

Seafood Extension Specialist Update

Photo Evelyn Watts

Research

EVALUATION OF FAT NATURALLY ADHERED TO FRESH CRAWFISH TAIL MEAT

The crawfish industry is the second largest seafood industry in the state of Louisiana, which has significantly grown and changed in the last three decades (*Agriculture: Backbone of Louisiana's Economy*, 2016). Crawfish tail meat is usually sold in one pound bags with the fat remaining, but it can be ordered at a higher price with fat washed off to improve storage (Raemes, 2011). In fresh crawfish tail meat, fat naturally adhered to meat can be measured by gravimetric method, which consists on washing tail meat and recording initial and final tail meat weights to calculate the percentage of weight loss. Weight loss can be interpreted as the percentage of fat naturally adhered to the crawfish tail meat. The purpose of this study was to determine the percentage of fat naturally adhered to fresh crawfish tail meat. To complete this study, we identified six processing facilities, three hot peelers and three cold peelers. We completed 168 measurements at 28 different observation points. Measurements were done on 3 to 4 week intervals at each peeling plant, from February to June 2018. A LSU AgCenter graduate student evaluated crawfish tail meat at each processing plant. The crawfish tail meat gross weight was measured, and then meat was placed in a sieve (#8) and rinsed under cold tap water for 45 seconds (Figure 1), and then drained for 2 minutes. The weight of washed tail meat was measure and the percentage of weight loss was calculated. Through the season, the fat naturally adhered to crawfish tail meat ranged from -0.8% to 8.6 %, with an average of 2.4%. Cold peelers showed significantly higher average with 3.0% compared to hot peelers with 1.6%. Cold peelers ranged from -0.4% to 6.5% and hot peelers from -0.8% to 8.6%. Hot peelers presented a greater variance of fat naturally adhered to tail meat compared to cold peelers. There was a greater average weight loss in fresh crawfish tail meat at the beginning of the season (3.0%) and at the end (3.1%). The percentage fat naturally adhered ranged at the beginning of the season from 0.6% to 6.3%. The fat percentage at the end of the season ranged from 0% to 8.6%. Based on the findings of this study, we can conclude that the fat natural adhered to tail meat can be up to 9%. We also found that fat naturally adhered to tail



Figure 1. Crawfish tail meat rinse.
Photo Evelyn Watts

meat increases with cold peeling compared to hot peeling. We are

currently completing an evaluation of weight loss in frozen crawfish tail meat at three, six, and twelve-month of storage to determine the expected weight loss in frozen tail meat.

BLACK DRUM SHELF LIFE COMPARING THREE PACKAGING TECHNOLOGIES.

Seafood is one of the main sources of protein around the world, and its consumption continues to grow annually. Because of its high unsaturated lipid composition, seafood is recognized to be highly perishable with a relatively short shelf life. Black Drum ranks second largest in Louisiana finfish landings, finding opportunities to expand its shelf life will allow fishermen and processors to reach larger markets. Reduce Oxygen Packaging technology is recognized to expand shelf life of fresh products by slowing down lipid oxidation and microbial growth. Louisiana Sea Grant/Undergraduate Research Opportunities Program funded my research proposal, “Black Drum shelf life comparing three packaging technologies.” The objective of this study is to evaluate the shelf life and quality of Black Drum using three different packaging technologies: polyethylene bag (not airtight), vacuum packed, and Modified Atmosphere Packaging (MAP) (Figure 2). We have completed laboratory testing for this project and are currently preparing abstract to present research at a national conference.



Figure 2. Modified Atmosphere Packed Black Drum. Photo Evelyn Watts

IMPACT OF REDUCE OXYGEN PACKAGING ON MELANOSIS DEVELOPMENT IN GULF OF MEXICO WHITE WILD-PLATE-FROZEN SHRIMP



Figure 3. Modified Atmosphere Packed Shrimp. Photo Evelyn Watts

Melanosis development in shrimp is a natural process caused by the polymerization of phenols into insoluble black pigments called melanins. During freezing and thawing, inactive Polyphenol Oxidase (PPO) stored in hemocytes and digestive glands is released and activated, resulting in a faster development of melanosis. This process significantly reduces shrimps economic value via consumer rejection. The main goal of this project was to evaluate melanosis reduction effectiveness by testing four different packaging techniques. Shrimp free of melanosis inhibitors were purchased

direct from fishermen within 12 hours of catch. Half of the shrimp were treated with a 4-hexylresorcinol based formulation. All shrimp were plate frozen and packed using current box format and vacuum packed boxes (VP). The four treatments included untreated/VP, treated/VP, untreated/box, treated/box. Each treatment contained three replicates. The shrimp were thawed under refrigeration on ice after 3 weeks. Melanosis observation occurred on days 1-5, 8, & 10. The shrimp were rated on a scale of 1 – 5 for melanosis (1 = no black spots present, 3 = unacceptable, 5 = strong blackspot: black heads and shells). Untreated shrimp start showing signs of melanosis on day 1, on the other hand, by day 10, none of the treated/VP shrimp showed melanosis. There was no significant difference between box and vacuum packed shrimp.

In collaboration with Dr. Julie Lively from the School of Renewable Natural Resources, in addition to this study we continued observation thawing shrimp at three and six-months of storage. We are currently doing a similar study comparing boxed shrimp vs. Modified Atmosphere Packaged shrimp (Figure 3).

