

Intensive Technical Assistance For Louisiana Shrimp Fishermen

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Intensive Technical Assistance for Shrimp Fishermen Louisiana Wild-Caught Shrimp

Shrimp Intensive Technical Assistance (ITA) Program in Louisiana

Introduction to Outreach Materials and Technical Transfer Session

The recommended best handling and management practices provided and detailed in these training materials and training workshops are designed to produce a premium quality shrimp. So what then does premium quality mean? We have selected and use this term, first of all, to indicate that this shrimp has better eating quality above that of “normal” or commercially produced shrimp in Louisiana. This better eating quality can then be recognized by improved quality characteristics. These are attributes, including visual and odor, in addition to taste, that are found in immediately harvested shrimp, but unfortunately are also often lost and absent by the time the shrimp reaches the final consumer. So, most importantly, these recommended handling and management practices have been developed to produce premium quality product and value, and retain this quality for the necessary shelf life and distribution, that will be obvious to the final purchaser and consumer.

Another term that could be used is “retail quality,” but we believe that premium quality is more appropriate and practically useful since currently there is shrimp being sold at retail markets that do not contain premium quality characteristics. This obvious and desired premium quality will be the foundation on which the buyer should be willing to pay more (or a premium price) for this best available product. This premium quality will also then support marketing and promotional information and efforts to encourage the consumer to respond with a premium price.

The best handling practices recommended in this training were developed from the available body of knowledge that has been gained from a long history of scientific studies and investigations, AND from the practical knowledge and learning from successful fishermen, and validated in Louisiana and elsewhere. These recommendations are focused on managing capture and handling practices that directly impact the loss and control of product quality, and NOT on those practices that focus on quantity without regard to the food or eating quality of the shrimp.

Once shrimp are brought on board without excessive dragging and resulting physical impact and damage, these practices focus on individual handling steps or activities that follow one another to form a continuous handling process. These practices and process are designed to protect quality, prevent blackspot, and rapidly reduce the shrimp temperature through to storage on the boat. This training contains information, details, and protocols to use these recommended best practices. This program also includes initial materials for the individual shrimp harvester to employ these recommendations while shrimping to demonstrate that these practices will produce premium quality shrimp for marketing and sale to receive premium prices above commodity, or dock, levels.

Louisiana Wild-Caught Shrimp



Introduction

- What is Intensive Technical Assistance (ITA)?
 - Extension of the USDA Trade Adjustment Assistance (TAA) program.
 - Optional program that provides educational assistance to fishing families that want to change and improve the way they do business.

OVERVIEW OF PROGRAM

Intensive Technical Assistance (ITA) is an extension of the USDA Trade Adjustment Assistance (TAA) program. ITA is an optional benefit program that provides additional educational assistance to fishing families in the shrimp industry who want to change and improve the way they do business.

The purpose of ITA is to help fishing families consider changes they can make to improve profitability. ITA provides information that will help produce premium quality Louisiana Wild-caught shrimp. It also provides information for direct marketing and other resources that may be helpful in improving or expanding shrimping businesses. The primary focus of these materials is product quality and direct marketing.

Goals of ITA

- Provide information and demonstration materials for shrimp fishing families to:
 - Direct market their shrimp
 - Produce premium quality shrimp that can compete in the marketplace

GOALS OF ITA

Direct Marketing - Many consumers are becoming selective and willing to pay a premium price for products that meet their expectations. Premium wild caught shrimp have superior flavor that cannot be duplicated in ponds and can be sold as a high priced specialty item. However; flavor alone will not establish wild caught domestic shrimp as a top-tier specialty product. Marketing and promotion is the key to finding buyers that are willing to pay a premium price for a premium product.

Product Quality - Product quality is quickly becoming a concern in the industry due to the perceived quality of foreign pond raised shrimp. Pond raised shrimp are harvested, headed, packed and frozen in a matter hours, not days, resulting in a high quality, competitive product that has the appearance of perfection. The visual appearance and product condition of imported farm raised shrimp has become the new quality standard by which all other shrimp are judged. Therefore, producers must develop and adopt harvesting and onboard handling practices that result in producing consistent high quality shrimp that can be sold in exclusive segments of the domestic market for a premium price.

Industry and Marketplace Challenges

- Major challenges in shrimp industry
 - Effects of foreign farm raised imports
 - Effects of Hurricane's Katrina, Rita, Gustave, and Ike
 - Global economy
- Major challenges in American markets
 - Concerns about food safety and where the food comes from
 - Concerns about how food is handled and processed
- Challenge brings change which brings opportunity

INDUSTRY AND MARKETPLACE CHALLENGES

Nothing is the way it use to be, nor will it be again. The past is gone. The fishing industry has always had its difficulties. Good years followed by bad years followed by good years. However, the industry has taken several extremely hard hits in consecutive years. In 2000, domestic shrimp prices collapsed due to cheap farm raised imports. The industry barely recovered from that economic tidal wave when Hurricanes Katrina and Rita in 2005 followed by Gustave and Ike in 2008 devastated Louisiana's coastline and fishing communities. Now, what is left of the industry is facing the effects of a global economy with a weak American dollar and high fuel prices.

The American marketplace is also facing challenges. With the recent food safety scares, many American's are becoming concerned about where their food comes from, the carbon footprint it is leaving on the earth and the cost of transporting it. Consumers are aware and concerned about how the food supply is handled and processed.

As bad as things look there is good news, all these challenges bring change and change brings new opportunities. More and more people want to buy fresh and buy local. Farmer's Markets and specialty food shops are very popular. Brand conscious, high-income consumers

(foodies) are willing to pay more for perceived value. The internet is making it easier to market and sell seafood products. Advances in transportation are making it possible to send fresh and frozen product to most parts of the United States and overseas.

Importers are facing challenges also. Because of the weak dollar and the strong Euro, the European Union is currently the number one importer of seafood. The push for ethanol is causing a shortage of corn to make fishmeal so it is becoming harder and more expensive for the farms to feed the shrimp. Shipping costs are increasing, more products are being tested at the ports, and their challenges can be our opportunities.

