



# Using Ice to Extend Shelf Life of Raw Catfish for Processors



**T**HE MOVE OF SILURIFORMES (INCLUDING CATFISH) INSPECTION to the U.S. Department of Agriculture’s Food Safety and Inspection Service (USDA/FSIS) has presented challenges to the wild catfish industry. Facilities processing catfish are limited to inspection during a 40-hour week (Monday-Friday) at no cost, but must pay for inspection during overtime, holidays, and weekends. This has forced facilities to reduce the number of days and the pounds of fish they process, which limits fishing days for fishermen.

However, USDA regulations do allow processors to receive, store, and ship catfish outside of inspection hours. The key, according to recent research by Louisiana Sea Grant, is to extend the shelf life of catfish by the proper use of ice during storage before processing.

In addition, *Pseudomonas*, a recognized spoilage microorganism in seafood, showed higher counts for not iced fish. By day one, fish without ice had 1,000s of colonies of *Pseudomonas* per gram of fish, while iced fish only had 100s of colonies per gram. By day four, fish without ice had 100,000s of colonies per gram, while iced fish stayed the same. Any increase in *Pseudomonas* levels equals an increase in spoilage.

## RESEARCH

All fish used in the study were iced on the boat and purchased from a local fish market within 12 hours of harvesting. For the experiment, there were four groups: iced whole (not gutted) and gutted catfish (flake ice at a 1:2 fish to ice ratio) were compared to gutted and whole (not gutted) fish that were not iced. All fish were observed for four days and stored in a walk-in cooler.

The presence of bacteria was evaluated for four days, and microbial analysis included Aerobic Plate Count (APC; a common measurement of bacteria), common food spoilage and pathogen microorganisms (e.g. *Enterobacteriaceae*, *Pseudomonas*, *Staphylococcus aureus*), yeast, and mold.

The bacteria levels did not really change between gutted and whole fish; however, fish without ice reached unsafe levels after one day of storage while the iced fish remained at a safe level all four days (Figure 1).

## RECOMMENDATIONS

What does this mean for the industry? If fish are properly iced from harvesting, a fish house can store whole fish for four days without compromising fish quality and safety. But the following handling practices must be followed:

- Fish must be iced on the boat, during storage, and for transport at a 1:2 fish to ice ratio; alternating layers of fish and ice to cover completely.
- Ideally, catfish should be stored in totes with drainage holes, where ice is able to melt and can trickle down through the stacked crates to wash fish and keep them moist.
- While in storage, fish core temperature should be kept around 34°F to hold off spoilage and extend shelf life.



### How many days will the catfish remain safe?

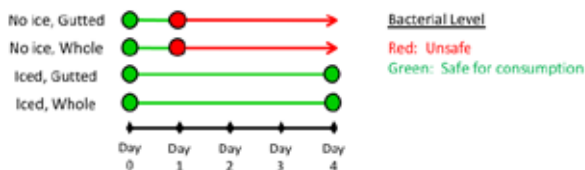


Figure 1. Levels of APC, colony forming units per gram (CFU/g)

An extended storage time allows fishermen to harvest on holidays, weekends, and during good conditions, and fish houses to better plan hours of operation within USDA hours of inspection.

Get more information on proper handling of freshwater fish and the La Sea Grant catfish study at <https://lafisheriesforward.org/freshwater-fisheries>

