

## **Shellstock Oyster Refrigerated Rates in Typical Harvest, Handling and Storage Containers**

**Objective:** To determine the cooling rates for harvested shellstock oysters in typical harvest, handling and storage containers/conditions after required refrigeration begins.

**Background information:** Beginning 2011, states including Virginia must implement regulatory required plans to control for *Vibrio parahaemolyticus* in shellstock oysters. To execute these plans, original oyster dealers must document and verify that internal oyster temperatures have reached a temperature of 50 °F or below within 10 hours of beginning refrigeration. In Virginia these requirements will be in place yearly from May 1<sup>st</sup> until September 31<sup>st</sup>. Oysters that cannot be cooled in this time frame will be diverted for shucking only and not allowed to be placed in higher value markets such as for raw or steamed half shell consumption. Original oyster dealers that are not able to meet these refrigeration requirements must determine how to achieve this requirement in order to continue to sell shellstock oysters.

Preliminary literature reviews show that some work has been done to determine physical properties of oyster shells and freezing rates of oysters to analyze the shellstock oyster for frozen shucking. Other literature work show that thermal properties of oysters have been evaluated for cooling oyster meats.

Because of the value of the shellstock oyster in state commerce, the regulatory requirements for food safety, the jobs in local and other parts of the state economy there are many parties interested in addition to the original oyster dealer to having this data determined.

Interested parties willing to participate will be from:

Industry: Aquaculture and Harvesters, Original Oyster Dealers, Shellstock Shippers, Oyster Processors

University: Virginia Tech: Virginia Seafood AREC, University of Maryland Eastern Shore

Regulatory: State Health Departments of Virginia, Delaware, New Jersey; Virginia Marine Resource Commission

### **Experimental Plan:**

Determine the types of containers that are used in the commercial harvest of shellstock oysters and then narrow down the list to a manageable number of possibly 4 containers. These containers would represent the majority of oyster containers used in commerce and the ones that would be accessible to use to measure the internal temperature of oysters as they are refrigerated over the required 10 hour period. Based upon the number of oysters in the container and the physical shape characteristics of the container we would determine the number of data points (up to 10) to collect internal oyster and external environmental data.

The data collected would be collected and tallied as below

[Location][date started][ time][elapsed time][internal oyster temperature][external oyster temperature]

The measured experiment would be run simultaneously on two up to a maximum of three similar containers at the same time depending upon the amount of logging equipment that could be incorporated into the experiment.

Data loggers to be used collect the about data would be ACR self-contained recorder buttons placed in oysters or Copper Constantine thermocouple probes wired to a Squirrel Eltek logger.

Software for the ACR and Eltek data loggers will for transfer of data to Excel Spreadsheets.

The measurements would be replicated three times for each container.

Critical factors for each container with shellstock oysters are: initial internal oyster temperatures, refrigerator temperature, volume of oysters, ambient air temperature around oysters containing data loggers located in the container.

#### **Preliminary Work:**

Review other preliminary work done in other states

Determine the Virginia locations of interested and willing participants and routes where the oysters would be targeted for refrigerated storage measurement.

Determine the time interval needed to complete the insertion of loggers in oysters, refrigeration, removal of data loggers, downloading of data and report development

Evaluate initial reports for improvement.

Perform test runs to determine if there are any unknown situations that would adversely affect the collection or handling of data.

**Estimated Costs:** Travel to the locations to perform set and remove data loggers, travel for preliminary meetings. Travel to ISS meeting in September to provide presentation via program or poster.

Data logger or other associated costs for lost or replaced equipment

**Reports:** Findings to be delivered to ISS and interested parties as shown in plan and as final research report.

**Timetable:** April 1, 2010- September 30, 2010

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