Change is difficult. Change is necessary. Change is here. Change is opportunity for success.

Fishermen's Direct Marketing Manual

4th Edition

Sea Grant Alaska Oregon Washington

- Do you have what it takes?
 - Read chapter 1
 - Answer “Got the Goods” on page 3
- If the answer is yes:
 - Make a commitment
 - Read the rest of the book
 - Start with a plan and follow it

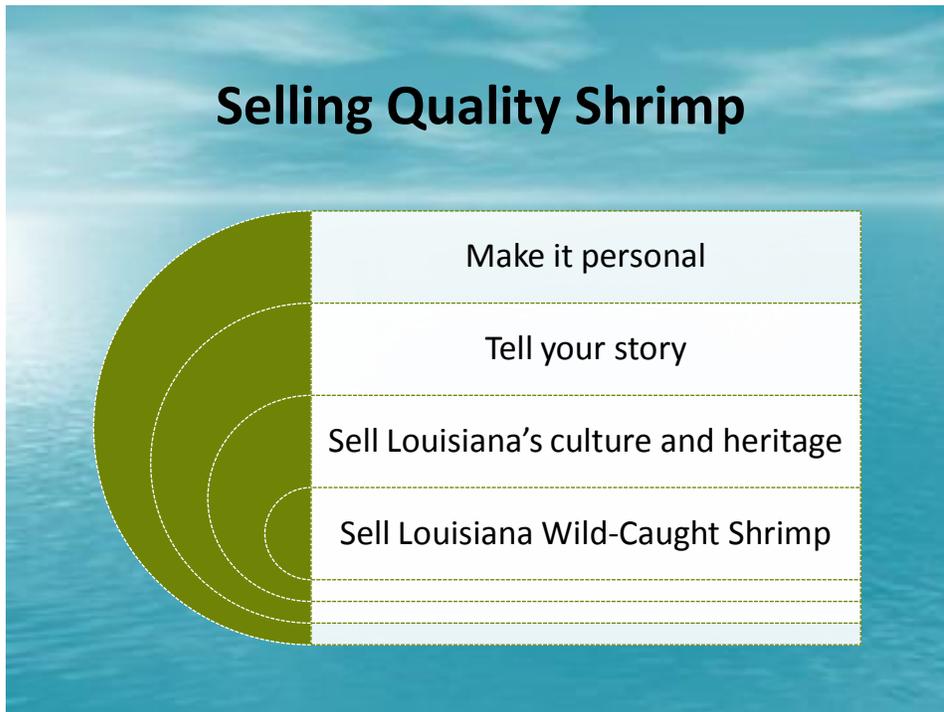
FISHERMEN'S MARKETING MANUAL 4TH EDITION

Sea Grant Alaska Oregon Washington

Marketing quality shrimp and producing quality shrimp go hand in hand. In order to make improving quality worthwhile you must have someone willing to buy your product at a higher price. In order to sell to someone at a higher price you must have a quality product to sell.

The first thing you need to do is determine if direct marketing is for you and if so, what type of direct marketing is your best approach. Read chapter one and then answer the questions on page 3 titled “Got the Goods” to help you make this determination. Other family members that may be working in the business should do the same. In many cases, the spouse and or other family members become the direct marketer while you do the fishing and provide the product for them to sell.

Although this manual is not specifically for the shrimp industry, the fundamental principles in each chapter (pages 1-55) apply to all fisheries. This manual is full of valuable information that can be applied to your business. The appendix's starting on page 56 applies primarily to the west coast fishing industry. In your ITA binder, you will find a list of **Louisiana Business Resources** that apply to Louisiana fisheries.



SELLING QUALITY SHRIMP

Louisiana is unique and so are you. Use that uniqueness in your sales and marketing materials. Do not just sell Louisiana Wild-Caught Shrimp; sell Louisiana's culture and heritage. Make it personal. Tell your story. Tell your families story. Tell your community's story.

In your ITA binder, you will find a page titled "My Story." Discuss and answer the questions with family and friends. Let your memories and imaginations roam, and then use the answers to help develop a story about you and your product. It can be a short paragraph or a long story, whatever works for you and your business. You, or someone you know, can do the actual writing or you can hire a professional to do the writing. The following is a sample of what one Louisiana fishing family is doing to direct market their shrimp.



Provided by Kim Chauvin

ABOUT US



My family is what you would call fourth and fifth generation commercial trawlers or shrimpers. Everywhere you look in our family, somebody is or was connected to the water, the marsh, and to this way of life. David's father, on up to his great grandfather, all trawled these waters. My father did a bit of trawling, and we have relatives that trapped and hunted and lived off the land just like we do today. My children, Little David, Dustin and Mariah, are the fifth generation and are learning the trade just like David learned about it from his father.

While attending junior high and high school, David learned from his father the craft of building vessels. When summer time came, David was off to work with his dad learning the trade of commercial shrimping. This part of the business has been engraved in Davids heart and soul. Upon earning his high school diploma, David began trawling full time. In his spare time, he and his father began building David's vessel the Mariah Jade. We built the Mariah Jade over the course of four years. The Mariah Jade is a 73 foot steel hull year round trawler. A shrimping trip consists of making sure you have all the supplies that you need while you're on the water, leaving from our bayou waters out into the Gulf of Mexico and setting down the nets to make the first drag of the trip. From this point you make your days trawling, come in to off- load the catch and get back to out on the water.

Provided by Kim Chauvin

Attributes of Wild Caught vs. Farm Raised

- Superior taste and texture
- Higher levels of nutrients
- Caught in natural habitat
- Uniform in size
- Commodity priced
- Sizes available year round

FARMED VS. WILD-CAUGHT

Most Americans do not know the difference between imported shrimp raised in ponds and domestic wild-caught shrimp. Most do not realize they are buying and eating imports. Both types of shrimp have attributes that buyers are looking for. However, most Americans have never eaten a domestic shrimp so they do not know the difference.

