

Postharvest treatments of marine cultured fish for quality preservation and shelf life extension



Ntzimani Athina¹, Semenoglou Ioanna¹, Kardamila Eleni¹, Tsironi Theofania^{1,2}, Taoukis Petros¹

¹School of Chemical Engineering, National Technical University of Athens, Greece (ntzimani@chemeng.ntua.gr)
² Laboratory of Food Process Engineering, Department of Food Science and Human Nutrition, Agricultural University of Athens, Athens, Greece

Slarry 🛐 Fish

Introduction:

The short shelf life and perishability of fish products is a commercial drawback and methods of extension of the shelf life are being investigated. New minimal and nonthermal food processing methods are sought by the industry in the pursuit of producing better quality fish products with extended shelf life with retention of nutritional and sensory properties (Tsironi et al., 2019; Tsironi and Taoukis, 2019). Several studies have been conducted recently on the efficacy of washing and sanitizing treatments in reducing microbial populations on food products. Limited work on the effect on fish has been published and no industrial scaling-up has been reported (Thi et al., 2015).



Results:

Microbial growth during subsequent refrigerated storage of untreated (Control) and treated fish was modeled using the Baranyi Growth Model (Figures 1, 2, 3). Limit of sensory shelf life of gutted fish (score 5 by the sensory panel for overall impression) coincided with a level of 10⁶ cfu/g of *Pseudomonas* spp. for whole and gutted samples and of 10⁷ cfu/g of TVC for fillets stored at 0° C (Tsironi et al., 2019).



Evaluation of the effect of slurry ice as alternative cooling medium for fish

TVC, *Pseudomonas* spp. and H₂S-producing bacteria counts increased during storage, whereas *Brochothrix thermosphacta*, yeasts/molds (<2.0 log CFU/g) and *Enterobacteriaceae* (<1.0 log CFU/g) remained below the detection limit during the 33-day storage period. Initial counts of TVC, *Pseudomonas* spp. and H₂S-producing bacteria were low and comparable with those reported in the literature for fresh fish stored aerobically (Tsironi et al., 2019).

Slurry ice delayed the growth of both *Pseudomonas* spp. and H₂Sproducing bacteria leading to better control of microbial growth as compared with conventional ice.



Figure 2: *Pseudomonas* spp. (log cfu/g) in gutted sea bass after surface washing with citric acid (200ppm for 10min or Water and Control during storage at 0°C.

Evaluation of citric acid aquatic solution as an alternative washing medium for fish

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Figure 3: TVCs (log cfu/g) in filleted sea bass after surface washing with citric acid (7500ppm for 10min), Water and Control during storage at 0°C. Initial surface decontamination (up to 2.0 logcfu/g for total viable count, *Pseudomonas* spp. and *Enterobacteriaceae* spp.) by the addition of organic acids in the washing water was observed (Figures 2, 3).

Decreased microbial load and growth rates were achieved at higher washing solution concentrations and longer treatments.

Higher reduction of the initial microbial load was observed after treatment with citric acid for TVC, *Pseudomonas* spp. and H₂S-producing bacteria as compared to the rest of the microorganisms tested.

References

- Replacement of conventional flake ice with slurry ice resulted in improved quality and microbial stability during refrigerated storage, resulting in 2-6 days shelf life extension of whole sea bass stored at 0 °C, without affecting the sensory properties of the product, whereas,
- □ initial surface decontamination up to 2.0 logcfu/g by the addition of citric acid in the washing water, resulted in 2-4 days shelf life extension of gutted and filleted samples at 0°C.

The systematic evaluation of the effect of harvesting, processing and transportation conditions on the quality and shelf life of fish may provide technological solutions for fish handling to improve quality and shelf life of fresh fish and reduce food losses during distribution and storage from harvesting up to the consumer level.

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Acknowledgment

Conclusions:

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