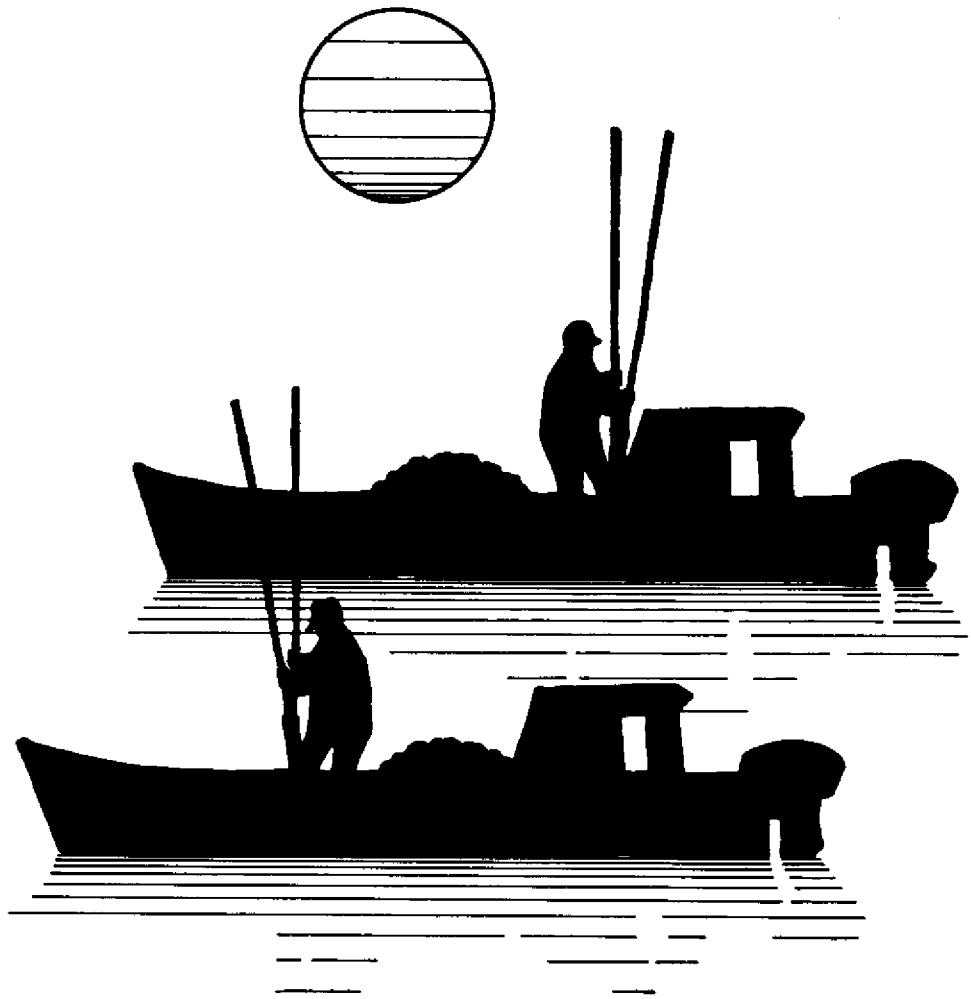
January 1982 MAP-21

Oyster Production: Plant Workers

W. Steven Otwell



Florida Sea Grant College
Marine Advisory Bulletin MAP-21

IMPORTANT NOTE

This manual has been prepared with reference to the guidelines recommended by the National Shellfish Sanitation Program and the Florida State Regulations specified in the Rules of the Florida Department of Natural Resources. This manual does *not* replace or interpret these recommendations and regulations, but should be used to supplement these references.

SPECIFIC REFERENCES

National Shellfish Sanitation program Manual of Operations
Part I Sanitation of Shellfish Growing Areas
Part II Sanitation of Harvesting and Processing Shellfish

1965 Revision with amendments as communicated through the U.S. Food and Drug Administration, Shellfish Sanitation Program, Region IV Office, 1182 W. Peachtree St., NW, Atlanta, GA 30309

The Florida Comprehensive Shellfish and Blue Crab Control Code, Chapter 16B-28
1979 corrected copy with amendments as communicated through the Bureau of Marine Resource Regulations and Development, Florida Department of Natural Resources, 3900 Commonwealth Blvd., Tallahassee, FL 32303

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Introduction

Shucking and processing oysters is a proud profession which requires hard work and training. An experienced worker has learned special techniques for opening the shells and removing the oysters without damaging or contaminating the 'meat'. Numerous attempts to develop oyster shucking machines have failed because opening the irregular shaped shells requires unique methods and care. Thus, oyster production is a specialized form of food processing which requires skilled labor.

Oyster production requires more care and attention than other types of food processing. Unlike beef, pork, poultry and fish—oysters are commonly eaten raw. Raw oysters are harvested from an environment that can carry harmful bacteria and contaminants which can threaten the health of consumers. Oysters are filter feeders which means they filter materials from the water as it is pumped through their gills. Oysters, therefore, can concentrate materials in their bodies to several times the amount found in the water. When raw oysters are consumed, any bacteria or contaminants present or growing on the raw oysters will also be consumed. Thus clean growing waters, sanitary handling practices, and proper refrigeration are of vital concern in safe shellfish production.

Occasionally, a consumer will suffer illness from eating poor quality oysters. The result is discomfort for the consumer and bad publicity which could threaten the jobs of all workers in the oyster industry. In fact, since raw oysters have the unfortunate reputation of causing food illnesses, they are sometimes blamed for sickness caused by other foods. Thus, it is the responsibility of all workers to assure that oysters are harvested from approved waters and are shucked and processed under sanitary conditions which prevent contamination and potential illnesses.

This manual has been prepared as a brief guide for workers in the oyster industry. Most of this information is good common sense. This information should be used along with the rules and regulations of the various health and regulatory authorities to assure the production of safe, top quality oysters.

