

Optimization of Processing Conditions to Develop Salt Fermented Herring (*Amblygaster sirm*) by Preserving its Sensory Qualities

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Herring (*Amblygaster sirm*), an underutilised fatty fish, has good potential for developing new food products due to its high Ω -3 fatty acid and vitamin D contents. Salting is a traditional preservation technique, which is practiced to ferment fish to develop different products. However, most such products are poor in sensory attributes compared to fresh fish. Therefore, this study was carried out to identify a new process to develop salt fermented herring while preserving its sensory qualities present in fresh fish. Initially, herrings were salted at three different fish to salt ratios (3:1, 4:1 and 5:1) and stored at $4 \pm 1^\circ\text{C}$ or ambient temperature ($28\text{-}30^\circ\text{C}$) up to 48 h under light proof conditions. At 24 h intervals samples were analysed for sensory attributes (colour, odour, texture, taste and overall acceptability) using a 9-point hedonic scale by employing 30 untrained panelists. Herrings treated with 4:1 ratio were significantly ($p < 0.05$) different from the other two treatments with respect to all tested sensory attributes. Moreover, salted herrings (4:1) stored for 48 h had significantly ($p < 0.05$) favourable sensory attributes compared to those salted fish stored for 24 h. Therefore, 4:1 fish to salt ratio was selected for further processing based on sensory attributes and analysed for physico-chemical properties. It was observed that, total volatile basic nitrogen (TVB-N), lipid oxidation and histamine levels were far below the recommended maximum levels. The salted herrings (4:1) were stored in two different brine solutions (75% or saturated) at $4 \pm 1^\circ\text{C}$ or ambient temperature for the fermentation process. At weekly intervals, samples were tested for TVB-N content, histamine content, lipid oxidation and sensory attributes. There were no significant ($p > 0.05$) differences observed in the above parameters under both storage conditions up to one month of storage. The levels of TVB-N, histamine and lipid oxidation gradually increased in salted fish stored in 75% brine solution and sensory attributes became gradually unacceptable, by the seventh week post-storage at both temperatures tested. However, in salted herrings (4:1) stored in saturated brine solution, the above parameters did not change significantly ($p > 0.05$) and remained at acceptable levels. Therefore, results of this study confirm that the salt fermentation of herrings at 4:1 ratio for 48 h followed by storage in saturated brine solution can be used to preserve them at least for three months without affecting their sensory qualities.