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Bacteriological Examination of Ice and its Health Significance

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ABSTRACT

Ice is widely used in catering and retail premises to cool drinks and food on display. Ice products are often used in street foods and are consumed by most people, especially in tropical countries. Ice suspension taken out 1 ml suspension of 1:10 dilution and transferred on the selective media aseptically for the isolation of the pathogen of Salmonella typhi, Staphylococcus aureus and Escherichia coli by standard plate count method (SPC). The attempt was made to analyze the microbial quality of ice sold in Chikhli market. The presence bacterial pathogen is alarming need to follow safety regulations regarding the public health and hygiene. . Ice is sometimes contaminated with pathogenic microorganisms where a contaminated water source is used in its production or where there are lapses in hygiene in their handling.

Keywords: Ice Suspension, Standard Plate Count Method And Bacterial Pathogen.

I. INTRODUCTION

Ice is widely used in catering and retail premises to cool drinks and food on display. Potable water should be used to prepare ice for consumption, and it should be free of coliforms, Escherichia coli, and enterococci. If used under hygienic conditions as a coolant for drinks, ice should remain of high microbiological quality. If hygienic practices are not maintained, ice can become contaminated with pathogenic and environmental microorganisms, especially when served from an open container. Ready-to-eat ice sampled at the point of sale is likely to be of lower microbiological quality than that of potable water, but it should be free of coliforms, E. coli, or enterococci in 100ml[1].

Ice products are often used in street foods and are consumed by most people, especially in tropical countries such as Indonesia. Microbial infections acquired from contaminated ice are not uncommon and have been reported for Escherichia coli O157 : H7, Legionella pneumophila, Salmonella enteritidis and Norwalk-like virus[2-4]. A significant number of cholera cases are due to consumption of contaminated water rather than personto- person transmission[5] (Schild et al., 2008).

Advice has been provided and guidelines proposed on the maintenance of hospital ice-making machines to prevent infection. This includes careful choice of and installation of machines, regular weekly cleaning and sanitization with a hypochlorite solution, regular hand washing for ice handlers, and the use of ice scoops with smooth, impervious surfaces[5] (Gordon et al., 2000).

II. MATERIALS AND METHODS

Ice samples were collected from local market of Chikhli town. Ice samples were sealed packed in bottles and analyzed within 2 hrs of collection. Bacteriological analysis of ice collected sample was analyzed for bacteriological studies. The bacteriological analysis of ice samples was carried out for the total counts of bacteria, yeast and moulds by using standard plate count methods. Ice water suspension taken out 1 ml suspension of 1:10 dilution and transferred on the selective media aseptically for

the isolation of the pathogen of Salmonella typhi, Staphylococcus aureus and Escherichia coli by standard plate count method (SPC). The suspension inoculated on the Eosin Methylene Blue agar, Mannitol salt agar, Bismuth Sulphide agar (BSA) and Potato Dextrose agar. And at last all plates kept into the incubator for the incubation period at 37temperature for 24 hours and observe the colonies next day and count[6]. The isolate of bacteria is characterized and identified according to Bergey's manual of determinative bacteriology[7,8].

III. RESULTS AND DISCUSSION

Edible ice is one of the delicious that chilled the drinks that enjoy a wide popularity during the summer season of the year throughout the country. The main problem associated with fresh edible ice is its short life and heat sensitivity. Therefore, the attempt was made to analyze the microbial quality of edible ice sold in Chikhli market. The maximum count of bacteria was recorded in edible ice from golawala S-1 samples and count was 38093 cfu/gm. While the lowest count of bacteria was reported in S-2 sample i.e. 28960 cfu/gm which was shown in figure 4.1.

Figure 4.1 Total viable count of bacteria in edible ice from golawala.