Health

All workers **must** be in good health while processing oysters. Human illnesses can be contagious to other workers and can contaminate the oysters with dangerous bacteria or viruses.* A common cold, cough, running nose, or infected eye can also cause problems. No person should report to work if they are sick or have infected wounds, sores, boils, pimples, or respiratory infections. In some areas of Florida, all workers harvesting and processing oysters for commercial use must obtain a **Health Permit.** This permit is to assure and promote the importance of good personal health when handling oysters. Procedures for obtaining these permits can be explained by the local county health departments.

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

QUESTIONNAIRE FOR COMMERCIAL OYSTER
EMPLOYEE'S HEALTH PERMIT

You must answer these questions to get your health permit.
Some of your answers may require further discussion with the nurse of physician. Please answer as honestly as possible

1. Have you ever had typhoid fever? Yes ____ No ____
2. Have you ever had hepatitis? Yes ____ No ____
3. Have you ever had jaundice (yellow eyes or skin)? Yes ____ No ____
4. Have your bowel movements ever been white in color? Yes ____ No ____
5. Have you ever had tuberculosis (TB)? Yes ____ No ____
6. Have you had diarrhea in the past 10 days? Yes ____ No ____
7. Have you had any sickness in the past 10 days? Yes ____ No ____

I certify the above answers are true.

Signed _____ Dated _____

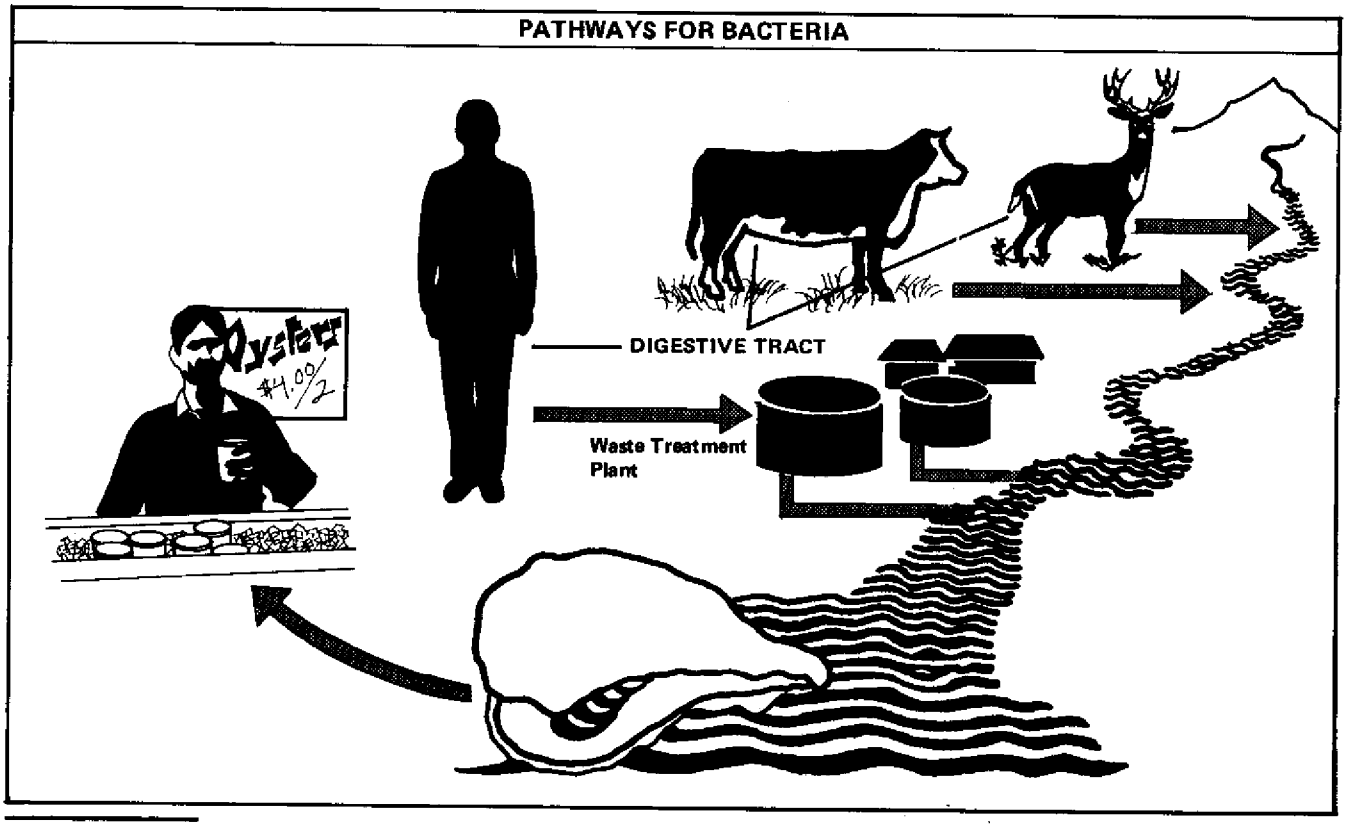
REMEMBER WASHING YOUR HANDS WITH SOAP AND WATER AFTER GOING TO THE BATHROOM IS THE MOST IMPORTANT THING YOU CAN DO TO BE A CLEAN SAFE WORKER.

HRS—H Form 4052, Oct 80

Processing

Oyster processing is the entire system of operations for the production of edible oysters. The first step in the operation is harvesting. Oyster processing begins as soon as the oysters are removed from the bottom. The quality of oysters will never be better than at the moment of harvest.** After harvest, natural chemical reactions and the presence and growth of bacteria will gradually decrease oyster quality.