CHARACTERIZATION OF SLURRY ICE AS CHILLING TECHNOLOGY FOR FRESH SEAFOOD

In April 2018, the Board of Regents, Industrial Ties Research Subprogram funded my research proposal, “Characterization of slurry ice as chilling technology for fresh seafood.” The overall goal of the proposed project is to evaluate the benefits of using slurry ice as chilling technology for seafood in the Gulf of Mexico. During the summer 2018, we completed an evaluation of chilling rates and cooling curves in slurry ice compared to flake ice (Figure 4). We compared chilling rates and cooling curves using different handling techniques including: continuous drain, initially draining then closing drain plug, and not draining any liquid. Fish were placed in plastic containers, and data loggers were placed in multiple fish. In addition, we will be evaluating the quality and the shelf life of Black Drum fillets comparing slurry ice and flake ice as chilling technologies.



Figure 4. Preparing Black Drum to evaluate chilling rates. Photo Evelyn Watts

Extension Publication (2018)

- **Watts, E. & Hymel, T.** *Sea Grant and AgCenter help Louisiana catfish industry comply with new regulations.* Louisiana Agriculture, December 2018. Online: lsuagcenter.com. Last accessed: 12/10/2018
- **Lively, J. & Watts, E.** *Preventing Black Spots from Appearing on Healthy Shrimp.* Louisiana Agriculture, December 2018. Online: lsuagcenter.com. Last accessed: 12/10/2018
- **Watts, E.** *Seafood HACCP and safety programs help sustain Louisiana’s coastal communities.* Louisiana Agriculture, December 2018. Online: lsuagcenter.com. Last accessed: 12/10/2018
- **Watts, E.** *USDA/FSIS Catfish compliance workshop curriculum.* LA Sea Grant & LSU AgCenter. August 2017. Curriculum. [National Sea Grant Library](http://NationalSeaGrantLibrary.org). Last accessed: 09/16/2018.
- **Watts, E. & Hymel, T.** *Know your catfish and label it properly.* Louisiana Fisheries Forward – Louisiana Sea Grant. July 2018. Article. Online: <https://www.lafisheriesforward.org/wp-content/uploads/2018/09/CatfishArticleFinal1.pdf>. Last accessed: 10/16/2018
- **Watts, E.** *Seafood Extension Specialist Update.* LSU AgCenter & LA Sea Grant. Year 2 Issue 2. April 11, 2018. Online: 20180410-Seafood-Extension-Specialist-Update.pdf. Last accessed: 12/10/2018.
- **Watts, E.** *Seafood Product Labeling.* Louisiana Fisheries Forward Fast Facts – Louisiana Sea Grant. 2018. Fact sheet. Online: https://www.lafisheriesforward.org/wp-content/uploads/2018/03/LFF_FastFacts_FoodLabeling_02-2018.pdf. Last accessed: 09/16/2018
- **Watts, E.** *USDA Inspection Guidelines for Siluriformes Fish (Catfish).* Louisiana Fisheries Forward Fast Facts – Louisiana Sea Grant. 2017. Fact sheet. Online: https://www.lafisheriesforward.org/wp-content/uploads/2018/03/LFF_FastFacts_Catfish_12-2017.pdf. Last accessed: 09/16/2018
- **Watts, E.** *Food Safety model for catfish processing under USDA regulation.* Louisiana Sea Grant & LSU AgCenter. August 2017. Model. Online:

<https://www.lsu.edu/departments/nfs/Seafood-Quality/documents/20171114-USDA-FSIS-Catfish-models.pdf>. Last accessed: 11/16/2018.

- **Watts, E.** Lagniappe – Louisiana Sea Grant & LSU AgCenter Newsletter. *Watts Going on with Catfish*. Volume 41, No. 10. October 2017. Online: <http://www.seagrantfish.lsu.edu/pdfs/lagniappe/2017/10-2017.pdf>. Last accessed: 09/16/2018.
- Gautreaux, K. *Louisiana catfish processors compliance with USDA regulation*. LSU AgCenter. August 23, 2018. **Contributor**. Online: <http://www.lsuagcenter.com/articles/page1535030319382>. Last accessed: 09/16/2018.
- Wernau, J. & Parkin, B. *Catfish Gets Tangled in a Small-Fry Trade War*. The Wall Street Journal. September 21, 2018. **Contributor**. Online: <https://www.wsj.com/articles/in-a-small-fry-trade-war-catfish-gets-tangled-in-red-tape-1537531205>. Last accessed: 10/16/2018.
- Gautreaux, K. *Catfish processors compliant with USDA regulation*. LSU AgCenter. August 24, 2018. **Contributor**. Online: <http://www.lsuagcenter.com/profiles/rbogren/articles/page1535135469305>. Last accessed: 09/16.2018



Student Awards

The FMI Foundations sponsors the “[Food Safety Auditing Scholarship and Education Travel Grant](#)” to students with great academic ability, leadership potential, motivation and initiative, along with a passion for the food industry and the auditing profession. [Katheryn Parraga, PhD](#) student under Dr. Evelyn Watts’s advice was awarded this well recognized scholarship and travel award. Katheryn also received 2018-2019 Zamorano Agricultural Society (ZAS) LSU Chapter Outstanding Award.

Upcoming events

[AFDO Sanitation Control Procedures \(SCP\) For Fish and Fishery Products](#)

January 22, 2019
Efferson Hall 212

[AFDO Basic Seafood HACCP](#)

January 23-25, 2019
Efferson Hall 212

[Beyond the Boat – Seafood Processing Conference](#)

January 30, 2019
4-H Minifarm

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