



MOL2NET, International Conference Series on Multidisciplinary Sciences
06. MODECO-05: Molec. Diversity & Ecosystems, Puyo, Ecuador-Porto, Portugal-Paris,
France, EPA, USA, 2020

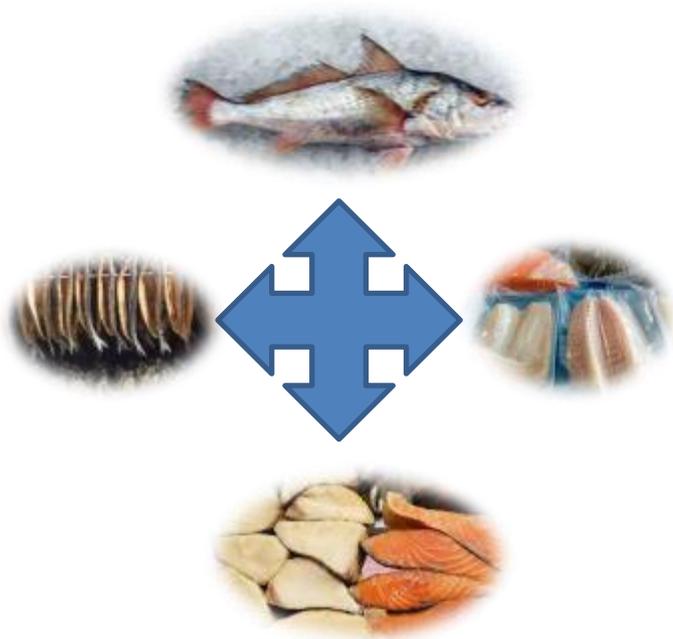
Conservation techniques for fishery products from the Ecuadorian Amazon: A bibliographic review

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Graphical Abstract



Abstract

Amazonian fishery products constitute an indispensable component in the food security of the Amazonian peoples of Ecuador. This review work analyzes the main conservation techniques that guarantee the quality and safety of Amazonian fishery products that have a relatively short shelf life, several investigations have shown the use of different conservation technologies (freezing, salting, smoking, vacuum packed) applied in the area capable of extending the post-mortem shelf life of fishery products. Freezing processes have a better capacity to extend the useful life of fishery products compared to conventional cooling, however, artisanal fishing is practiced in this area and an effective cold chain is not guaranteed. Vacuum packaging has great potential for packaging fresh fish products. The use of non-thermal technologies, such as the traditional salting and smoking of native peoples, is an alternative for the conservation of local fishery products.

Key words: Food safety, post-mortem, freezing, salting, smoking, Amazonian fishery products.

Introduction

Fishery products are perishable due to their high-water content, high amounts of small molecules and neutral pH, providing a perfect medium for bacterial and biochemical deterioration (Liu et al., 2014). Post-death, degradation begins through 4 stages that include pre-rigor, rigor mortis, resolution of mortis,

and autolysis and deterioration. The time elapsed between death and rot depends on several factors such as: species, size, feeding, method of capture, handling and, fundamentally, storage temperature. These factors jointly determine or affect the degradation quality of fishery products during post-mortem storage.

To provide quality fish products with a longer shelf life, several conservation technologies have been developed, including; supercooling (Liu et al., 2013), high hydrostatic pressure, modified atmosphere packaging, active packaging, irradiation and edible coatings.

On the other hand, freezing processes have a better capacity to extend the useful life of fishery products compared to conventional cooling, however, the biggest drawback is the limitation of Ecuadorian artisanal fishing in which an effective chain is not guaranteed of cold. Vacuum packaging has great potential for packaging fresh seafood. The use of non-thermal technologies, such as salting, constitutes an ancestral practice of conservation of Amazonian fishery products, in this process putrefactive bacteria are inactivated and has little effect on the flavor and nutritional quality of the product. Finally, the conservation technique combined with traditional salting and smoking of the native peoples is an alternative for the conservation of fishery products in the conditions of the original peoples of Ecuador.

This review work analyzes the main conservation techniques that guarantee the quality and safety of Amazonian fishery products that have a relatively short shelf life, several investigations have shown the use of different conservation technologies (freezing, salting, smoking, vacuum packed) applied in the area capable of extending the post-mortem shelf life of fishery products.

Materials and Methods

This research was bibliographic in which information regarding conservation techniques (freezing, salting, smoking, vacuum packaging) of Amazonian fisheries resources of Ecuador was collected.

Results and Discussion

Freezing

Oliveira et al. (2015) measured the sensory, physical-chemical and microbiological changes that occurred in samples stored at ($2 \pm 1^\circ\text{C}$), the results showed that the shelf life for consumption, according to the sensory evaluation, was 27 ± 0.5 days on ice, and 0 (CFU/g).

Vacuum packed

Suarez et al. (2008) evaluated a new technology to mitigate the presence of thorns in vacuum packed white cachama fillets, stored for 30 days at (0.5°C) obtaining values of 39.36 for Total Volatile Basic Nitrogen; 6.22 pH; and 3.3% moisture loss.

Salty

the surplus of Amazonian fish is captured, gutted and subjected to conservation by adding salt, this causes a penetration of NaCl into the muscle of the fish and a loss of water through dehydration. There are variations according to the time required to preserve the weight. Thus, working with 100 kg of fish, 50 kg of salt is used for a duration of four months, 40 kg for three months, and 25 kg for two months or less.

Smoked and salty

Is a traditional food preservation technique that combines the effects of salting, impregnation of smoke components and drying, with this process both flavor and color characteristics that are appreciated by the consumer are achieved. In salting with brines, two fluxes are generated simultaneously: salt that

diffuses from the brine to the fish and water that diffuses from the fish to the brine, due to differences in concentration and osmotic pressure between the internal cells of the fish and the brine.

Conclusions

The use of non-thermal technologies, such as the traditional salting and smoking of native peoples, is an alternative for the conservation of local fishery products.

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