Noticeable changes in quality could be development of odors, cloudy fluids, bad flavor, and discoloration. Also, harmful bacteria and viruses could be present and growing to dangerous levels. Growth of harmful bacteria is not always noticeable. Thus, when processing oysters, workers must use methods of storage and handling which preserve the quality, prevent spoilage, and keep oysters safe for consumers.



*"Bacteria and Seafood" is a free booklet which explains bacteria problems associated with Seafoods. Ask for Florida Sea Grant Marine Advisory Bulletin, MAP-22, 1982.

** The above statement assumes the oysters are harvested from clean approved waters or after an approved relaying operation. Relaying and depuration operations for moving live oysters from contaminated to clean waters can remove some harmful contamination, thus improving the oyster quality.

Shellstock

All commercial oysters must be harvested from *approved waters* as determined by state enforced regulations. Bacterial surveys indicate approved waters are not likely to carry types of bacteria which could be harmful to consumers. Most states also enforce a *size law* (3 inches at greatest dimension) to protect the oyster stocks and to assure a better quality product.

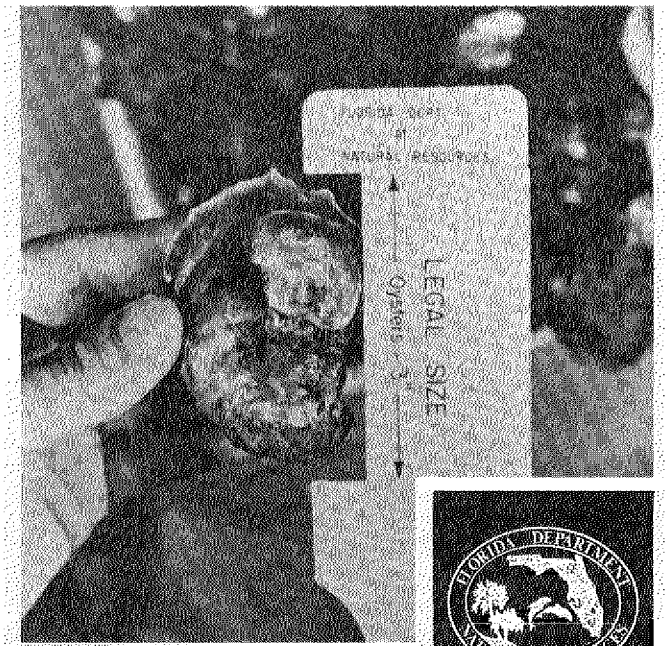
Workers should never harvest, purchase, or process dead or dying oysters. Dead oysters are not always easy to detect, but gaping is a sign of death. If the oysters are gaping and remain open after agitation, then they are probably dead. Oysters die when they are mishandled, improperly stored, or diseased. Dead oysters can spoil rapidly or contain harmful bacteria. It is interesting to note that spoilage bacteria, which cause changes in odor and flavor, are not necessarily the same types of bacteria which can be harmful to consumers. Regardless of which type of bacteria is present, spoilage or harmful types, both can cause problems.

Naturally, all shellstock will contain some bacteria. During warm months it is necessary to protect the shellstock from overheating in the sun. As the temperature of the shellstock increases, the amount of bacteria in the surface mud and inside the shell can increase. During cold months the oysters can remain on the boats for more than six to eight hours, but in summer months, the oysters should be protected and brought to the dock as soon as possible. Florida's Seafood Quality Control Code requires that the cargo be protected from the sun and weather. This is best accomplished by a shade or canopy over the oysters on the deck.

Oyster Quality Can Be No Better Than At The Moment Of Harvest

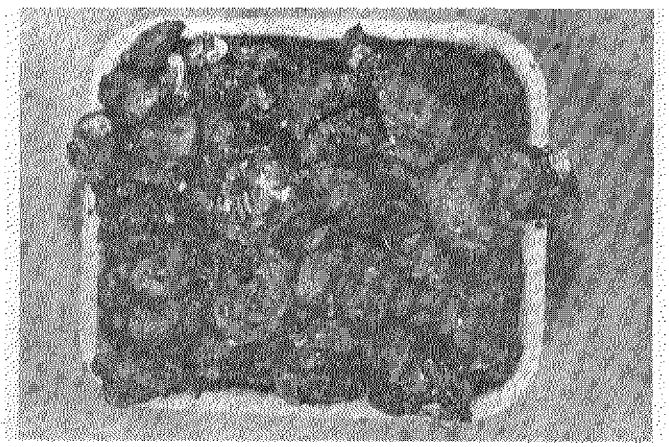
When approved shellstock is delivered to the plant it should be clean. Although washing requires a little extra work, it will remove excess mud. If unnecessary amounts of mud enter the processing and storage areas, it can contaminate working surfaces, workers clothing and shucked oysters. Both spoilage and harmful types of bacteria can grow in mud.

The best time to wash oysters is when they are being removed from the water or when loaded on the boat. A simple sloshing action with the oyster tongs can remove loose mud before unloading oysters on the culling board or deck, and a small battery pump can be installed to provide a hosed spray to remove sticky mud. If the oystermen are harvesting from approved waters, then the oysters can be washed with approved water which has a similar salinity and temperature. Oysters should never be washed with water from unapproved areas, and the boat should have a removeable false bottom to prevent bilge water or wash water from coming into contact with the clean oysters. If the oysters are washed at the dock, then workers must make sure

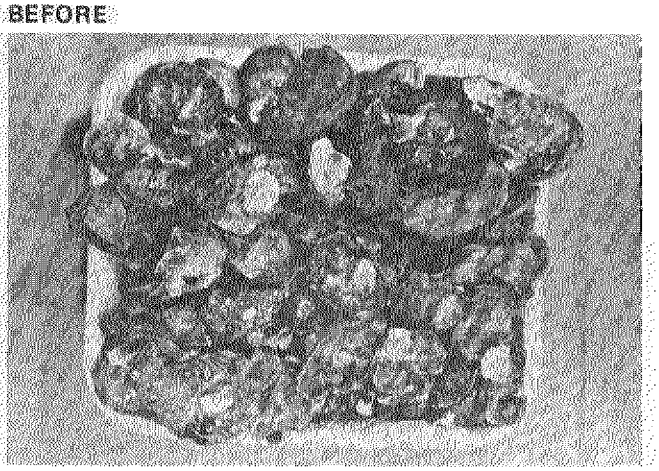


The Florida Department of Natural Resources (DNR) maintains an atlas of coastal areas approved for harvesting oysters.