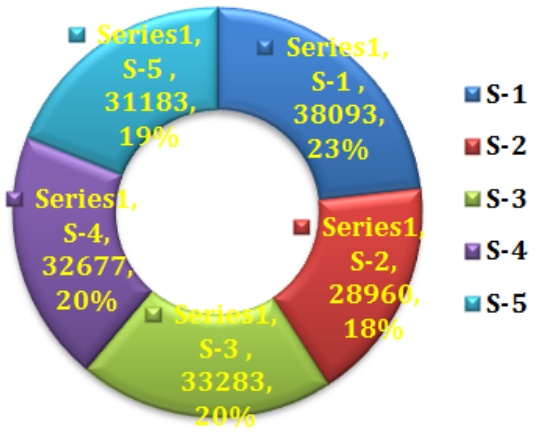
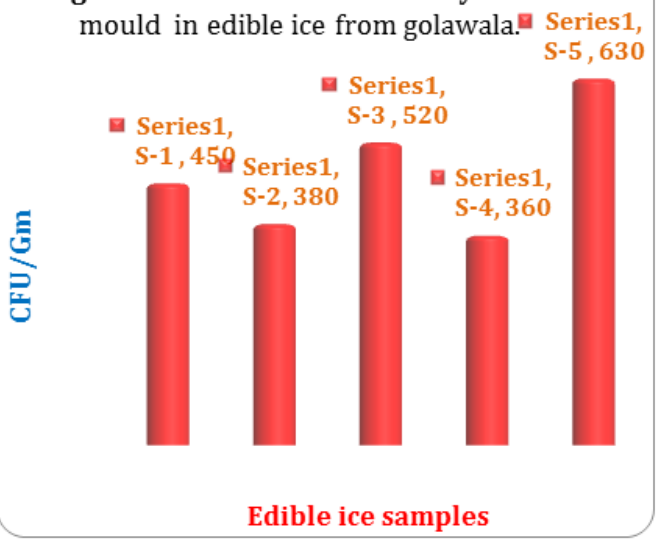
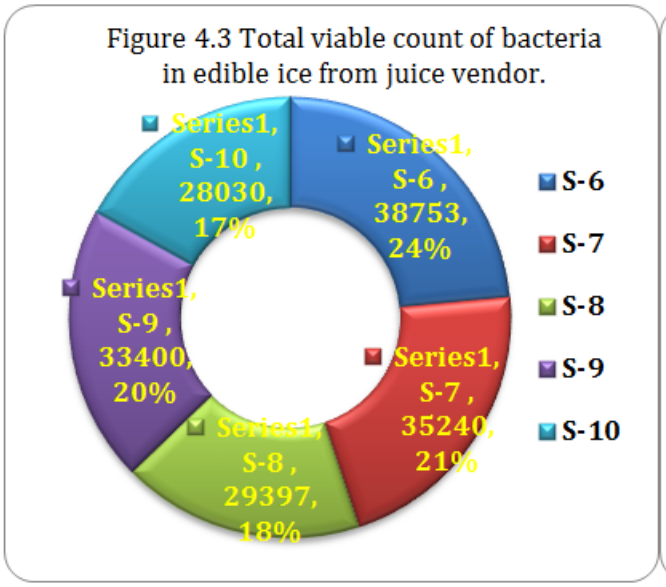
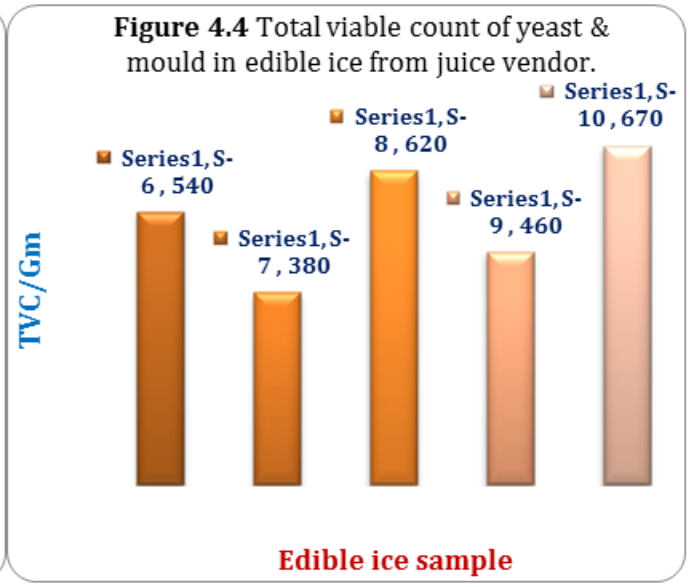


Figure 4.2 Total viable count of yeast & mould in edible ice from golawala.



The maximum count of yeast and mould was recorded in S-5 sample of edible ice from golawala. The count was 630 cfu/gm. While the lowest count of yeast and mould was reported in S-4 sample i.e. 360 cfu/gm which was shown in fig. 4.2. The ice samples were analysed for total viable count of bacteria and yeast & mould. The ice samples were collected from juice vendors of Chikhli market. The maximum count of bacteria was recorded in sugarcane juice without ice S-6 samples. The count was 38753 cfu/gm. The lowest count of bacteria was reported in S-10 sample i.e. 28030 cfu/gm which was shown in fig. 4.3. The maximum count of yeast and mould was recorded in S-10 samples. The count was 670 cfu/gm. While the lowest count of yeast and mould was reported in S-7 sample i.e. 380 cfu/gm of sugarcane juice without ice which was shown in figure 4.4.