Louisiana wild shrimp grow and reproduce in a safe natural environment. They have a consistent superior taste and are higher in nutritional value than pond raised shrimp. These attributes are due to the shrimp being harvested from their natural habitat and cannot be duplicated in ponds. A Texas A&M study titled, *Naturally-occurring Compounds which Create Unique Flavors in Wild-harvested Shrimp*, and a study on nutrient values by ABC Research for Wild American Shrimp Inc., scientifically backs these claims.

Farm raised shrimp are grown to the size desired and then harvested at the same time making them uniform in size and visually appealing. Because of their growing and harvesting methods, they have sizes available year round at inexpensive prices.

What affects shrimp value?

Eating Quality and Product Specifications

Product Condition

- Odor
- Texture
- Blackspot
- Dehydration
- Chemical abuse

Pack Style

- Weight/counts
- Uniformity
- Damaged or broken shrimp
- Soft shells

WHAT AFFECTS SHRIMP VALUE

Product condition and pack style determine the price of shrimp and need special attention in order to compete in the marketplace. From the time shrimp enter the nets you are in a race against time and temperature to maintain quality. Chilling quickly, maintaining proper temperature, handling gently, and good sanitation practices are essential to preserving quality and producing a product buyers are willing to pay for. The three things you must control are heat, dirt, and time. To combat these remember to keep it cold, keep it clean, and move it fast.

A good rule of thumb is to ask yourself if you would buy and eat the shrimp you are attempting to sell. If the answer is no then you do not need to be selling it.

PRODUCT CONDITION

The product must be appealing to the senses of sight, touch, taste, and smell, therefore, special attention needs to be paid to appearance, odors, and texture. If any of these are a little off the shrimp cannot be considered premium quality.

Spoilage is the result of bacterial action that has a negative effect on shrimp odor and color. Bacteria, also called germs, are microscopic organisms, which live on nutrients present in shrimp and cause shrimp to spoil rapidly. Bacteria grow by dividing in half. Under ideal conditions, bacteria can divide every half hour and produce 1 million bacteria in just 10 hours. The time it takes for bacteria to multiply to spoilage levels depends on the number and type of bacteria on the shrimp and the temperature to which shrimp are exposed.

Temperature control and good cleaning and sanitation habits help control the multiplication of bacteria. Cold temperatures slow the growth and multiplication of spoilage bacteria, which is why it is important to thoroughly rinse the catch and ice it or freeze it as soon as possible.

Odor

Shrimp should have a fresh briny seawater smell. Several things can cause objectionable off odors. An ammonia smell is a sign that the shrimp is spoiling. Bilge water getting in the boat hold or shrimp exposed to fuel or other chemicals on the boat will cause off odors.

Texture

Shrimp should be firm and moist. Poor handling practices such as improper icing, de-heading, or rinsing can cause shrimp to be mushy. Tough dry shrimp are a result of improper storage temperatures or repeated refreezing.

Blackspot

Shrimp will occasionally have a shell discoloration called blackspot or melanosis. This is not caused by bacteria and is not spoilage, but rather an enzymatic reaction caused by naturally occurring amino acids, high temperatures, and sunlight. Very similar to sun tanning. While it is considered a cosmetic defect in the marketplace and visually not desirable to consumers, the shrimp may still be safe to eat. Blackspot has an impact on the visual quality of shrimp.

Red Shrimp

Red or heated shrimp is the result of temperature or heat abuse causing shrimp to turn pink/red/orange colors. The off color can occur in blotches or individual segments on the shrimp and can develop anytime during harvest, storage, or handling. Chilling shrimp quickly after harvest and avoiding hot spots in storage will help prevent red shrimp.

Dehydration

Dehydration or freezer burn is a drying out of the flesh, caused by prolonged exposure to dry air in the freezer, and will have chalky white blotches under the shell. When the freezer air is colder than the shrimp moisture will migrate from the shrimp into the freezer, resulting in dehydration. Dehydrated shrimp will float when placed in fresh water.

Chemical Abuse

Improper use of sodium bisulfate (sulfites) and sodium tripolyphosphate (tripoly) result in an abused or adulterated product. If used properly they can be beneficial in preserving product quality.

Excess soaking in sulfite solution causes yellowing on the underside of the shrimp or a bleached appearance. Spreading sulfites directly on shrimp results in shrimp shells having pitted or gritty shells.

Over soaking or high concentrations of tripoly adds illegal water weight and affects the appearance and texture of shrimp. Abused shrimp may appear translucent, glassy, and plump, have a slippery texture, and are hard to cook.

PACK STYLE

The physical condition of the shrimp should comply with the product specifications and the expectations of the buyer. In other words, the package contains what it says it contains and is in good condition.