SHELLSTOCK BEFORE AND AFTER WASHING



BEFORE



AFTER

to use clean wash water. The muddy water must be directed away from the processing area to avoid contact with floors, containers, and workers clothing and boots.

After washing, the shellstock should be stored in a clean cool area. The recommended storage temperature should not exceed 45°F. Even in cool temperatures bacteria will continue to grow. If the storage temperature is decreased, then the bacterial growth rate will decrease. A good rule of thumb is to ship or shuck all shellstock within 48 hours after harvest.

Shucking

There are several methods used to hand-shuck oysters. Workers like to use the most comfortable and rapid method. The plant manager wants to use the method which produces the most clean, undamaged oysters. Usually the method will depend on the individual worker's skill and the size and type of oysters. The best method carefully cuts the oyster muscle away from the shell and does not tear the 'meat'.

The three basic oyster shucking methods are stabbing, chipping, and grinding.

When stabbing oysters, workers force the point of a thin blade oyster knife between the two oyster shells. Inexperienced shuckers stab the oysters along the hinge or 'heel' of the shells, then twist the knife to pry the shells apart. Stabbing along the hinge area can damage the knife point and tear the oysters. Experienced shuckers stab the shells along the edge or 'beak' at a point near the muscle attachment. Thus, when the knife enters the shell, the muscle can be cleanly cut and the top shell removed.

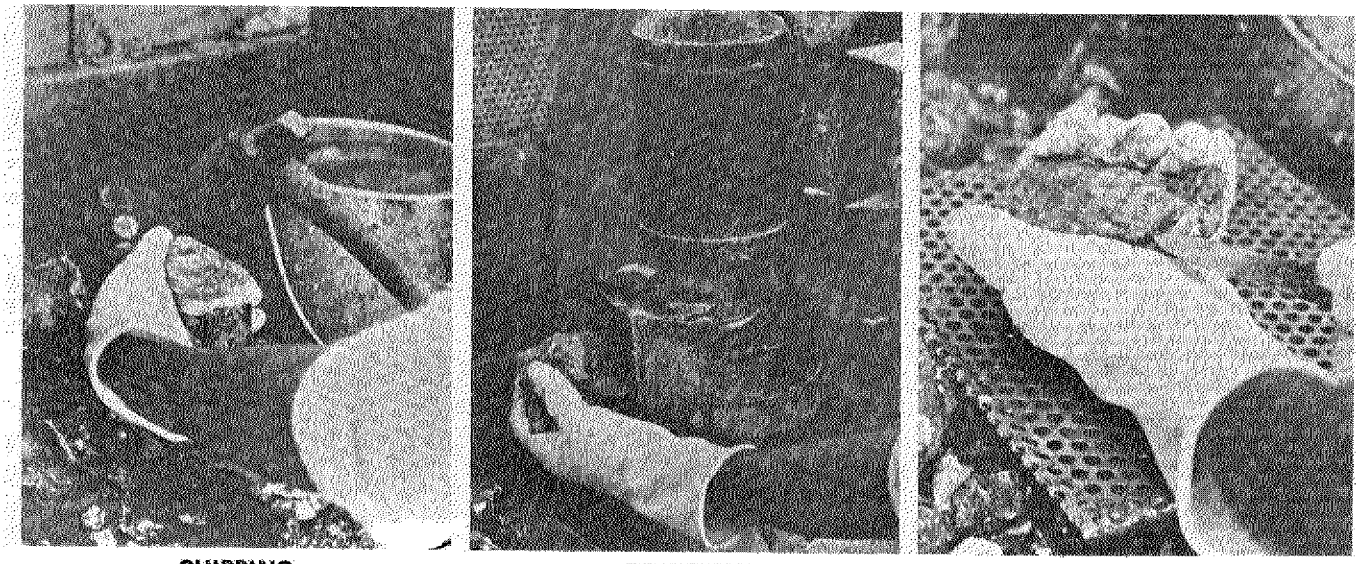
Grinding and chipping methods provide an opening for inserting the knife blade along the edge of the shells. Grinding refers to the electrical machines that grind an opening. These methods require less force to enter the shell, but they mix small pieces of shell with the shucked oysters.

Regardless of which method is used, workers' clothing and utensils should be clean, as well as the work area. When the oysters are removed from the shell, they can be contaminated with more bacteria. Clean clothing and the use of rubber gloves and aprons help reduce bacterial contamination. Rubber and plastic materials may be difficult to work with, but they do not absorb water, slime or bacteria, and they are easier to clean than cloth. At *no* time should workers remove clothing, shirts, shoes and socks while shucking oysters. Hats, hairnets, and scarves are recommended to prevent loose hair from falling into the shucking buckets.

