Enhancing Seafood Shelf Life and Quality

Evelyn Watts
Assistant Professor – Seafood Extension Specialist
School of Nutrition and Food Sciences
Louisiana Sea Grant & LSU AgCenter
Outline

- Seafood Quality
- Seafood Chilling & Freezing
- Seafood Packaging
- Conclusions
Seafood Quality

- Attributes of seafood such as Color, Texture, Flavor
- Chemical and Biochemical Aspects
- Microbiological quality & safety
Bacterial Growth Curve

Seafood Chilling & Freezing

- 70.0°F
- 40.0°F → Refrigeration
- 32.0°F → Water freezes
- 30.2°F → Seawood starts to freeze
- 23.0°F → Freezing zone or Critical zone
- -4.0°F
- -13.0°F → 90-95% of water in seafood is frozen
Cooling curves of Black Drum fish stored in a 2:1 ice to fish ratio. Handling technique abbreviations: (PDSI) pre-drained with slurry ice, (CDSI) continuous drain with slurry ice, (RSI) retention of meltwater with slurry ice, and (RFI) retention of meltwater with flake ice (Parraga, K., 2019).
Cold storage

Aerobic Plate Count (APC) of Black Drum fish stored in a 3:1 ice to fish ratio comparing flake ice (F/26-28°F) and slurry ice (N/23-26°F) (Eseose, H., 2020)
Chilling after cooking

Crawfish Cooling Rates after cooking

- Cold peeled
- Hot peeled
Cold peeled vs. hot peeled

- Crawfish tail meat shelf life
  - Hot peeled 6 days (Shackelford, J., 2015).
  - Cold peeled 10 days (Touza, J., 2019).
Aerobic Plate Count (APC) Log CFU/g during fresh crawfish tail meat 14-day shelf life study comparing the treatment with different concentrations of lactic acid at the chilling step; control, 1%, and 2% (Touza, J., 2019).
Seafood Packaging

- Vacuum Packaging
- Modified Atmosphere Packaging (MAP)
Vacuum Packing

- Removes most of the available O2.
- High O2 barrier materials are required.
- Barrier will depend on food packaged (15K cm³/m²/24h oxygen transmission rate or less).
Modified Atmosphere Packaging (MAP)

- MAP principle is the replacement of air in the package with a fixed gas mixture.
- The O2 is removed by vacuum and/or displaced by an inert gas.
- Removal of O2 slows the rate of oxidation and microbial activity.
- The main advantage of MAP is the increase of shelf life possibly 50-400%
Tub vs VP vs MAP
Crab meat shelf life

Aerobic Plate Count

Yeast Count
Black Drum shelf life

Aerobic Plate Count

Yeast Count

(Cobar, J., 2019)
Conclusion

- Good cold management practices result in a better seafood quality for a longer time.
- Fast chilling after cooking results in a lower microbial growth and longer shelf life.
- Antimicrobial interventions allow longer shelf life.
- MAP results in longer shelf life.
Thanks!!!

Evelyn Watts
(225)578-6304
egwatts@agcenter.lsu.edu