Weigh, counts and uniformity

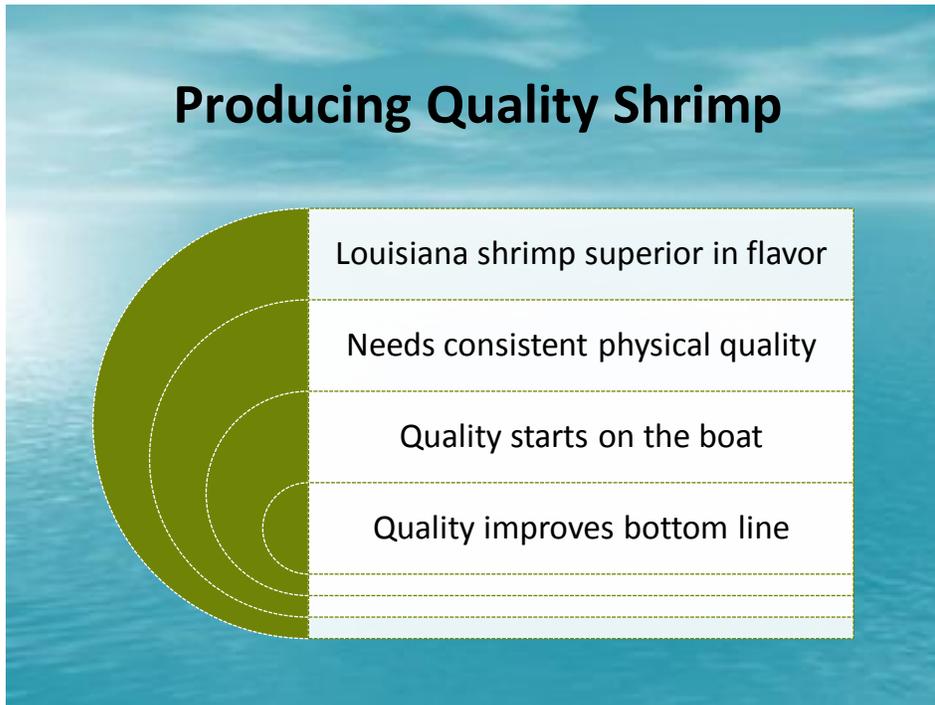
Wild-caught shrimp vary in weight and size. Farm shrimp are raised to be harvested at a certain uniform size, allowing the consumer to buy shrimp that are all exactly the same size. This can be overcome by educating the consumer about the uniqueness of Louisiana shrimp in regards to availability and sizes. The size of domestic shrimp will not be exact but it needs to be consistent. Meaning if you sell a customer 5 pounds of 16/20's then the average size of the shrimp should be between 16 and 20 to the pound. Not mostly 20 count shrimp or a mix of sizes with just enough big ones to make the count.

Damaged or Broken Shrimp

Shrimp need to be handled with care. Long tow times, rough handling, or improper storage can severely damage the taste, appearance, and texture of shrimp. Any shrimp that is crushed, mutilated, cut or missing a body segment or tail fins is considered broken or damaged and should be removed.

Soft Shells

Soft shells are a natural occurrence in shrimp during molting. Most consumers are not familiar with soft-shelled shrimp and may think the shrimp is not good. Therefore, be sure to remove any soft shell shrimp before selling. If you should catch many soft-shelled shrimp, you can advertise them as a specialty item like soft-shelled crabs and sell them.



PRODUCING QUALITY SHRIMP

Louisiana shrimp are superior in texture and flavor. In order to receive a higher price for Louisiana shrimp, producers must improve physical and visual quality and provide a consistent, high quality product. Loss of quality begins when shrimp enter the nets and continues until they are cooked. Once quality begins to deteriorate it is impossible to reverse, but it can be maintained and minimized by slowing the process. Therefore, physical damage to the shrimp must be controlled and minimized from the time the nets enter the water throughout handling and unloading. This will require most producers to adopt new and improved onboard handling practices. Quality starts on the boat and paying attention to the details will improve your bottom line.

Enemies of Quality

Heat

Dirt

Time

Best Handling Practices

Recommendations For:

Trip
Length

Tow Times

Working
Shrimp On
Deck

Unloading

Sanitation

Recommended Best Handling Practices To Produce Premium Quality Louisiana Wild-Caught Shrimp

Trip Length

- Your goal is to fill customer orders, not fill the boat with shrimp
- 1 – 2 days or nights of shrimping for ice boats
 - Or last 1 – 2 days of catch
- Shrimp must have days of high quality for distribution and shelf life after unloading

Trip Length

Your goal is no longer to fill the boat with shrimp, but to fill customer orders. To do so, shrimp must have days of high quality for distribution and shelf life after unloading. For iceboats, this means no more than 1 – 2 days or nights of shrimping. Larger ice vessels that make longer trips may separate the last 1 or 2 days of their catch for quality product.

Recommended Tow Times

- Shrimp quality improves with shorter towing, pushing, or drag times
- 3 hours max when water is less than 80°F
- 2 hour max when water reaches 80°F
- Skimmers can pull up one side every half hour



Recommended Tow Times for Quality Shrimp

Reducing the amount of time shrimp spend in the net will improve the quality of a portion of the catch. Best handling practices suggest that you limit time to 2 hours max when water is less than 80°F, and 1-hour max when water reaches 80°F or when skimming.

By picking up your nets every 1 or 2 hours, you are able to work smaller segments of the catch on the deck faster enabling you to preserve the quality of the shrimp sooner. Skimmers can work steadily and greatly improve the quality of their catch by picking up one side every half hour.

Benefits of Shorter Tow Times

- Physical damage and temperature abuse minimized
- Growth of spoilage bacteria reduced
- Accumulation of enzymes that discolor shrimp and cause black spot reduced
- Ability to work shrimp faster
- The best shrimp are shrimp that are processed live

Benefits of Shorter Tow Times

Shorter tow times always result in a better quality product by reducing physical damage to shrimp along with temperature abuse. Spending less time in the water reduces the amount of spoilage bacteria and the accumulation of enzymes that affect shrimp's texture and cause black spot. Upon death, quality begins to deteriorate. Immediately spoilage bacteria begin to grow and enzymes start attacking the freshness, texture, and color of shrimp. Long tow times in warm water speeds up this process.

Another advantage of shorter tow times is that shrimp do not pile up in the heat waiting to be processed. It gives you the ability to get shrimp off the back deck into ice or the freezer faster. The sooner you get the shrimp from the net into storage the better. In fact, the best shrimp are shrimp that have been processed live.

Your goal is to change from working big piles of shrimp and taking long breaks to working small piles of shrimp continuously using an assembly line method.

Working Shrimp on Deck

- Salt Box & Culling
- Rinsing
- Blackspot Treatment
 - Everfresh
 - Sulfites
- Chilling In Ice Slush
- Icing and Storage
- Brine Freezing



Working Shrimp on Deck cont.

- Work shrimp immediately after landing
- Fill baskets with no more than 30 lbs of shrimp or half full
- Work in shade, not in full sun
- Spray water or pour ice on shrimp pile to keep it cool
- Keep Everfresh solution and ice slush in shade

Working Shrimp on Deck

Shrimp should be processed immediately after bringing on board in order to keep as much of the catch as possible in top condition.

