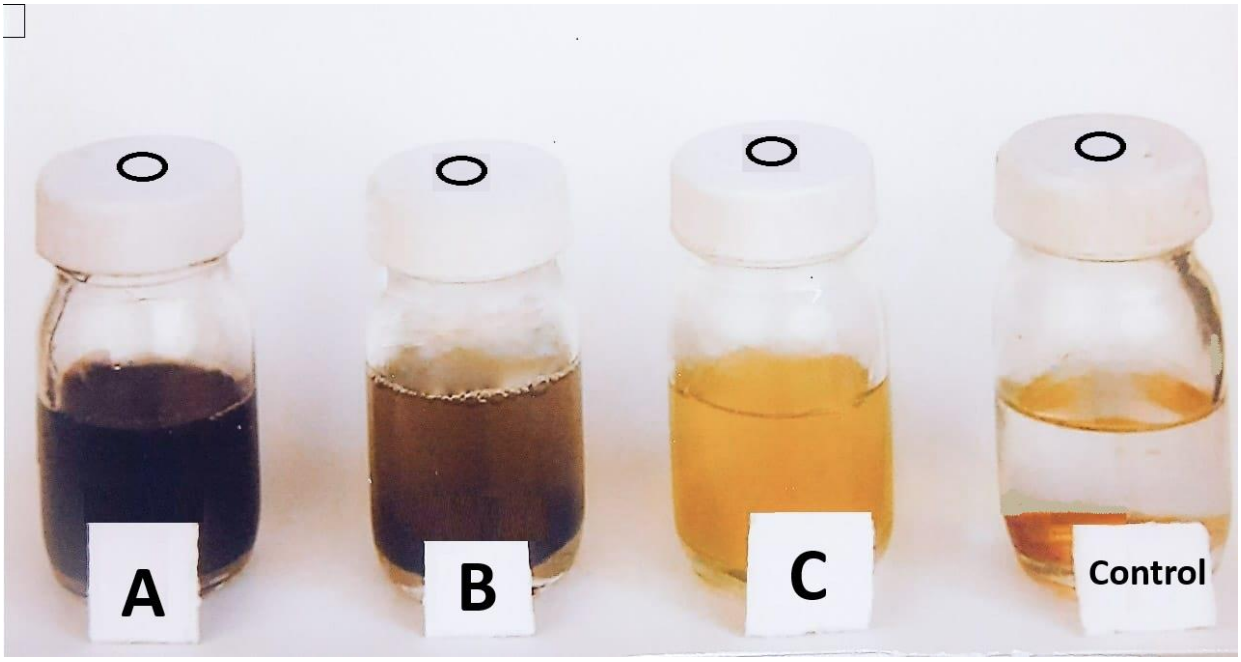

Fig 2: After Incubation results shown in test bottles (A: *Salmonella*; B: *Citrobacter*; C. *E. coli*, and Control)

3. Results and Discussion

There are numbers of reports available about Ice balls contamination. These items are mostly consumed by children results into enteric infection in human being. To verify the reports, attempts were made for microbial analysis of various samples available in Wardha city. Table 1 and Figure 2 below illustrates the analysis of 48 samples. It was discovered that, during a 24-48-hour incubation period at 28–30 °C, 19 of the 48 samples were disease-ridden with *E. coli*, 12 with *Salmonella* spp., and 17 with *Citrobacter* spp. Which indicates the unhygienic procedure of ice making and handling which made it contaminated with pathogenic organisms a chief source of human infection.

4. Conclusions

The microbiological quality of the ice that is prepared and served continues to be a cause for worry, according to the findings. Hygiene standards must be followed. Enhancing knowledge and alertness regarding the possibility of ice becoming contaminated with food-borne pathogens and providing guidance on doable steps to reduce the risk of contamination are two ways to achieve this. As a result, to prevent serious infections, take all appropriate hygiene measures before consuming the ice balls.

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Conflict of interest

Author declares that there are no conflicts of interest.

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