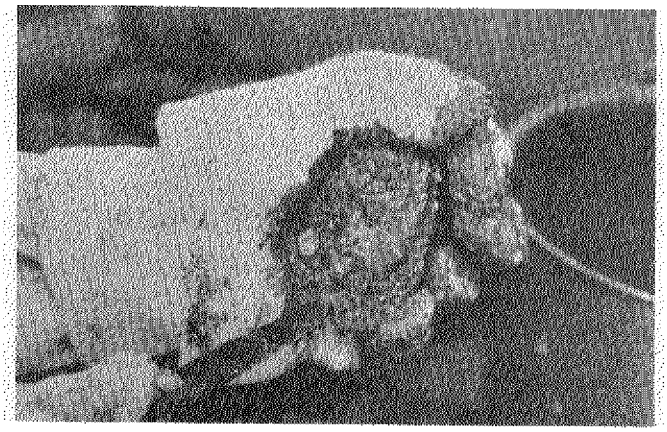
Always Wash Hands Thoroughly After Every Work Break, Lunch Time, and Visits to the Bathroom

Utensils including knives, buckets, and pails should be cleaned and sanitized on a regular schedule. The shucking containers should be rinsed in running tap water before each refilling. The use of dipping buckets for frequent rinsing of the knife is *prohibited.* A three compartment sink is required for cleaning and sanitizing all utensils and small equipment. This sink is *not* for washing hands. The first compartment is for washing to remove dirt, slime, and food particles. The second compartment is for rinsing. The last compartment is used for a sanitiz-

THREE BASIC SHUCKING METHODS



CHIPPING GRINDING STABBING



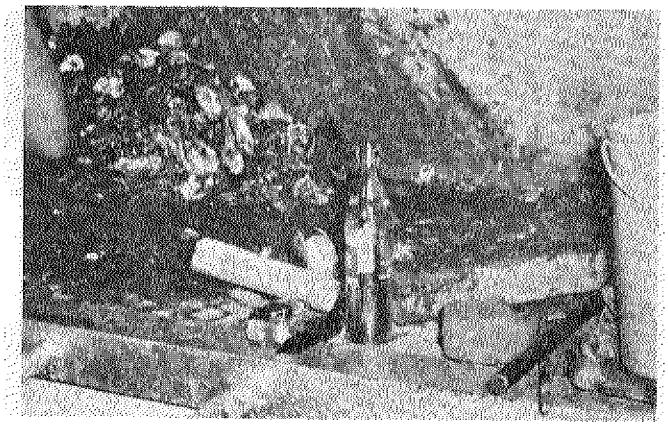
Cloth gloves are often preferred because they are easier to work with, but they can become worn and soaked. Used cloth gloves will contain bacteria which can contaminate fresh shucked oysters.

ing treatment. Rinsing between washing and sanitizing removes the dirt and detergent film which would prevent an effective sanitizing treatment. Proper draining and drying completes the cleaning procedure. Until further use, the utensils should be stored in a clean location protected from splashes, dirt, handling, and contact with food. Knives, gloves, and aprons should *not* be taken home because they could be exposed to harmful bacteria from illnesses, pets, or unsanitary storage conditions. Utensils should remain stored in a dry location in the plant.

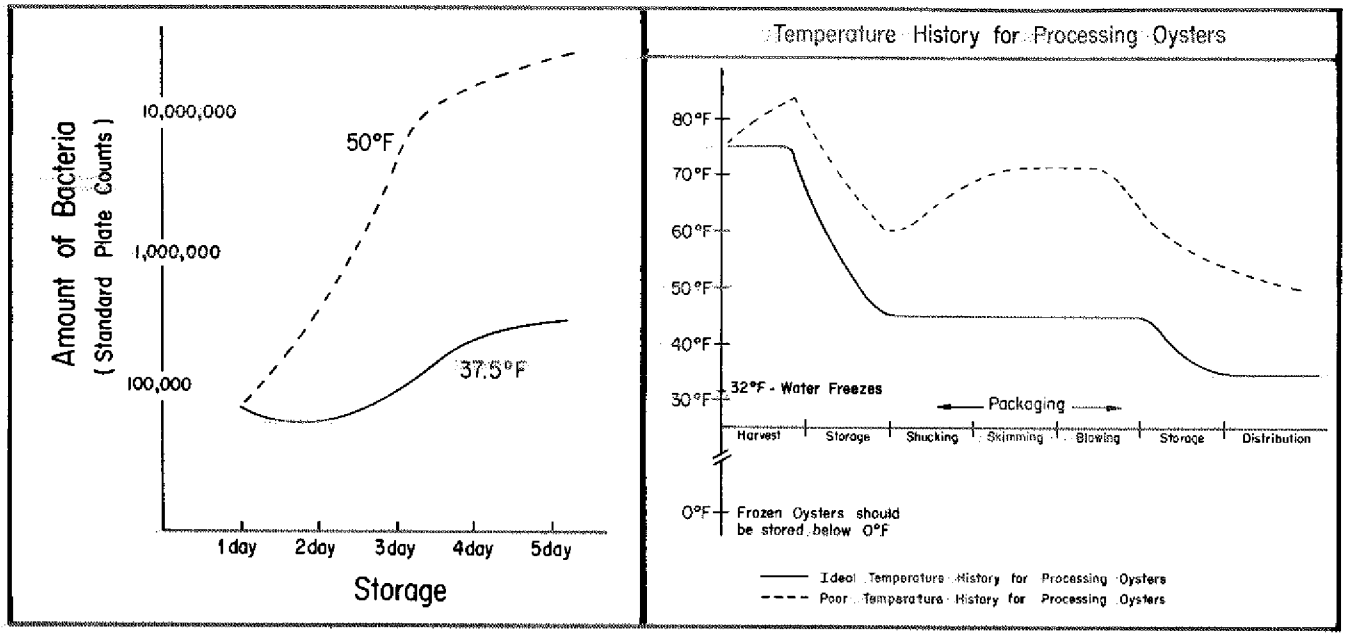
Wooden materials should not be used in the shucking operation. Wooden shucking blocks, cutting boards, boxes, benches, stools, and tables are difficult to clean and will support bacterial growth. Wood requires frequent painting or may become cracked, splintered, and soaked. Smooth surfaces of concrete or non-toxic metal are recommended because these materials are easier to clean and do not absorb or promote bacterial growth.