Work shrimp in smaller amounts by filling baskets with no more than 30 lbs. of shrimp or half-full. By not filling the baskets up, you will be able to rinse shrimp and get them into the ice slush quicker. Shrimp also have room to move in the slush tank and will chill faster. Working less shrimp at a time saves on the amount of Everfresh or sulfite solution you use because shrimp have better contact with the solution. Following this suggestion will extend the shelf life of the shrimp resulting in better quality.

It is very important to work in the shade, not in full sun. Shield shrimp from direct sunlight by setting up a tent or canopy over the back deck to shade the work area. The Blackspot solution and ice slush tank should be kept in the shade as well. To help keep shrimp cool while working you can spray water or pour ice on the shrimp pile.

Work Shrimp Continuously

- One basket at a time - assembly line method



Work Shrimp Continuously

It is best to work shrimp smoothly in segments one basket at a time. Sort, rinse, treat for Blackspot, chill in ice slush or brine tank, store in ice or freezer, then go to the next basket; rather than sorting all the shrimp, rinsing all the shrimp, etc. A larger amount of the catch will qualify for premium shrimp because it will spend less time in the heat. Working small segments of shrimp in an assembly line fashion is less intimidating than working a big pile of shrimp one big job at a time. In addition, by working smaller piles, you get a break sooner.

Salt Box & Culling

- Sort premium shrimp into separate boxes before using salt box
 - Using salt box is not recommended for premium shrimp
- Use salt box properly to separate shrimp from other catch
- Work quickly and do not allow shrimp linger in the box!
- Monitor amount of salt in box
 - Too much salt – shrimp float
 - Not enough salt – nothing floats
- Change salt solution daily or more often if needed
- Rinse shrimp thoroughly to remove dirt and bacteria

Salt Box & Culling

Using a saltbox for premium shrimp is not recommended so you should attempt to separate the premium shrimp before using the saltbox for the rest of the catch. Be sure to monitor the amount of salt in the box. If there is too much salt the shrimp will float, and if there is not enough salt nothing will float. Work quickly and do not allow shrimp to linger in the box! Carefully remove and sort shrimp into separate baskets, then rinse shrimp thoroughly to remove dirt and bacteria. Be sure to change salt solution daily or more often if needed.

Rinsing



- Rinsing thoroughly is a very important step
- Removes some dirt and some spoilage bacteria
- Reduces the rate of spoilage when shrimp are thawed
- Extends effectiveness of Everfresh dip

Rinsing

Rinsing or washing shrimp is a very important step in producing a quality product. Thoroughly rinsing the shrimp removes some dirt and some spoilage bacteria. This is especially important on freezer boats because shrimp spoil rapidly when thawed. Rinsing also helps extend the effectiveness of the Blackspot treatment.

Heading

- Three fourths of spoilage bacteria is found in the head
- Do not leave front legs attached to the tail
- Do not mash the head into the tail
- Salt box is not needed when heading shrimp.



Heading

Three fourths of spoilage bacteria are found in the head of the shrimp. When heading shrimp do not leave the front legs attached to the tail or mash the head into the tail. Doing so causes rapid spoilage. The saltbox is not usually needed when heading shrimp.

Blackspot Treatment

- Everfresh – recommended for quality shrimp
 - Generally Recognized As Safe (GRAS)
 - Prevents blackspot
 - No effect on flavor or texture
 - Does not require labeling
- Sodium Bisulfite (not recommended)
 - Know allergen
 - Controls blackspot
 - Releases toxic sulfur dioxide fumes in moist conditions
 - Requires labeling
- DO NOT USE TRI-POLYPHOSPHATES or other chemicals

Blackspot Treatment

Properly treating shrimp in a Blackspot treatment solution can control or prevent the formation of blackspot. Sulfites (sodium bisulfite or sodium metabisulfite) and Everfresh are the most commonly used treatments in the industry. Everfresh is highly recommended for producing premium quality shrimp. It prevents Blackspot from forming rather than just controlling it.

Everfresh (4-hexylresorcinol) is the brand name of a processing aid used to prevent blackspot. Used in a 2 to 4 minute soak, it works by attaching itself to the enzyme responsible for black spot and shuts it down. It has no effect on the flavor, texture, or natural color of shrimp and does not require labeling. It is Generally Recognized as Safe (GRAS) and is accepted by most organic retailers.

When used correctly, Blackspot should not occur, even after rinsing, refrigerating, freezing, or thawing. This product does not bleach shrimp nor does it prevent microbial spoilage of shrimp.

Sulfites are preservatives that control the symptoms of Blackspot formation and lose their effectiveness over time. Sulfites are listed as a known allergen and are

considered a critical control point under HACCP (Hazard Analysis and Critical Control Point) regulations therefore, FDA requires the product be monitored, and the finished product clearly labeled due to some consumers being allergic to sulfites. In accordance with Good Manufacturing Practices (GMP's) 100ppm (SO₂) is the level needed for effective control of blackspot.

Also, be very careful when handling and storing sulfite powders. They can be very dangerous when working in enclosed spaces on vessels. If these powders get wet, they release toxic sulfur dioxide fumes making it unsafe and in some cases fatal for fishermen.

In producing quality shrimp, it is very important that that you do not use Tri-Polyphosphates or other chemicals. It is counterproductive and lowers shelf life.

Blackspot Treatment cont.



- Make a new batch of solution after 400 to 500 pounds or 16 baskets of shrimp, or at least once a day
- Do not spread Everfresh or Sulfites directly on shrimp
- Do not use Everfresh or Sulfites in slush ice or brine
 - Dips are less effective in cold water

Blackspot Treatment Continued

If shrimp are handled properly, you should be able to dip up to 500 pounds of shrimp in one batch of Everfresh or Sulfite solution. If the solution begins to smell sour that means spoilage bacteria is growing in the tank and the solution needs to be changed. Not rinsing shrimp properly, a shrimp left in the tank or the water getting too hot can cause this problem. Monitor your tank visually and with a thermometer. If the solution is getting too hot, you can use an ice pack to bring the temperature down without diluting the solution.

