Improving the quality of whole frozen Bombay duck (*Harpodon nehereus*)

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Drying is the only processing method adopted since long time by processors and fishermen to preserve the fish on commercial scale. Freezing is one of the best methods of preserving the fish for maintaining quality and its natural delicate attributes (Boonsumrej *et al.*, 2007). The quality changes in frozen samples can be minimized to a greater extent by adopting additional treatments like glazing, packaging, pre-treatments like salt dip etc. Bombay duck being a moisture-rich species, has a delicate jelly texture and the texture may get affected on freezing and further storage. Hence, an attempt was carried out to derive the best freezing and dip treatment

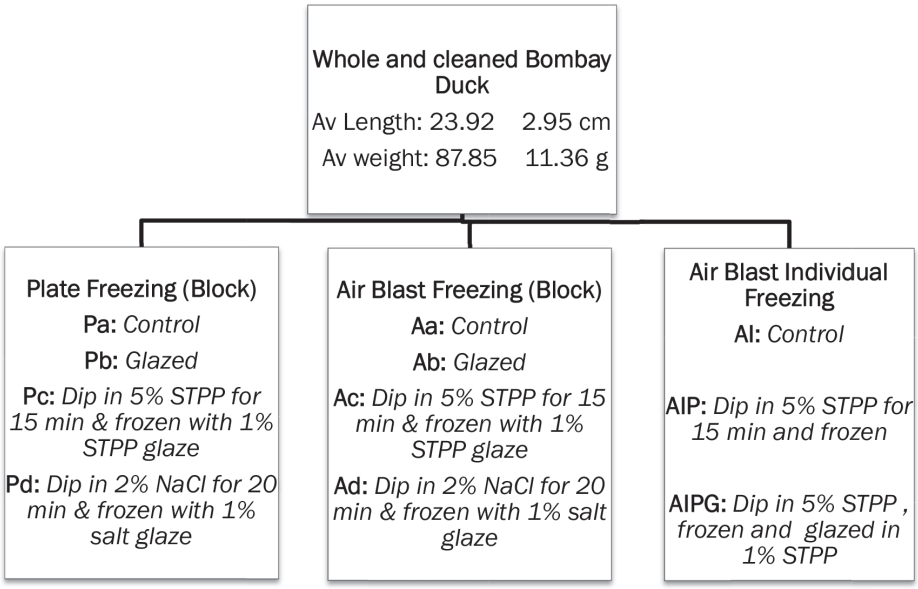

Fig. 1. Different freezing methods and treatments adopted for Bombay duck

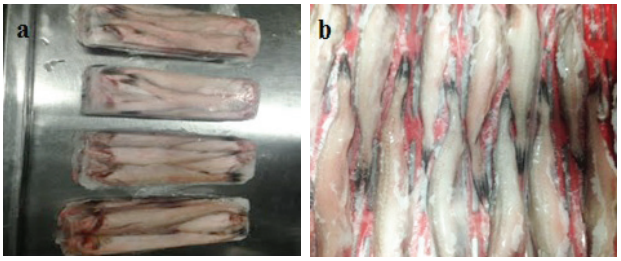

Fig. 2. a - Plate frozen Bombay duck, b - Air blast individually frozen Bombay duck

combinations that can be adopted to retain its prime quality during subsequent storage (Fig. 1 and 2).

Frozen samples were further stored at -20 °C and were subjected to physical, sensory, biochemical and microbiological evaluation every month for a period up to six months.

Salt content (NaCl) of fresh sample was 0.47% which increased to 0.52% after dip treatment with 2% NaCl solution. The salt content in the samples registered a lower value of 0.48% on 6th month of frozen storage. Similarly the phosphate content of fresh sample was 0.22% which increased to 0.34% on subjecting it to 5% STPP dip. The value further decreased to 0.32% towards the final month of storage. Initial TPC of Bombay duck was observed to be 3 $\log_{10}$ which on frozen storage for six months got increased by one log cycle in plate

