An assessment of sanitary conditions and microbial quality of ice factories in selected districts of Sri Lanka

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Ice is crucial for maintaining the freshness and quality of seafood. However, when produced or handled under poor sanitary conditions, ice can carry harmful microorganisms, creating risks to food safety and public health. This study aimed to assess the microbial quality of ice produced in 28 ice plants across eight districts: Galle, Matara, Hambantota, Trincomalee, Anuradhapura, Mannar, Batticaloa, and Jaffna. The sample collection was conducted over 2 months from July to August 2025. Samples were collected from three points in each factory: source water used for ice production, stored block ice, and crushed ice to identify contamination sources or points/steps at different production stages. Microbial analysis was conducted to detect *Escherichia coli* (SLS 1461 Part 1/Sec.3:2013) and *Salmonella* (ISO 19250:2010). The results showed that all three samples taken from the production lines of four ice plants had an acceptable microbial quality, as indicated by 14.29 % (4/28) of the samples meeting the standards outlined in SLS 971:1992 for potable water. A number of 28 ice plants indicated that 85.71 % (24/28) were unacceptable in quality due to the presence of *E. coli*. Among these 24 plants, the water used for ice production in 14 facilities contained faecal coliforms with a mean of 144.96 MPN/100 mL and a median of 9.5 MPN/100 mL, and in the range of 1 to >1,800 MPN/100 mL, and 13 facilities exhibited the presence of *E. coli* contamination with a mean of 22 MPN/100 mL and a median of 2 MPN/100 mL, and in the range of 1 to 1,600 MPN/100 mL. Stored ice of 20 plants contained faecal coliforms between 1 to 350 MPN/100 mL range, and the mean of faecal coliform count was 86.08 MPN/100 mL, and median 15 MPN/100 mL, and 17 plants detected *E. coli* (1 to 275 MPN/100 mL), with a mean and median of 33.08 MPN/100 mL and 9 MPN/100 mL. All crushed ice samples were contaminated with faecal coliforms (1 to 1,600 MPN/100 mL), and the mean was 268.21 MPN/100 mL, and the median was 17 MPN/100 mL, with *E. coli* present in 21 facilities (1 to 1,600 MPN/100 mL), and the mean was 163.38 MPN/100 mL, and the median was 13 MPN/100 mL. All samples were free from *Salmonella*. The study highlights increasing contamination through production stages, linked to poor sanitation facilities and handling practices. Continuous staff training, adoption of good manufacturing practices, and regular monitoring of ice quality are strongly recommended.

Keywords: Ice plants, Microbiological quality, *Escherichia coli*, Faecal coliforms, *Salmonella*

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