The pathogenic bacteria were isolated on the selective media. The major four pathogens were analyzed for the presence on soups samples. These pathogens had such as *S. typhi*, *S.aureus, P. aeruginosa* and *E.coli*. E.coli was present of the given Chinese food sample. The fecal coliform was present in the collected samples of Chinese foods. The four pathogens were present Chinese food. From the positive MacConkey broth tubes, It was observed that Chinese food sample S-1, S-4, and S-8 were shown presence of *E. coli*. It was observed that soup sample S-3 and S-7 were shown presence of *S. typhi*. While, Chinese food sample S-1, S-5 and S-8 were shown presence of *S.aureus*. Chinese food sample S-2 and S-6 were shown presence of *P. aeruginosa*.

Similarly, Moreira and Bondelin reported that safe drinking water and waterborne outbreaks. The main causes for contamination were: for groundwater, intrusion of animal faeces or wastewater due to heavy rain; in surface water, discharge of wastewater into the water source and increased turbidity and color; at treatment plants, malfunctioning of the disinfection equipment; and for distribution systems, cross-connections, pipe breaks and wastewater intrusion into the network[9]. Stephanie and co-worker observed that microbiological quality of packaged ice from various sources in Georgia. This study determined the microbiological and chemical quality of ice produced and bagged on premises in retail establishments and in free-standing self-service ice vending machines in the state of Georgia and compared the results with that from ice produced by manufacturing companies monitored by the International Packaged Ice Association. Thirty-seven percent of these samples contained an unsatisfactory level of coliforms, 1% contained nonpathogenic *E. coli*, and 13% contained *Enterococci*. One sample tested positive for the presence of *Salmonella* and another tested positive for *Enterobacter agglomerans*. Ninety-five samples of packaged ice from retail establishments and vending machines (38%) had pH levels outside the acceptable range that can affect product flavor. Turbidity of three samples exceeded the acceptable level[10].

IV. CONCLUSION

Microbiological quality of ice used in food establishments. The ice used in the food industry has to be safe and the water used in ice production should have the quality of drinking water. The consumption of contaminated ice directly or indirectly may be a vehicle for transmission of pathogenic bacteria to humans producing outbreaks of gastrointestinal

diseases. Ice is sometimes contaminated with pathogenic microorganisms where a contaminated water source is used in its production or where there are lapses in hygiene in their handling.

V. REFERENCES

[1]. Wilson, I. G., G. M. Hogg, and J. G. Barr. 1997. Microbiological quality of ice in hospital and community. J. Hospital Infect. 36:171–180.

[2]. Kim, J. K. & Harrison, M. A. (2008). Transfer of Escherichia coli O157 :H7 to romaine lettuce due to contact water from melting ice. J Food Prot, 71, 252–256.

[3]. Seo, K. H., Valentin-Bon, I. E. & Brackett, R. E. (2006). Detection and enumeration of Salmonella enteritidis in homemade ice cream associated with an outbreak: comparison of conventional and realtime PCR methods. J Food Prot, 69, 639–643.

[4]. Boccia, D., Tozzi, A. E., Cotter, B., Rizzo, C., Russo, T., Buttinelli, G., Caprioli, A., Marziano, M. L. & Ruggeri, F. M. (2002). Waterborne outbreak of Norwalk-like virus gastroenteritis at a tourist resort, Italy. Emerg Infect Dis, 8, 563–568.

[5]. Gordon Nichols, Iain Gillespie, and John De Louvois (2000). The Microbiological Quality of Ice Used to Cool Drinks and Ready-to-Eat Food from Retail and Catering Premises in the United Kingdom. Journal of Food Protection, Vol. 63, No. 1, 2000, Pages 78–82.

[6]. Collins C.H. and Patricia M. Lyne (1980). Microbiological Methods. Butterworth World Student Reprint, London.

[7]. Olajuyigbe, Folasade M and Joshuao Ajele (2005). Production dynamics of extracellular protease from Bacillus species. African J. Biotechnol. 4(8):776-779.

[8]. Holt. G.J., Noel Krieg R., Peter Sneath H.A., James Stanley and Williams T. (1994). Bergy's manual of determinative bacteriology, ninth edition, 559-561.

[9]. Moreira, N. A. and M. Bondelind (2017). Safe drinking water and waterborne outbreaks. J. of Water and Health, 15 (1) 83-96.

[10]. Stephanie L. Mako, Mark A. Harrison, Vijendra Sharma, and Fanbin Kong (2014) microbiological quality of packaged ice from various sources in Georgia. Journal of Food Protection: 77 (9): 1546-1553.