Seafood Processing Involves Unique Challenges

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While there are some similarities between process seafood and other animal protein procedures, the seafood-processing environment carries with it some unique challenges driven by the nature of the organisms involved and their generally higher degree of handling.

A Matter of Time

Time is a critical factor in the seafood business. The process period for fish, shellfish and other marine organisms begins from the moment of harvesting to delivery of the finished product to the consumer. With other animal proteins, the processing period begins when the animal arrives into the slaughter facility, not when the product is “harvested” from the farm.

Temperature Troubles

If being kept alive, the product must be stored in cold water, similar to the environment from which it was harvested, to reduce loss. Otherwise, the product must be hygienically eviscerated, which is usually done onboard the boat or ship, either by hand with a knife or with the use of a gutting machine on larger vessels. The only exceptions are small, fatty fish, such as herring, which are not usually eviscerated.
The temperature of harvested seafood must be maintained by freezing or icing the product to prevent protein degradation. Within this cold storage, hygienic conditions must be maintained in order to avoid contamination, including the ice that is

typically spread over and into the seafood products to maintain temperature.

Moreover, the ice itself must be made hygienically to avoid contamination. On some of the larger or more modern boats, the product is frozen rather than iced. While frozen product is not intended for the fresh market, freezing is quite effective at minimizing the risk of protein degradation.

Hygiene Is a Priority

In addition to the storage facility, personnel, clothing and equipment must be maintained in a sanitary manner. Waste must be disposed properly to reduce the risk of contamination to the product and to the environment.

While large ships may have entire processing operations aboard that operate under a full food safety program, some smaller vessels have begun instituting Hazard Analysis and Critical Control Point (HACCP) plans and good manufacturing practices (GMPs) over the last 10 to 15 years. These practices start with the condition of the boat itself: The structure must be designed to process, handle and store the seafood. Any equipment being used, such as the knives or other eviscerating tools, shovels, etc., must be cleaned, sanitized and stored in a sanitary manner.

The ice production and storage must be clean and sanitary. The temperature at which the seafood is held generally becomes the critical control point, while there may actually be other critical control points, depending on the boat’s structure and any processing that is being done on board.

In the case of whole fish, the processing challenges may not end there. Whole fish must be moved from the boat to a container that allows the product to be sold straight to the consumer. This transfer creates the potential for contamination and safe-temperature violation. To avoid the risk, industry best practices dictate the seafood must be placed on ice into sanitary, insulated fiberboard boxes or other hard plastic containers while on board the vessel, thus reducing the handling requirements for transferring the product from the boat to the consumer.

When the seafood reaches what the other animal protein industries would consider the “processing facility,” seafood typically must undergo more manual handling than other animal proteins. Most seafood is wet packed or placed on ice, while the remainder of animal proteins is sold under dry-pack conditions.

Even live seafood products, such as shellfish and finfish, must be kept in proper water or proper moisture to keep them alive. These tanks require maintenance and, if not done properly, the tank itself can be a source of contamination.

Contaminant Concerns

In addition to unique handling requirements, seafood is subject to a host of contaminants other animal proteins need not worry about, such as mercury, clostridium botulium E, vibrio, scombrotoxin (histamine) and other natural toxins like ciguatoxin and neurotoxins, just to name a few. In 2011, the Food and Drug

Administration (FDA) updated the list of hazards found in the Fish and Fishery Products Hazards and Control Guidance. Species, water source and harvest location dictate which types of contaminants must be tested for and how the test must be conducted.

Fortunately, in the past few decades, the seafood industry and government regulatory bodies have worked together to develop systems to test and inspect the water and the products to reduce and eliminate these contaminants from entering the food supply wherever possible.

Given the recent development of aquaculture practices, veterinary drugs — once only a factor in other animal product industries — have now become a concern in the seafood business as well, and the entire animal protein industry now battles constantly to eliminate illegal or improper use of veterinary drugs.

Species Identification

The seafood industry is especially unique due to the large variety of species involved. Throughout the processing chain — from the boats and processing plants to the wholesalers, importers and retailers — there exists a good chance for misidentification of the species.

While this is less likely with whole fish and more likely with processed fish, the problem can be eliminated. To combat the risk, the industry has established traceability systems to track the properly identified whole fish throughout the entire processing system, and the regulatory industries are utilizing PCR-DNA analysis to reduce fraudulent practices.

Industry, Government Cooperation Drives Quality & Safety

To control issues associated with seafood production, the industry has turned to food safety programs that include HACCP, GMPs, traceability of sourcing, and certification of materials and handling for the products. Many of these programs have been developed and enforced by regulatory personnel. There are many of these programs throughout the world, but in the U.S., this is primarily done through the FDA Seafood HACCP program and the U.S. Department of Commerce National Oceanic and Atmospheric Administration (USDC-NOAA) audit, inspection and testing programs.

The U.S. Department of Agriculture (USDA), which oversees the safety of catfish, is also developing a program that will combine meat inspection regulations with the FDA and USDC-NOAA specs for other seafood species. This program will be handled by the Office of Catfish Inspection Programs (OCIP).

In addition to mandatory regulatory programs, there are also industry-backed programs, including the Global Aquaculture Alliance Best Aquaculture Practices. This program is a seafood-specific program that has been benchmarked against the Global Food Safety Institutive (GFSI).
The industry and the government regulatory personnel have combined their efforts

to develop systems of auditing, inspection and testing to remove companies that supply adulterated or misbranded products, and to ensure the delivery of high-quality, safe seafood products to consumers throughout the world.

For more information, please visit www.us.sgs.com *[1].*

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