Temperature control is the best method to limit bacterial growth. Bacteria will grow or multiply more rapidly in warmer temperatures. For example, when fresh, shucked oysters are stored for 5 days at 50°F, the number of bacteria present can increase over 1000 times, but when oysters from the same batch are stored for 5 days at 37.5°F, the bacteria may not increase more than 5 times. Although the bacteria continues to grow at both temperatures, the lower temperature (37.5°F) near freezing, slows the rate of bacterial growth. Workers should try to keep the oysters cold during shucking, skimming, blowing, and storage.

The temperature control guideline for shucking oysters is that all fresh oysters should be cooled to below 45°F within 2 hours after shucking. To meet this guideline, especially during warm months, workers must prevent overheating of the shellstock. Starting with refrigerated shellstock leads to a cooler shucked product. Do not let piles of



Drinking, eating, smoking and tobacco chewing should be prohibited in the work area. Handling food or tobacco can transfer bacteria from the workers mouth to the fresh shucked oysters.



Growth of bacteria on fresh oysters packed in gallon cans and stored at 37.5°F (—) or 50°F (- - -). (References: Kelly, C.B. 1964. Time-Temperature Effect on Bacteriological Quality of Stored Oysters. Proceedings Fifth National Shellfish Sanitation workshop, available from Shellfish Sanitation Branch, Food and Drug Administration, Washington, D.C.)

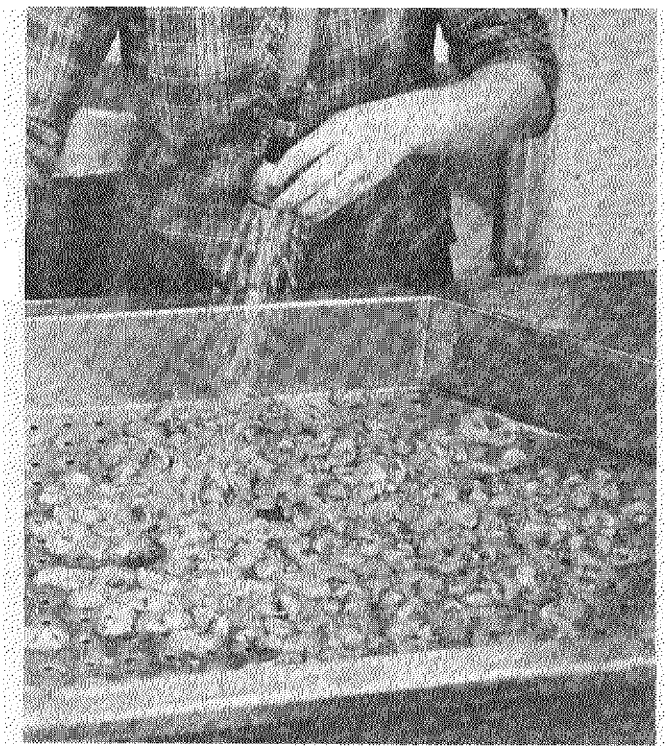
shellstock remain on the shucking benches overnight. A shucking schedule should be managed to control the temperature of fresh shucked oysters. In larger operations, smaller shucking pails can be used for more frequent trips to the packing room. Some workers have placed ice in the shucking buckets (1/3 can full) to lower the temperature of the fresh oysters. Remember, certain bacteria can survive in ice, so the ice should be clean.

Skimming and Blowing

Skimming and blowing operations can be used to drain and clean oysters before packing. Fresh, shucked oysters should be cleaned and packaged in a room separated from the shucking room. This separation prevents shell, mud, and unauthorized workers from contaminating the cleaning and packing operations. Only authorized personnel should be allowed in the packing room and oysters should never be returned from the packing room to the shucking room.

The skimming operation washes oysters with a clean, chilled water spray to remove dirt, slime, and small pieces of shell. Excess water mixed with the oysters will drain through small holes in the skimming table. Since oysters come in direct contact with the skimming table, the surface of the table must be cleaned and sanitized regularly.

The blowing operation is a cleaning process that can improve the appearance of the oysters. The aeration in the blowing tanks stirs the oysters in clean water to remove more dirt and pieces of shell. While the oysters are in the tank, they absorb water which increases the yield. An experienced plant manager controls the blowing time, depending on the season and size oysters, to produce an attractive product that is not over-soaked. In Florida, the legal time limit for blowing oysters is 15 minutes. Over-soaked oysters could lose water after they are packed and may not meet market standards. Also, water in the blower should be changed on a regular schedule to prevent bacterial build-up. An excellent way to keep the oysters cool is to use crushed, clean ice in the blower water.



Oysters should be spray-washed with pre-chilled, clean water on the skimming table.

Fresh Oysters Should Be Cooled, Below 45°F Within 2 Hours of Shucking

Packaging and Storage

Containers for packing oysters must be clean and dry, and each container must have a permanent label. Information on the labels is important and can be used to trace the source of the oysters in case of illnesses or market problems. In Florida, all packages of fresh oysters must be labelled with a 'terminal sale date'. This date is 14 days after the original shucking day.

Fresh packed oysters should always be stored at temperatures between 32° to 40°F until purchased by the consumer. Frozen oysters should be stored at or below 0°F. It is illegal to thaw frozen oysters for sale as fresh oysters.

Packed oysters or shellstock which is shipped by truck should be refrigerated at 40°F or below. When storing containers or bags, they should be arranged to allow cool air circulation around, under, and above the packages. If the packages are arranged in a tight bunch, completely filling the refrigerator or truck, then the center of the bunch will not be cooled and bacteria will begin to multiply.