It is very important that you do not spread Everfresh or Sulfite powder directly on shrimp. Direct powdering or dusting shrimp will cause some shrimp to have too much powder on them and other shrimp will not have enough, possibly missing some shrimp. Applying dip directly to shrimp can pit and corrode the shells and cause shrimp to have a sandpaper feel.

Dipping with Everfresh



- Mix in a separate dip tank with sea water
 - No chlorine
 - Follow instructions on package for mixing
- Fill basket with no more than 30 lbs of shrimp
 - Or half full
- Dip for 2 - 4 minutes
 - Agitate to make sure all shrimp contact solution

Dipping with Everfresh

Everfresh comes in premeasured packets and used in the same manner as a sulfite dip. Just follow the directions for mixing on the back of the packet or on the enclosed sheet titled “SunOpta Technical Bulletin.”

Dissolve the contents of one packet with ambient temperature seawater, brackish or fresh water, not water containing chlorine, slush ice, or brine. Fill shrimp basket half-full and dip in the solution for 2 to 4 minutes, agitating the basket so the solution contacts all shrimp, then drain shrimp and ice down or place in the brine tank.

Using more Everfresh or leaving shrimp in the solution longer will not increase the effectiveness of Everfresh. It is very important to discard the solution and make a new batch after dipping 16 baskets of shrimp or at least once daily.

Dipping with Sulfites



- Mix 1.25% dip solution
 - 1 pound (1 ½ cups) powder per 10 gallons of water
 - Use ambient temperature water
- Fill basket with no more than 30 lbs of shrimp
 - Or half full
- Soak for 1 to 2 minutes with mild agitation
 - Soaking longer may add excessive sulfites

Dipping with Sulfites

Should you have a customer base that is okay with sulfites be sure to mix and use the solution correctly. You must clearly label the use of sulfites on your packaging.

It is best to apply a 1.25% shrimp dip solution (sodium bisulfite or sodium metabisulfite) for a 1 to 2 minute soak time with mild agitation. A 1.25% dip equals 1 pound (1½ cups) of powder per 10 gallons of clean water. The mix water should be ambient temperature. Cold or ice water dips are less effective. Soak times longer than one minute are not necessary and may add excessive sulfites. It may also cause unusual yellowing on the underside of the shrimp or cause shrimp to look bleached. After 500 lb. have been treated, discard the solution and mix a new batch.

Chilling In Ice Slush

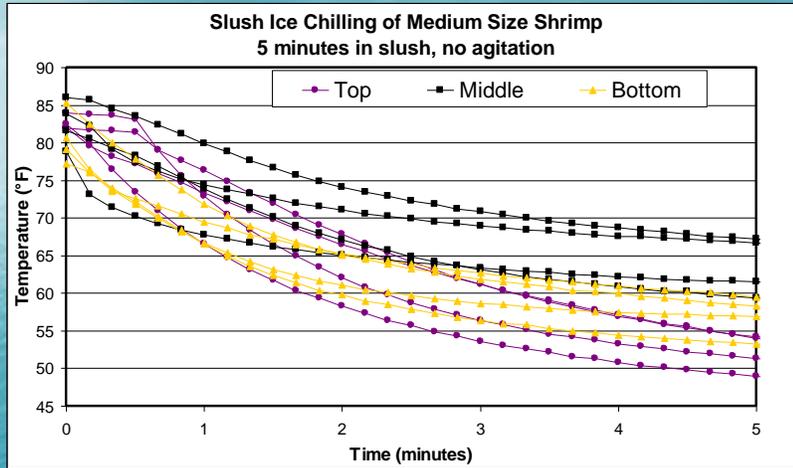
- Rapidly brings down temperature of shrimp
 - Much quicker than ice alone
- Rapid chilling and low temperature are critical to producing and maintaining premium quality
- Slush chilled shrimp melts less ice during storage

Chilling in Ice Slush

Rapid chilling and low temperature are critical to produce premium quality shrimp. Dipping shrimp in ice slush rapidly brings down the temperature of the shrimp. Slush chilled shrimp will melt less ice during storage.

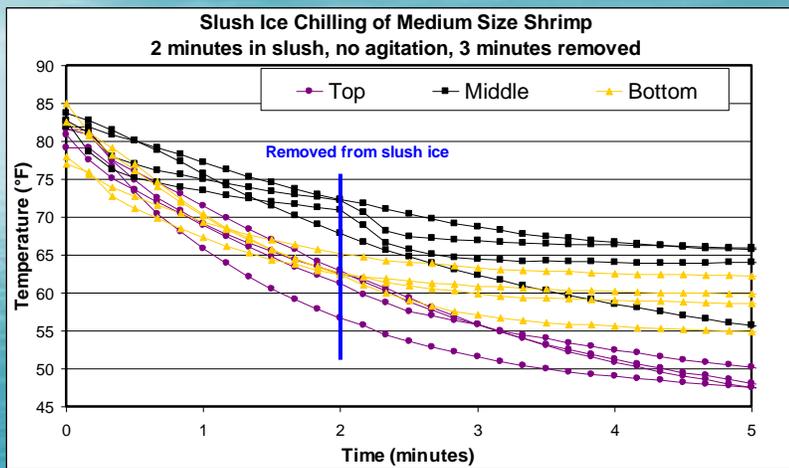
The following slides compare the difference in temperature using ice slush versus ice only. A basket full of shrimp was placed in 25 gallons of ice slush resulting in temperatures dropping between 10°F and 30°F. By filling baskets half full as recommended and submerging them in slush ice for 2 minutes after sorting the results should be 20°F to 25°F versus 3°F to 4°F for 5 minutes in ice only.