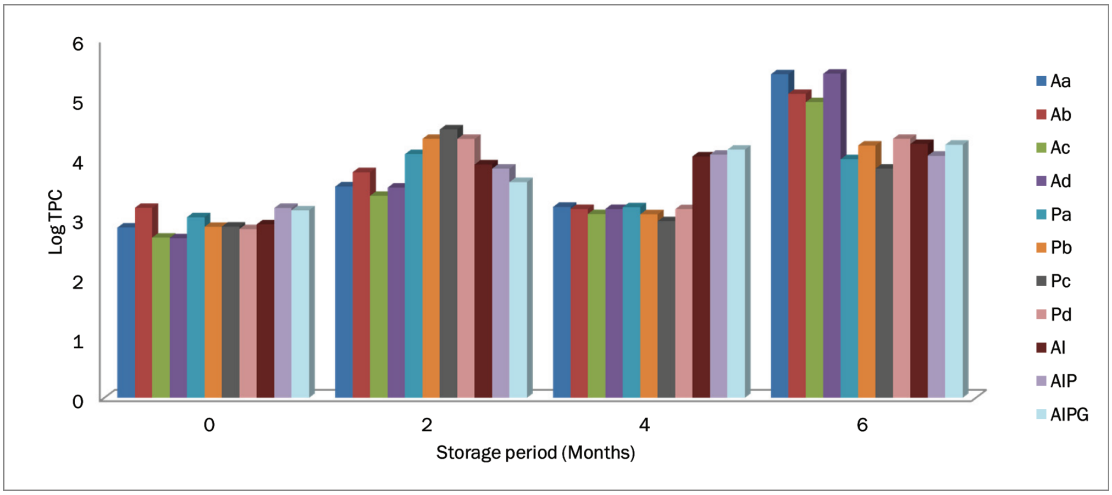

Fig. 3. Variations in TPC of frozen whole Bombay duck samples stored at -20 °C

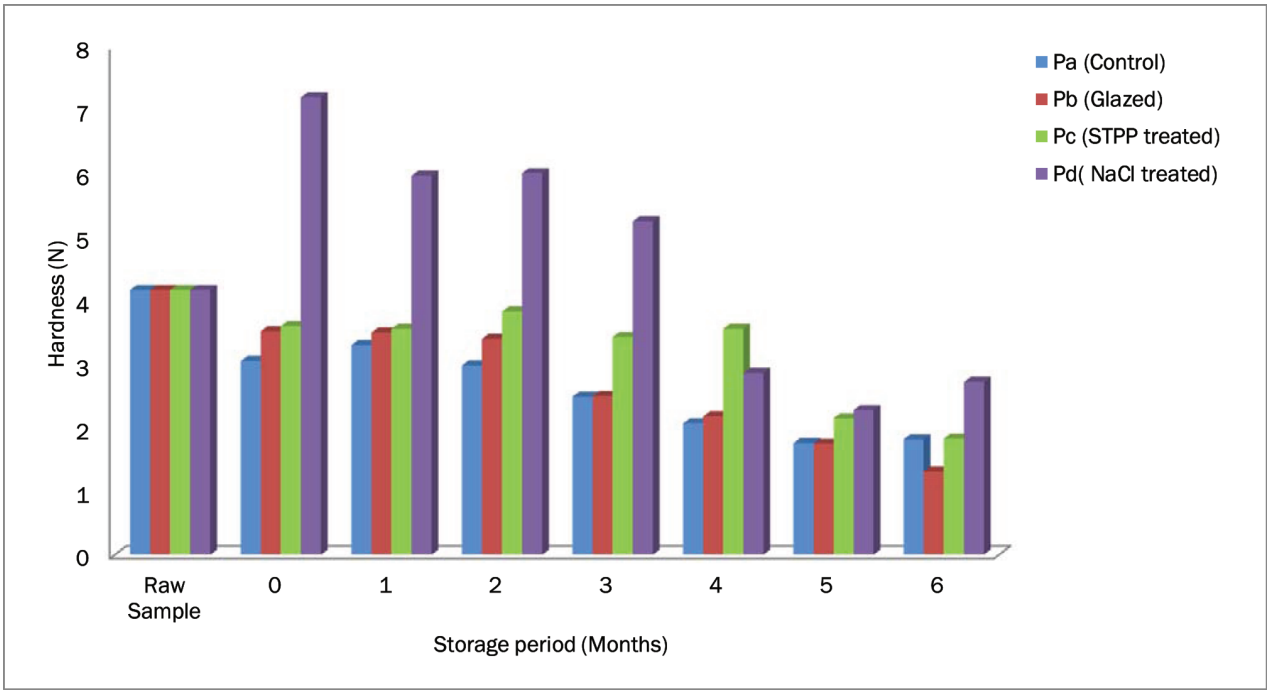

Fig. 4. Variations in hardness of plate frozen whole Bombay duck samples stored at -20 °C

frozen and air blast individually frozen samples and two log cycles in air blast block frozen samples (Fig. 3).

Texture of Bombay duck, as indicated by hardness value was found to be better in plate frozen samples compared to air blasted ones. It decreased from 4.17N in raw Bombay duck samples to an average value of 1.21, 1.23 and 1.82 N in air blast block frozen, air blast individual frozen and plate frozen samples, respectively towards the end of storage period. Radhakrishnan *et al*. (1973) reported a loss of textural characteristics in block frozen dressed Bombay duck samples after three months of frozen storage. Additional treatments like glazing and salt treatments was observed to have a positive effect on the texture of the sample. Additionally, it was noted that NaCl treated samples exhibited a hardened texture compared to raw sample (Fig. 4).

Free drip and expressible moisture content were higher for individually frozen air blast samples compared to air blast block frozen and plate frozen samples. Salt treatment as well as glazing of samples showed comparatively lower free drip and expressible moisture contents compared to their respective controls. Similar observations of reduced drip loss were reported by Goncalves *et al*. (2008) in phosphate treated pink cuskeel and searobin fillets. Biochemical, textural and microbiological analysis inferred plate freezing as better method for freezing of whole Bombay duck and additional treatments like glazing and salt dip enhanced the quality of the samples.

References

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