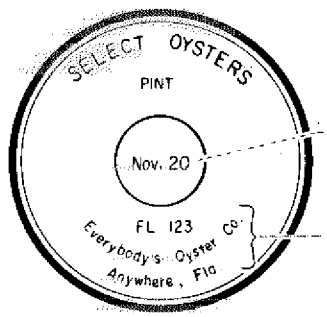
Clean-Up and Waste Disposal

Daily oyster processing operations are not complete until the processing house is cleaned and all waste removed. Good clean-up and waste disposal helps reduce bacterial build-up in the house and discourages insects and rodents. Critical clean-up points in the shucking rooms are benches, stools, knives, buckets, gloves, aprons, and the floor. Critical points in the packing room are the skimmer tables, the entire blower system, and the floor. A simple water spray or hosing down is **not** adequate cleaning.

Proper cleaning begins with a clean, cool water rinse to remove excess dirt and large particles. Next the equipment and surfaces should be scrubbed thoroughly with detergent. After the excess detergent is washed away with a second clean water rinse, the surface should be sanitized. Sanitizing kills the invisible bacteria that can remain even after scrubbing with detergent. Chemical sanitizing agents and/or hot water solutions should be specified by the plant manager. Knives, buckets, skimming tables, and blower systems should be sanitized at the end *of every work day*. Benches, shucking stalls, and floors should also be sanitized daily.

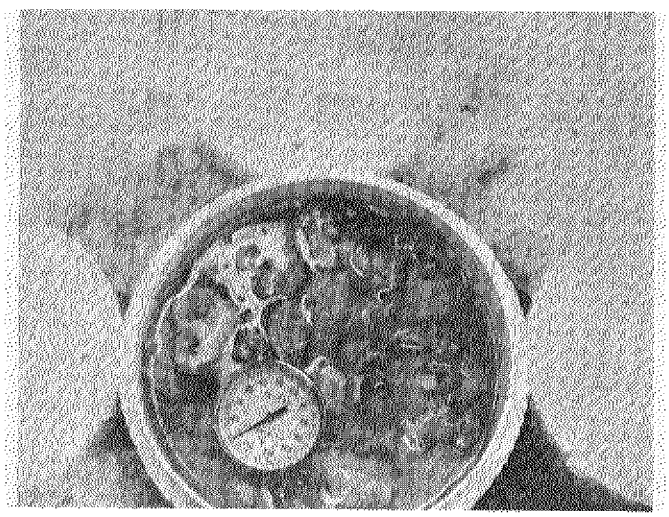
All waste materials, empty boxes, used containers, and trash should be moved outside the plant. Outside waste storage should be contained to prevent attracting insects, rodents, and dogs. All waste should be picked up on a regular schedule.

LABEL INFORMATION REQUIRED ON EVERY CONTAINER OF FRESH OYSTERS



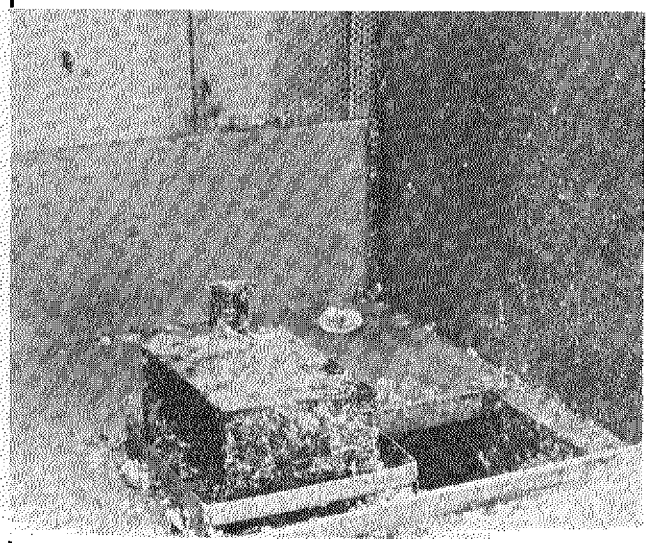
LAST SALE DATE indicates the 14th day after shucking. Florida law prohibits sale of fresh oysters 14 days after shucking.

Company name, address, and certification number can be used to trace the oysters to their point of origin.

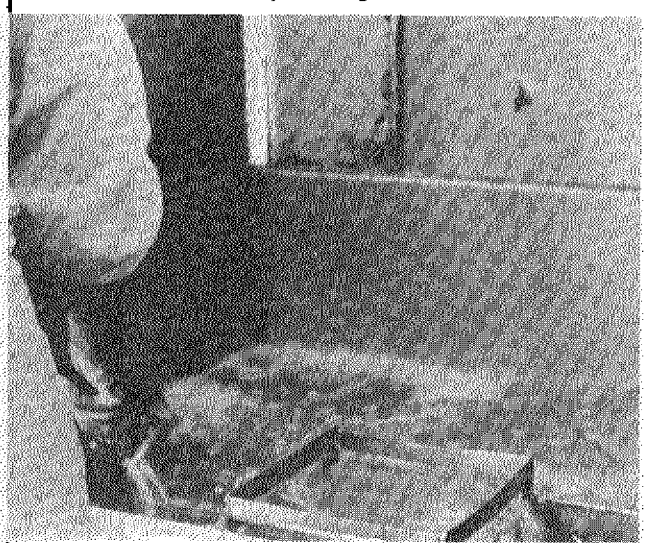


Fresh packed oysters should be stored with an internal temperature between 32°F to 40°F.

