

PROCESSING SEAFOOD UNDER SANITARY CONDITIONS

By: Evelyn Watts *

Most seafood processing facilities focus on developing and implementing a HACCP plan (which is a preventive base program that identifies significant hazards associated with the species and the process of the food product) but forget to build a strong sanitation program. Considerations that will help ensure proper sanitary conditions and practices are presented in this article.

The U.S. Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA) require seafood processing facilities to develop and implement a Hazard Analysis Critical Control Point (HACCP) plan. A HACCP plan is a preventive base program that identifies significant hazards associated with the species and the process of the food product, and focuses on specific steps to prevent, control, or

reduce the hazard to an acceptable level. However, a HACCP plan is not a standalone program. To provide a good base for a strong HACCP program, Good Manufacturing Practices, Sanitation Control Procedures, and other pre-requisite programs are needed (Figure 1).

The FDA regulates all seafood products except for fish from the Order Siluriformes. FDA requires seafood processing facilities to monitor conditions and practices during



Figure 1. Food Safety Pyramid. Good Manufacturing Practices, Sanitation Control Procedures, and other pre-requisite programs are necessary to build a strong HACCP program.

processing with sufficient frequency to ensure compliance with conditions and practices specified in the Current Good Manufacturing Practices regulation in 21 CFR 117 Subpart B 21 CFR §123.11). Facilities are required to keep sanitation control records on file.

The USDA regulates Siluriformes fish processing facilities. USDA requires establishments to comply with two sets of regulations concerning sanitation: 1) Sanitation Standard Operational Procedures (SSOP) and (2) Sanitation Performance Standards 9 CFR Part 416). Under SSOP requirements, facilities must develop, implement, and maintain written procedures for the tasks completed daily, before, and during operations, to prevent product contamination.

Most seafood processing facilities focus on developing and implementing a HACCP plan, but forget to build a strong sanitation program. Even though the FDA and USDA approaches to sanitation might be different, they both concur that sanitary conditions are necessary to produce a wholesome and safe food product. Considerations that will help ensure proper sanitary conditions and practices during processing are presented below:

1. Safety of Water

All water used in processing must be to drinking level standards; whether it is obtained from a municipal source, treated from a well, or seawater. Proof that the water is safe and potable must be available. For municipal water in the U.S., a copy of the water bill is usually sufficient documentation, as most have high chemical and microbiological standards, have been purified or treated, and are regularly tested. If the municipality does not provide water analysis or water comes from a private well, testing for safety is required twice a year, at least for coliforms (otherwise known as bacteria from sewerage).



Image 1. Color coding for food waste handling.

Contamination of wells can occur due to floods or heavy rains, location close to septic tanks, or cracks or improperly sealed equipment. Seawater must meet the same requirements for municipal and private sources, and so must be treated and tested.

Ice is considered the same as running water, and ice machines should be sanitized to ensure they do not contaminate the seafood (Image 3).

Safe water also involves proper plumbing to prevent cross-connections between clean water and post-process or wastewater. Backpressure or siphoning can result in back-flow; this can be prevented by using air gap, vacuum breaker, or check valve. Hoses should be properly stored, hanging off the floor when not in use, and not submerged in tanks.

items during each cleaning is necessary.

The design of food contact surfaces is just as important as the condition. Food contact surfaces should be easy to clean and smooth, including seams, corners, and edges. The surface material should be non-toxic, non-absorbent, resist corrosion, and unaffected by repeated cleaning and sanitizing. Avoid wood, iron-based metals, brass, and galvanized metal.

Proper cleanup to maintain sanitary conditions should be a five-step procedure: solid waste removal, rinse, detergent application, and then rinse again, followed by the application of a sanitizer.

Several methods can be used to wash food surfaces effectively, including a soak tank, foam, automated system, or good old-fashioned scrubbing by hand. The key is to allow enough detergent contact time, use of hot water, with enough scouring to remove unseen waste in

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2. Good Condition and Clean Food Contact Surfaces

Any surface that touches seafood during processing should be kept clean and sanitized. This includes tables, conveyors, baskets, totes, cutting boards, knives and other utensils. Gloves and aprons are also food contact surfaces and should be kept clean and not used when torn or cut. A good visual inspection of these



Image 2. Condition and cleanness of food contact surfaces.

every corner and fissure. Scrubbing brushes should be kept clean and sanitized, and used for cleaning food contact surfaces only.

Sanitizer solutions must be used at recommended strength. Check the solution often using test strips, and replace sanitizing solution if diluted (Image 2).

Finally, all food processing items should be stored in a clean and dry location, not exposed to splash, dust or other contaminants. Follow these steps, and all other good manufacturing practices, to produce safe, sanitary and quality seafood.

3. Prevention of cross-contamination and cross-contact of allergens

Cross-contamination happens when bacteria move from an item to the seafood through direct contact. The source of these pathogens could come from the seafood handler or other personnel, raw seafood, equipment or utensils, or the processing plant environment.

Cross-contamination can be prevented with the separation of raw and cooked product at every stage in the processing chain, from receiving to shipping. Not only should there be separate areas for raw and ready-to-eat products, but also, clothing, utensils, and cleaning tools should not cross from raw to cooked foods. Color-coding is recommended to separate utensils from food contact

surfaces and non-food contact surfaces, as well as raw and cooked areas. Controlling the movement of equipment and using the right utensils for the right purposes can play a key role in sanitation (Image 1).

