

Shellfish are delicious, nutritious and healthy — if handled properly. That means using appropriate time and temperature controls to slow or stop bacterial growth which will help reduce illnesses.



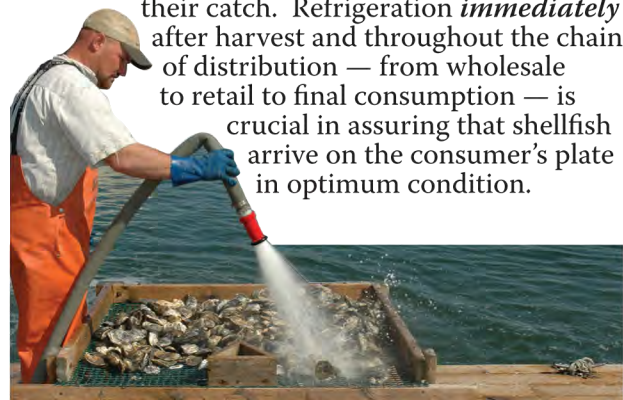
WHAT ARE VIBRIO BACTERIA?

Vibrio parahaemolyticus, (*Vp.*) and *Vibrio vulnificus* (*Vv.*) are naturally occurring bacteria that proliferate during warm weather. Shellfish can concentrate vibrios as they feed and if the shellfish are eaten raw these bacteria can make your customers ill. Eating raw or undercooked shellfish when *Vp.* bacteria are present at high levels can cause flu-like symptoms known as gastroenteritis (diarrhea, vomiting, headache, fever and chills). Symptoms can sometimes require hospitalization. Even worse, if an immune compromised individual consumes shellfish contaminated with *Vv.* it may cause serious illness or possibly even death.

HOW TO REDUCE OR ELIMINATE ILLNESSES CAUSED BY VIBRIOS

Vibrio bacteria thrive at higher temperatures, and when shellfish are warm the bacteria can multiply at alarming rates. Temperature control is the best way to limit bacterial growth and ensure that producers deliver the safest possible product to consumers. Bacterial growth slows at low temperatures and stops altogether below 45° F.

To reduce or eliminate bacterial growth harvesters should take every precaution to chill their catch. Refrigeration *immediately* after harvest and throughout the chain of distribution — from wholesale to retail to final consumption — is crucial in assuring that shellfish arrive on the consumer's plate in optimum condition.



HARVEST OPTIONS

During hot weather, depending on conditions in your growing area and harvest practices, the level of vibrios in shellfish at the time of harvest may already be high enough to cause illness even if temperature abuse does not occur. Several harvest methods can reduce or eliminate this risk, including:

- Harvesting shellfish from below the thermocline, where temperatures are several degrees cooler than at the surface.
- Harvesting shellfish before the tide goes out completely. Shellfish on exposed tidal flats can get very warm.
- Collecting shellfish in bags, baskets or cages, and then holding them submerged (preferably in cool, deep waters) until harvest. For this to work properly shellfish must be held in such a way that they can continue filtering water to allow themselves to purge accumulated bacteria.
- Watch for stray shellfish. When emptying cages or baskets be certain no strays get left behind!



POST-HARVEST TEMPERATURE CONTROL

The sooner shellfish are placed under temperature control (under 45°F) the better. "Harvest" begins at the time the first shellfish is exposed to the air, either on deck or when the tide recedes. At 80°F vibrio levels can double every hour.

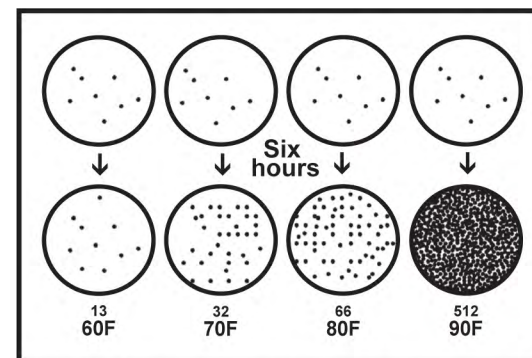
ACHIEVING AND MAINTAINING TEMPERATURE CONTROL

Temperature can be controlled through mechanical refrigeration, icing, or the use of gel packs. Studies have shown that direct icing can reduce shelf life of clams, especially when growing waters are exceptionally warm, but a layer of cloth between the shellfish and ice can prevent this. Make sure that the container can drain so no shellfish are sitting in ice melt-water.



Regardless of the method of temperature control used, make sure that shellfish in the center of the container get cooled as well. Providing shade to keep shellfish out of the sun can make a big difference. Once the shellfish are landed you can cool them with a spray of cold fresh water from an approved source.

Each state has established harvest protocols to determine the hours of harvest and maximum time to refrigeration in order to minimize bacterial growth.



Growth of *Vibrio parahaemolyticus* at various temperatures.



“CHAIN OF CUSTODY” TEMPERATURE CONTROLS

Temperature abuse of shellfish can cause low numbers of vibrio present at time of harvest to multiply to dangerous levels. Therefore, it is important for growers to educate everyone who handles shellfish about the importance of temperature control. This includes dealers, wholesalers, truckers, retailers, foodservice workers and consumers. Everyone in this chain needs to be educated about the importance of keeping shellfish under temperature control at all times. Ask them about their protocol and what measures they have in place to assure strict compliance with temperature requirements.



TRANSPORTATION

Temperature data loggers can be used to track changes in temperature throughout the transportation process, allowing receivers to see if and when temperature abuse occurred during transit. Many dealers use them to tell whether shippers are abiding by temperature requirements.



In the case of refrigerated trucks that are frequently opened to add other food items, ensure that shellfish are positioned so they stay cool during transport.

EDUCATE YOUR DEALERS AND BUYERS

Make sure your shellfish are handled properly as soon as they are turned over to the dealer. They can start the cooling immediately by spraying the shellfish with cold water. Don't let the dealer delay putting your harvest into refrigeration, and ensure that they have proper temperature controls in place.

BE A SHELLFISH PROFESSIONAL

By working proactively to ensure that everyone in our industry is keeping shellfish cool we can reduce illnesses, keep harvest areas open and avoid additional costly regulations.

FOR MORE INFORMATION CONTACT:

East Coast Shellfish Growers Association
(401) 783-3360 or bob@ECSGA.org
Visit our website: www.ECSGA.org
or contact your state
Shellfish Control Authority
listed at www.ISSC.org

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From Harvest to Table THE PERFECT SHELLFISH

