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Removal of Marine Worms from the Surface of Oyster Shells Using Salt Brine

Background

There are a variety of marine worm species that commonly inhabit the benthic sediment of oyster growing areas. Because of the oysters proximity to the substrate, benthic worms may often be found in the external crevices of oyster shells. As well, the worms may inhabit the holes in oyster shells created by the boring sponge *Cliona sp.* which bore holes when feeding on the oyster shell. Marine worm species do not harm the oyster, nor do they provide any public health risk



Two species of marine worms found on the external shell of a market ready oyster.

to the consumer. In the past, the presence of worms indicated to buyers that the oysters were freshly removed from the water. However, on rare occasions during the shucking process, a worm on the shell surface may fall or be pushed by the oyster knife onto the oyster meat, making the product unappetizing to the consumer. An incident like this in the early 1990's resulted in restrictions

on oyster importations to Quebec from PEI. As a result, oysters must be carefully cleaned to remove these fouling organisms. The washing technique used during processing occasionally may result in less than 100% removal of the worms, leaving live worms in the many crevices of the oyster shell. The Department of Fisheries, Aquaculture and Environment was asked by a local processor to determine if there was a method that could be used to remove the majority of the worms on oysters. The following note outlines the success of saturated brine treatments that were used to remove live marine worms during oyster processing.



Benthic marine worm that was transferred to the oyster meat during the shucking process.

Methods

Oysters were examined prior to and following processing at a plant on PEI. Following a rigid processing regime, that included high pressure washing, significant numbers of marine worms, in particular sandworms *Nereis sp* and bloodworms *Glycera sp* remained alive in the

crevices and on the surface of the oyster shell. The damp, cool storage conditions permitted worms to remain viable and active for an extended period of time. In an effort to find a simple method that would remove the worms, treatments with saturated brine were conducted. Immersion treatments of various times using a saturated brine solution (300 parts per thousand of food grade Windsor® Fine Salt) were incorporated into the regular processing procedure. All treatment trials were performed in triplicate. For each trial, the numbers of live and dead worms present on treated and untreated oysters were counted. Crevices on the oysters were carefully examined for live worms and a dilute solution (10%) of formaldehyde was used to force worms out of non visible areas to ensure no live worms escaped recovery.

Results

The results showed that saturated brine was an effective method to kill marine worms on oyster shells even at very short immersion times. Trials using immersions for 15 seconds proved effective in killing 99 % of all worms present.

Results of saturated brine treatments on marine worms at 15, 30 and 60 seconds compared with untreated controls.

Treatment Times*	Average # of Live Worms/30 Oysters	Average # of Dead Worms/30 Oysters	Average % Kill
15 Sec.	1	35	97
30 Sec.	4	26	87
60 Sec.	1	25	96
Control	25	5	17

* Treatments were performed in triplicate and the results presented as an average of the three trials.

Observations on oysters following treatment with salt brine revealed that worms dehydrate and fall off the shell surface or are readily removed by washing.

Conclusions

The undesirable experience of having a consumer find a harmless, but yet unappealing marine worm, on a freshly opened oyster may be easily rectified by immersing oysters in a saturated brine solution. An immersion tank may be easily incorporated in the processing line. The salt brine treatments, although not 100% effective, will greatly decrease the number of live worms found externally on oyster shells. Observations showed that washing the oysters prior to immersion will increase the effectiveness of the brine treatment by removing the majority of sediment. The brine solution is safe and easy to use. However, if a salt brine immersion treatment is added to the processing procedure, the Quality Management Program (QMP) should be adjusted and it will be necessary to perform a hazard analysis. Other studies using brine immersion treatment have also reported no adverse effects to oysters.

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