Another important way to prevent bacteria from contaminating your seafood is to limit employee traffic to essential personnel, who use good hygiene and hand washing practices. Proper hand washing is essential, as is the use of hair and beard covers, footwear, and a ban on any and all jewelry, and food and drinks in processing areas. Just the simple act of touching an unclean cooler door handle, then handling the product, can lead to unsafe food.

4. Protect food from adulteration & proper label, use and storage of toxic compounds

Seafood must be protected at all times from ‘adulterants.’ An adulterant is a substance that will contaminate the food product: non-food grade lubricants, fuel, pesticides, detergents, and sanitizers. Seafood, as well as packaging materials and sur-

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faces should be protected from condensate or other dripping liquids, and from splashes of pooled water that may contain these toxic compounds.

Though exposure to these substances may be small, adulterated food is still considered unsafe, with the potential to harm the health of a consumer. Avoid contamination by checking food areas regularly for any pooled or dripping liquids, and correct those issues in one or more possible ways:

- remove the condensate,
- correct air flow and room temperature,
- install covers or trays to collect condensation,
- rinse surfaces that have been sanitized with too high a concentration of sanitizer,
- remove standing water on floors,
- discard unlabeled chemicals.

All toxic compounds, like cleaners or pesticides, should be clearly labeled. Products in their original containers must show the compound name, manufacturer's name and address, approvals, and instructions of proper use. Chemicals in working containers, like spray or mixing bottles, must be labeled with the name of the compound and instructions for proper use.

Storage of these products must be separate from processing areas— in a room with limited access, segregated by food grade and non-food grade, and away from food equipment, utensils and other food contact surfaces. NEVER store cleaners and sanitizers in food containers that could inadvertently be used to pack product.

Inadequately labeled supplies should be returned. Damaged containers should be destroyed. Reinforce training of employees to avoid exposing seafood to toxins by mistake.

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Image 3. Safety of Ice.

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focuses on the employees. Even a healthy person can cause contamination on food in process, just by touching their face or opening a door.

5. Employee health and personal hygiene practices

A key part of Good Manufacturing Practices focuses on the employees. Even a healthy person can cause contamination on food in process, just by touching their face or opening a door. Hand washing is the best way to limit the spread of germs, and it starts by making hand-washing facilities easily accessible near bathrooms and entrances. These facilities should be dedicated to hand washing only, and employees should be taught how to wash properly using liquid soap, hot water, and thoroughly drying using paper towels or air blowers. Hands should be washed each time personnel enter the processing floor, after using the restroom, and after sneezing, coughing, or touching skin.

Though all areas of the facility must be kept clean, it is very important to pay special attention that toilet facilities and hand washing stations are kept clean and in good repair at all times. Soap and hand drying products must be available always. Trash should be emptied often to prevent overflowing.

Personal cleanliness, clean outer garments, removing jewelry, wearing gloves and hair restraints, and excluding such things as gum, food and drinks, tobacco, makeup, and any personal belongings from the food production area will help control the spread of bacteria.

A sick employee is a potential source of microbial contamination, no matter how well they wash their hands. This includes any person with symptoms such as diarrhea, fever, vomiting, jaundice, sore throat with fever, open skin sores or cuts, boils, and dark urine. Management should set clear company policy on when to restrict or exclude an ill employee, and when to allow such an employee to return to work.

Just as personnel have the responsibility to maintain good health, report illness, wash hands properly, and be aware of unsanitary conditions, facility management is responsible for training employees so they understand what is expected, monitoring their work and work space, and setting a good example by following all good manufacturing practices, including health and hygiene.

6. Pest control

Control of insects, rodents, birds, and other pests is a key sanitation practice to prevent the spread of bacteria and disease. A good pest control program should use three strategies: (1) eliminate shelter and attractants; (2) keep pests out of the plant; and (3) extermination of those that get inside. Above all, the key to success is consistent monitoring for the presence of pests and adjusting the pest control program as needed.


Grounds around the facility should be clear of weeds, tall grass, and debris where pests could hide, as well as no standing water. There should be enough traps set in good condition.

The condition of the building should be inspected. Windows and doors should have a tight seal and window screens should be intact

with no holes. Openings that allow pest intrusion should be eliminated. Drains should be cleaned, and properly fitted with good covers. Blacklights for flying pests should be inspected to ensure proper function.

Plant machinery, equipment, and utensils can also serve to harbor pests. These should be consistently cleaned to prevent pest attraction. Survey the space between equipment, stored material, and the walls. Make sure there is enough room to clean and sanitize between equipment and walls, and debris are not accumulated in any dead spaces.

Good housekeeping throughout the building will help prevent attraction of bugs and rodents. Keep trash picked up and properly stored and disposed. Maintain clean and sanitized areas that might accumulate food or water, including the locker and break rooms, as well as waste bins. During regular monitoring, be sure that any sign of pests is cleaned up, not just for sanitation, but so that any new activity can be noted.

Pest extermination can be done by an outside pest control company or the facility can handle the job. Always remember that pesticides must be properly labeled and stored, and follow manufacturer's instructions for application. 



Dr. Evelyn Watts has a Veterinary Medicine degree and a Master's in Food Safety from the University of San Carlos in Guatemala, and a Doctorate in Food Science from Louisiana State University. She works with seafood processors in Louisiana assisting in regulatory compliance, as well as providing guidance on handling, processing, packaging and storage technologies.