



Effect of Storage Conditions on *Staphylococcus aureus* Found in Giant Freshwater Prawn

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Ensuring microbial safety of the commercially important giant freshwater prawn (GFP), *Macrobrachium rosenbergii*, is crucial given its rising commercial value and sensitivity to postharvest handling conditions. *Staphylococcus aureus* is a major foodborne pathogen of concern in crustaceans; however, its behaviour under different storage conditions remains poorly understood. This study examined the growth of naturally contaminated *S. aureus* on GFP stored under three standard postharvest methods. A total of 72 fresh male prawns (average weight, 440 ± 38 g; length, 30 ± 4 cm) from the Ridiyagama Reservoir, Sri Lanka, were transported under chilled conditions and randomly assigned to three treatments (n=24 per treatment): (i) ice storage (1:1, w/w), (ii) freezing at -20°C , and (iii) blast freezing at -35°C followed by storage at -20°C . Microbiological counts were performed at three-day intervals from day 0 to day 21, following ISO standard procedures, with analyses performed in triplicate at each time point. The initial (day 0) *S. aureus* count in GFP was 269 ± 63 CFU/g. *S. aureus* showed significantly different survival patterns ($p < 0.05$) across the three storage methods. Ice-stored samples exhibited continuous and substantial growth, reaching a $3,977 \pm 440\%$ increase by day 21, with three distinct proliferation phases: a gradual increase during days 0–9 ($83 \pm 19\%$), a moderate rise from days 9–15 ($575 \pm 76\%$), and a sharp escalation during days 15–21, resulting in a net increase of 3,402% in the final phase. Conversely, freezing at -20°C led to a gradual decline in *S. aureus* counts ($56 \pm 4\%$ of initial levels by day 21), whereas blast-freezing resulted in the greatest reduction, with counts at $28 \pm 5\%$ of the initial level. Prawns stored on ice exceeded international microbial limits after day 12, whereas both frozen treatments remained within regulatory limits established by the European Union (EU), Asian, and Oceania standards throughout the storage period. These results indicate that ice storage promotes *S. aureus* growth due to favourable conditions, whereas freezing, particularly blast freezing, decreases the pathogen's persistence. Rapid freezing thus provides superior microbial safety for GFP and should be prioritised in postharvest handling systems to uphold product quality and compliance with international standards.

Keywords: Food-borne pathogens, Frozen seafood safety, Giant freshwater prawn, *Staphylococcus aureus*, Storage temperature