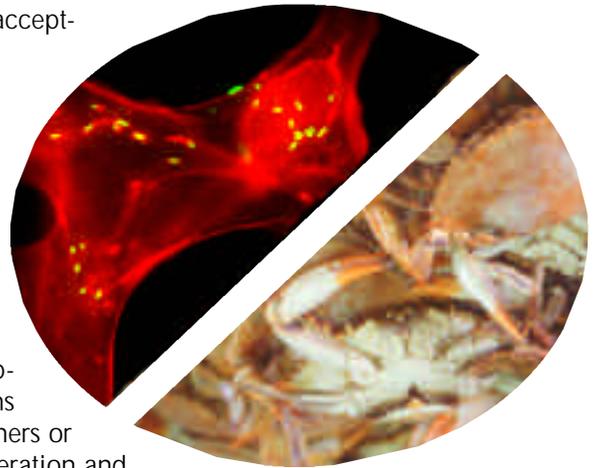


CONTROLLING LISTERIA IN CRAB PROCESSING PLANTS

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Listeria monocytogenes is a disease-causing bacterium that is not accepted, at any concentration, in ready-to-eat seafood. Its presence in crabmeat has led to numerous product seizures, recalls and economic loss for processors. Listeria is associated with soil and feces from wildlife, livestock and pets. Since it is found in seagull droppings and soil, Listeria often enters the plant on shoes and clothing. Even touching a pet is likely to contaminate hands. Listeria may also enter on cooked claws or other crab parts purchased from another company.

Listeria is introduced into processing plants in two ways; by (1) people or equipment entering the plant, or (2) populations of the organism that take up residence in the plant. Generally, a resident population of Listeria is the more difficult to control. Listeria forms biofilms that are not eliminated by normal cleaning with general purpose cleaners or by chlorine alone; it flourishes in moist conditions and tolerates refrigeration and salt.



Sources of Listeria Contamination

Any surface in the plant that is not routinely cleaned and sanitized thoroughly fosters the growth of *Listeria*, including:

- floor brooms and squeegees
- scrap/waste barrels, scrap hoppers and augers
- conveyor belts (especially rollers, underside of belts)
- door handles, push plates, strip curtains
- floors and floor drains
- sponges or cloths
- coolers
- under the lip of picking tables
- pickers chairs and footrests

How to Prevent Contamination by Personnel

1. Use a shallow footbath at all entrances to the picking and packing rooms. They are available from food industry suppliers such as Nelson Jameson Co. (800-826-8302, "disinfectant mat," stock #430-2007). Maintain footbaths with 400 ppm quat solution. Test with quat strips (e.g., Nelson Jameson #387-3297).
2. Require strict handwashing and hand sanitizing procedures. Follow full procedure at start-up and breaks, and dip hands in sanitizer at each weigh-up. Remember to
 - a. Wet hands (very warm water).
 - b. Apply hand soap and lather all surfaces up onto forearms, 20-30 seconds.
 - c. Rinse.
 - d. Dip in sanitizer (after about 20 seconds, dry with disposable paper towel).
3. Control picking room employee movement to the outside or raw crab areas.
4. Consider issuing smocks and washable/sanitizable aprons and boots that remain at the plant.
5. Avoid splashing water, for example, do not use a hose to spray the floor during processing.
6. Watch for hand carts, retort cage wheels or other equipment that may be rolled or dragged through unsanitized areas before entering the picking or packing rooms. Where this may occur, periodically wet wheels and floors with 400 ppm quat, using a pump sprayer.

7. Ensure that trays or bins that hold cooked crabs in the picking room are designed to prevent crabs or crab pieces from contacting the floor. Take precautions to prevent water splash or contact with equipment, boots, and other material.
8. Repair dripping gutters and fill depressions in walkways so that employees do not walk through roof run-off or other water before entering the plant.

How to Prevent Listeria from Taking up Residence

1. Implement an end-of-day cleaning program for all picking/packing room surfaces, involving the foam application of an alkaline or chlorinated detergent intended for the food industry (use recommended concentration) and sanitizer following the 5-step system:
 - a. Wet surfaces.
 - b. Foam apply detergent using warm water.
 - c. Scrub with "green" pads or brushes (approximately 10-15 minute standing time).
 - d. Rinse thoroughly.
 - e. Apply quat (QACs), chlorine dioxide, peroxyacetic acid or chlorine sanitizer. Use the equivalent of 200 ppm quat or 100-200 ppm chlorine on food contact surfaces (tabletops, pans, trays, knives, scales) and 400 ppm quat or 200-400 ppm chlorine on non-food contact surfaces (scrap handling equipment, floors, sinks, door handles and drains). A hot water dip (several minutes at 190°F) can be effective for small items, such as pans and trays, but is not required. Only do this after they have been washed with detergent — otherwise, the hot water will actually cook a crabmeat film onto surfaces. This film is hard to remove.
2. Clean the floor and accessible parts of floor drains first, then clean other surfaces from the top down, daily. Include undersides of tables and table legs (at least twice per week), chairs and stools. Pick articles up off the floor for washing and sanitizing, and store them off the floor so they dry. Walls should be foam-washed (scrubbing is only periodically required) from the "splash zone" down (lower 4-5 feet), daily. Foam and scrub scrap barrels, rinse and sanitize, at least daily (a hot alkali soak tank is another option). Never spray floors or drains with a pressure sprayer unless followed by a vigorous cleaning of other plant surfaces. Wash hoses and store them on racks off of the floor. Contact your chemical supplier or Maryland Sea Grant Seafood Specialist Tom Rippen for information on foaming equipment or other help with cleaning and sanitizing.

3. Individuals who touch scrap handling equipment or items that touch the floor should not handle food contact surfaces, such as bowls used on picking or packing tables. If this becomes necessary, first thoroughly wash, rinse and sanitize hands. Pickers should not touch chairs, undersides of tables or scrap barrels with hands, picking trays, or other equipment.
4. Routinely check and refresh hand dips (maintain 100 ppm chlorine or 25 ppm iodophor) and sanitizer dips used for crab shovels and at sinks used for bowls, trays and knives.
5. Consider removing all crab parts from the picking tables and moistening tabletops with 200 ppm quat, every 4-6 hours. A pump sprayer or disposable towel dipped in quat can be used for this procedure. Any excess sanitizer should be swept off with a hand squeegee (cleaned and sanitized) or disposable towel.
6. Prevent condensate formation that could drip onto crabs: condensation can occur in crab cooking areas, on cooler ceilings or on water pipes. Refrigeration coil catch-pans must drain discretely away from crabs or floor, preferably to the outside.

For more information on controlling Listeria, please contact Tom Rippen at (410) 651-6636 or terippen@mail.umes.edu. Additional copies of this Extension Brief can be printed from the web at: www.mdsg.umd.edu/Extension/listeria.html



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