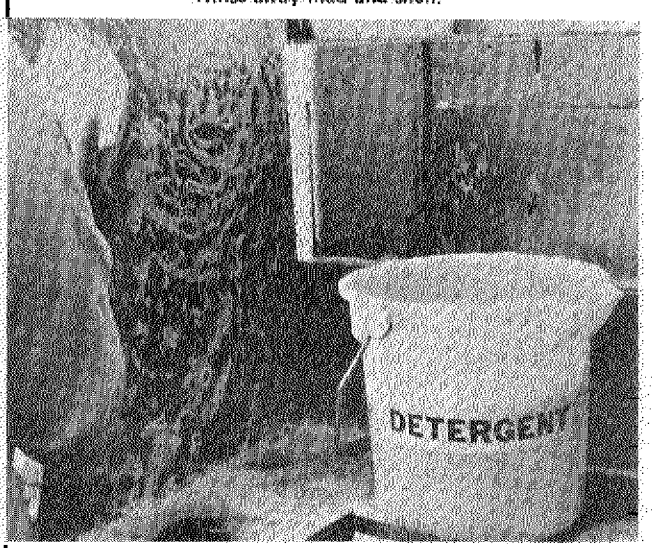
RECOMMENDED CLEANING PROCEDURE



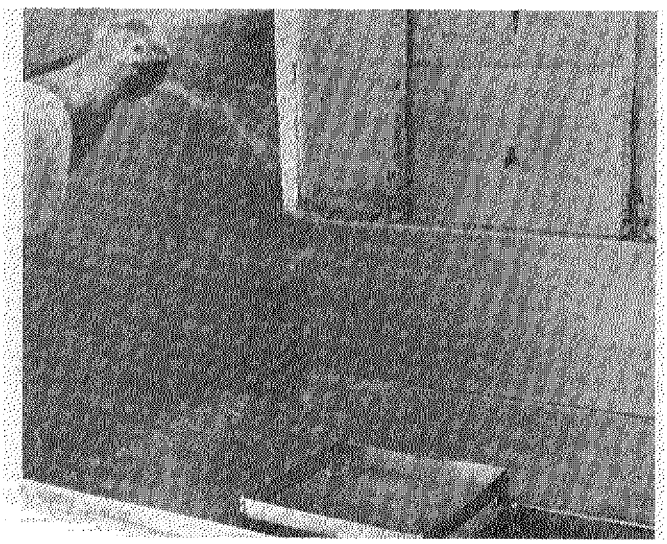
Dirty shucking stall.



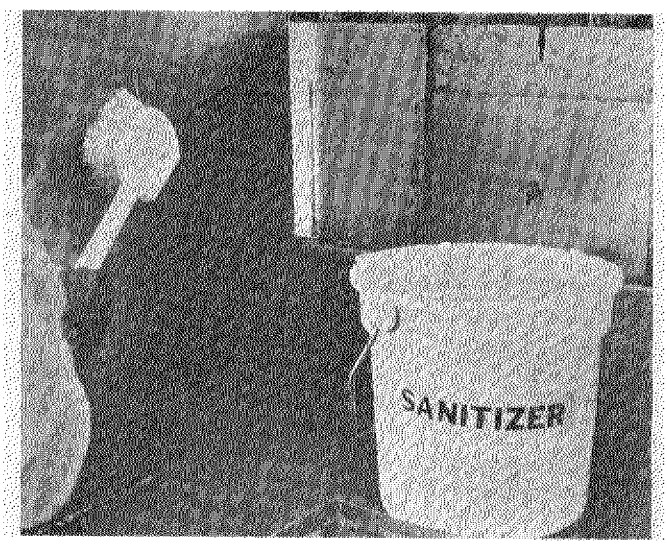
Rinse away mud and shell.



Scrub all surfaces with detergent.



Rinse away remaining detergent before final sanitizing treatment.



Regulatory Agencies

Regulation of oyster production is a complex job involving both harvesting waters and oyster processing operations. At the federal level, a National Shellfish Sanitation Program (NSSP) has been established. This program is a partnership between the U.S. Food and Drug Administration, various state shellfish programs, and the oyster industry. This partnership follows a recommended set of guidelines and standards established for growing water quality, harvesting, and processing.

In Florida, the State Shellfish Program is in the Department of Natural Resources (DNR). This program is divided into two sections. The Shellfish Environmental Assessment Section located in St. Petersburg monitors shellfish harvesting areas. The Bureau of Marine Resource Regulations and Development located in Tallahassee inspects and certifies processing operations. Also a DNR microbiology laboratory in Apalachicola tests for the number of certain bacteria in water samples and oysters.

Other state agencies are also concerned with oyster quality and safety. The Florida Department of Agriculture and Consumer Services is primarily concerned with the quality of oysters in retail operations, seafood markets, and grocery stores. The Florida Department of Health and Rehabilitative Services (HRS) is primarily concerned with oyster quality and safety in restaurants and other places oysters are served to consumers. This agency is also responsible for issuing **Health Permits** required for workers employed to harvest and process oysters.

All Florida state agencies can be contacted through their local county offices or by direct contact with the main office in Tallahassee.

Project No. A/MAP-1
Grant No. NA80AA-D-00038

Florida Sea Grant College is supported by award of the Office of Sea Grant, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, grant number NA80AA-D-00038, under provisions of the National Sea Grant College and Programs Act of 1966. This information is published by the Marine Advisory Program which functions as a component of the Florida Cooperative Extension Service, John T. Woeste, dean, in conducting Cooperative Extension work in Agriculture, Home Economics, and Marine Sciences, State of Florida, U.S. Department of Agriculture, U.S. Department of Commerce, and Boards of County Commissioners, cooperating. Printed and distributed in furtherance of the Acts of Congress of May 8 and June 14, 1914. The Florida Sea Grant College is an Equal Employment Opportunity-Affirmative Action employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, sex, or national origin.

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Prepared in cooperation with the
Florida Department of Veteran and Community Affairs and the
Florida Sea Grant Marine Advisory Program
with funds from the
Economic Development Administration and the
Florida Sea Grant College Program

This public document was promulgated at a cost of $1312.00, or 26.2 cents per copy, to provide guidelines regarding sanitation and production methods to persons involved in the oyster industry. 2-5M-82