Slush Ice Chilling



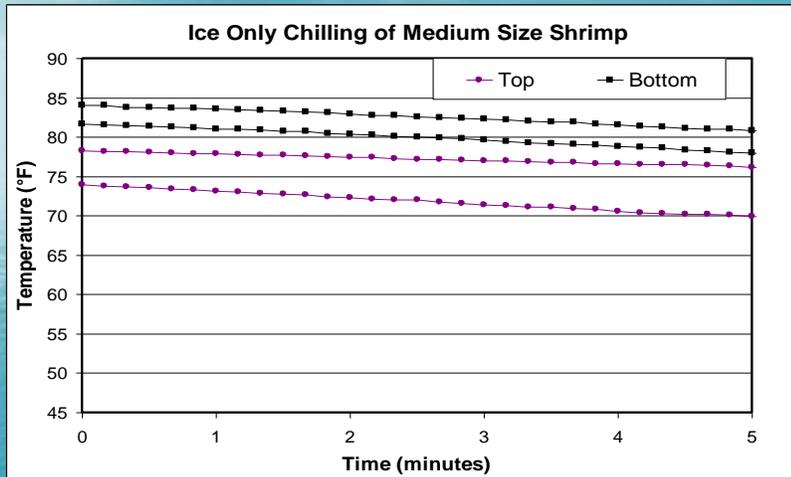
Shrimp Temperature decrease of 20-30°F in 5 minutes in slush ice

Slush Ice Chilling



Shrimp Temperature decrease of 15-30°F in 2 minutes in slush ice

Chilling In Ice Only



Shrimp Temperature decrease of 3-4°F in 5 minutes in ice only

Chilling In Slush Ice

Ice slush mixture

- Fill slush tank with 2 baskets of ice
- Add water to fill line (25 gallon mark)
- Keep 50/50 ratio of ice and water in slush tank
- Maintain ice slush temperature near 32 F

Icing and Storage

- Two pounds of clean ice for each pound of shrimp
- Ice shrimp immediately after slushing
 - Layer 6" of ice on floor and against sides
 - Layer of shrimp – not too thick
 - Cover with layer of ice
- Be careful not to crush or damage shrimp
- Do not pile above 2' high
- Temperature in ice hold should not exceed 35 F
- Store premium separately from other shrimp

Icing and Storage

Ice and store shrimp immediately after slushing using 2 pounds of ice per pound of shrimp. Place a 6" layer of ice on the floor and against sides of the fish hold so that shrimp are not touching the walls or floor. Then place a layer of shrimp on the ice and cover shrimp with another layer of ice. Premium shrimp should be stored separately from other shrimp, and not piled more than 2' high so they are not crushed or damage by the weight.

The temperature at which the shrimp are stored determines the length of acceptable shelf life. The hold temperature should not exceed 35°F and iced shrimp should maintain a temperature of 33°F. Use a thermometer to monitor the temperatures.

Brine Freezing

- Freezing shrimp as quickly as possible reduces
 - Weight Loss
 - Salt Intake
 - Drip Loss upon thawing
- Shrimp should freeze completely within 20 minutes if brine is working properly
- Shrimp must be fully frozen before taking out of tank
- Longer freezing adds salt to shrimp and pulls water (weight) out

Brine Freezing

Brine systems are very effective in producing premium quality shrimp if monitored, used, and maintained correctly. Water removes heat from shrimp ten times faster than cold, circulating air or layers of ice. Concentrated salt water (brine) is an inexpensive way to lower the freezing point of water. To properly use a brine freezer a brine solution must be created that will lower the freezing point of water to about -6°F; the lowest point achievable by adding salt.

It is very important to follow the manufactures instructions for charging, recharging, and loading the brine tank. Freezing shrimp as quickly as possible reduces weight loss, salt intake, and drip loss upon thawing. Shrimp should freeze within 20 minutes if the system is working properly, the correct amount of salt is added, and the brine is not overloaded. Leaving shrimp in the brine longer will add salt to the shrimp and pull water (weight) out.

Brine Solution

- Measure the gallon capacity of brine tank
 - Determine amount of salt needed for initial brine solution
- Charge the brine system before each trip
- Monitor the brine temperature – use a thermometer
- Recharge brine to maintain proper solution
 - Pounds Method
 - Refractometer Method (recommended)
- Discard brine and clean tank and system at the end of trip

Brine Solution

Follow the outline on the following page for instructions on measuring the tank, charging, and recharging the brine system. Freezing shrimp gradually decreases the percentage of salt in the brine, so salt must be added to maintain the correct concentration.

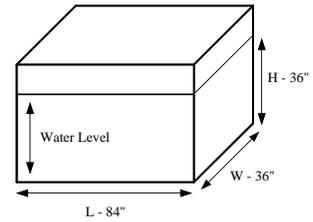
The brine needs to be recharged after every 1000 pounds of shrimp (Pounds Method), or when the concentration drops 2 percentage points (Refractometer Method).

The Refractometer Method is very accurate and highly recommended. A small miscalculation of the percentage of salt can lead to a large difference in temperature.

At the end of the trip, drain and discard the brine solution then clean and sanitize the system.

Measure the gallon capacity of brine tank

- Mark the “fill line” (height) and measure in inches
- Measure inside width and length of tank in inches
- Gallon capacity = (Height x Length x Width) ÷ 231
 - Ex. (36” x 84” x 36”) ÷ 231 = 471 gallon



Charge the brine system before each trip – Initial Brine Solution

- Fill the tank with clean water to the fill line marked
- Add salt according to the table below
- Dissolve ingredients before starting compressor
- Keep temperature below 5°F – monitor with thermometer or refractometer

Ingredients	Proportions	Quantity for 471 Gallons
Food-grade salt	2.53 lb. per gal.	(2.53 x 471 gal.) = 1,192 lb.

Recharge brine system during trip

- Concentration of salt gradually decreases as more shrimp are frozen
- Salt must be added to maintain the correct concentration for proper freezing
- Recharge using the Pounds Method or the Refractometer Method
 - **The Pounds Method**
 - Add 28 pounds of salt after freezing every 1,000 pounds of shrimp
 - 28 pounds is approximately 6.5 inches of salt in a 5 gallon bucket
 - Dissolve salt in a small amount of warm water before adding to cold tank
 - **The Refractometer Method (recommended)**
 - Recharge with salt when refractometer drops 2 percentage units from original reading
 - Ex. From 30 to 28% - add 2% salt to recharge
 - Multiply gallon capacity of the brine tank (471 gal.) by the weight of one gallon of salt brine (8.3 lb.) by the two percentage units (0.02)
 - (471gal. x 8.3 lb./gal. of brine x 0.02) = 78 pounds of salt
 - 78 pounds of salt fills a 5 gallon pail about 18 inches
 - Add three cups of dip along with the 78 pounds of salt
 - Mix and recheck reading

Filling Bags or Boxes

- **DO NOT overfill sacks or boxes!!**
 - Prevents proper brine circulation
 - Increases time to completely freeze shrimp in the center
 - Causes damage to shrimp
- Small bags – 30 pound capacity only
 - Fill naturally and tie off. Do not force shrimp in.
- Rectangular 4" deep plastic mesh boxes (*recommended*)
 - 20 pound capacity
 - Fill, snap on lid and use twist ties to secure lid

Filling Bags or Boxes

Shrimp can be frozen in small mesh bags that hold up to 30 pounds of shrimp or 4" perforated plastic boxes, which hold up to 20 pounds. Shrimp must have room to move and expand in order to freeze correctly, so it is very important that the bags or boxes are not overfilled. Doing so prevents proper brine circulation and increases the time it takes for shrimp to freeze completely. It can also cause hot spots in the containers resulting in soft centers and red shrimp.

Both bags and boxes are to be handled very carefully since frozen shrimp are especially vulnerable to breakage.

Loading the Brine

- Load 15 pounds of shrimp to 100 gallons of brine
 - DO NOT Overload the brine tank
 - An overloaded brine system causes
 - Shrimp to freeze unevenly
 - Brine to not work correctly
 - Damage to shrimp
- First in – First out
 - Track time shrimp is in brine tank
 - Track order shrimp enters the brine tank
 - Monitor time and remove in order

Loading the Brine

The brine tank should be loaded with no more than 15 pounds of shrimp to 100 gallons of brine. Overloading can raise the temperature and cause the brine to work improperly causing soft centers and poor quality due to slow freezing. An agitator or submersible pump helps circulate cold brine and reduce the time necessary to freeze shrimp. Make sure the brine temperature remains below -6°F.

First in – First out

Be sure to use a first in, first out system to keep track of the order, time, and amount of shrimp loaded into the brine. The order in which shrimp are loaded into the brine is very important to prevent under or over freezing shrimp. The brine needs recharging after approximately 1000 pounds of shrimp so it is important to keep track of how many pounds have passed through the system.

Unloading

- Handle fresh and frozen shrimp very carefully
- Avoid fluctuation spikes in temperature
- Store premium shrimp in coolers or slush ice containers that can be easily unloaded
- Do not compromise quality that you have worked hard to produce!

Unloading

Unloading techniques are just as important as any other step taken to preserve shrimp quality. Special care needs to be a priority or you can find that all the good you did during the trip is quickly undone. It is very important to retain the shrimp's low temperature during unloading and transporting. Unfortunately, maintaining the cold chain from the boat to the dock to the processor is difficult. Current unloading practices cause increases and decreases in temperature. These temperature fluctuations have a harmful effect on the quality of shrimp, as well as additional bruising and damage incurred by repeated shoveling and handling.

One option is to store your premium shrimp in separate containers with ice or ice slush that you can unload yourself or have unloaded with a lift. If you retail your shrimp, you should be able to deliver your product with very little temperature change. Another idea is to quick freeze shrimp at an onshore facility enabling you to store the product until sold.

Sanitation Practices

- Good sanitation practices extremely important
 - Protects against contamination
 - Prevents build-up of spoilage bacteria
- Use FDA approved food grade cleaning agent and sanitizing solution
 - Rinse deck and equipment after each drag
 - Clean and sanitize deck and equipment daily
 - Clean and sanitize deck, equipment and all storage areas after each trip

Sanitation of Vessel and Equipment

A clean boat is extremely important to producing quality shrimp. Good sanitation procedures protect against contamination and prevent bacteria from growing causing shrimp to spoil. Only FDA approved food grade cleaning and sanitation chemicals are to be used.

Most spoilage bacteria come from mud caught up in the nets, not the shrimp itself. It can contaminate the deck, culling tools, baskets, hands and gloves, as well as fish holds. A warm deck that is not cleaned and sanitized properly can have tens of millions of bacteria per square inch in a matter of hours. Dropping fresh catch onto a deck not scrubbed properly after the previous tow is sure to contaminate the catch with spoilage bacteria.

Bacteria growing in a fish hold will adapt to growing in cold temperatures if the fish hold is not cleaned and sanitized after every trip.

Summary

- Virtually all shrimp fishermen can produce premium-quality shrimp
- Following these Best Handling Practices enables operators to maximize more of the catch as premium quality shrimp
- Increasing the quality and value of a portion of the catch increases the average price of all of the catch
- Major changes taking place in the American marketplace bringing new opportunities
- New opportunities opening up for those willing to change

SUMMARY

Virtually all shrimp fishers have the ability to produce premium-quality shrimp and increase the value of a portion of the catch by adopting and following these recommended Best Handling Practices. Improving quality and increasing the value of a portion of the catch causes the overall value all of the catch to increase. In most cases, fishermen will have to change the way they do business in order to receive a higher price for their product. One way of doing that is by selling your product direct to the end user.

Major changes are currently taking place in the marketplace and with these changes; new opportunities are on the horizon. Many consumers are concerned about where their food comes from and how it is handled. They are developing higher expectations of quality and are willing to pay a higher price for it.