Developing a HACCP Program for the Catfish Processing Industry

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Hazard analysis of critical control points (HACCP) is an inspection concept developed by the National Aeronautics and Space Administration (NASA) and the Pillsbury Company that combines risk assessment with critical control points. These tools of quality control are being expanded to include quality assurance from the producer (harvester) to the consumer. The idea of HACCP is to locate and control potential problems before they become a reality.

Several agencies are now involved in developing a HACCP program. These include the U.S. Department of Agriculture, Food and Drug Administration and National Marine Fisheries Service. Most programs utilize from six to ten points. This paper utilizes seven points to develop a program.

What is HACCP?

HACCP locates specific points in the food plant that must be controlled to produce a high quality product under good sanitation, labeled correctly and free of contamination. One might be reminded of a particular problem that occurred last week, or even yesterday. Some examples include:

- the breakdown of a refrigeration unit, causing the temperature to rise and product to thaw;
- a pile of fish you saw lying on the table during lunch;
- fish that wasn’t tested for off-flavor;
- a new employee who didn’t remove all of the viscera, resulting in customer complaints;
- an old product pulled from the back of the freezer because you needed to fill an order (two of your customers complained, returned the product and are now former customers); or
- a truck that breaks down and sits full of product, overnight.

These are just a few critical control points (CCP) that could exist. Somehow, they must be transferred to your employees without giving them license to throw away product indiscriminately and thus affect your bottom line.

1. Commitment

The scientific community and the food industry are learning that microorganisms cannot be controlled by inspections of finished product.

Figure 1. A well-lighted, well-designed plant is conducive to better quality control.
Prevention of contamination, whether microbial, physical or chemical, during processing is the key to longer and safer shelf-life of any product. A dedicated HACCP program allows this to be done.

Seafood is an expanding part of the food industry. This industry must demonstrate its own capability to produce consistently clean, wholesome and safe product. As pounds per capita consumption of seafood increases, the industry can expect to have more attention from the news media. The industry must portray an image of quality, safety and wholesomeness to their customers and consumers.

Many processors as well as scientists and governmental regulators believe that HACCP is the best available voluntary program for achieving the objectives of food quality and safety. Since the program is voluntary at present, the first criteria for success is total commitment by the manager/owner of the food facility. Management must be willing to delegate responsibility and authority to the quality assurance manager or the HACCP team.

Future regulation of the industry may well require each processor to develop a HACCP plan for submission and approval by the appropriate regulating agency.

2. Develop a HACCP team

There are certain individuals within a plant who are safety and/or quality conscious. These individuals should make up the team. Care should be taken to represent as many areas of the plant as possible since this is where the knowledge will originate. Production, engineering and quality control are obvious, but do not overlook procurement, sales and one of the most important but most often overlooked department – sanitation. Yes, individuals cleaning your plant can inform you about product waste at the end of a shift, especially if you are running two shifts. They know where the frayed belts, clogged drains and deferred maintenance problems are.

Your department managers may already meet on a regularly scheduled basis but this team should be made up of people who are in intimate contact with the product, i.e., line leaders – the ones who are first on the job. Discuss with them
the program they are about to develop. Assure them of your commitment and cooperation. Perhaps invite an outside individual to discuss HACCP with them.

3. Construct a flow diagram

The first step may be to look at blueprints. Are they up to date? (See figure on pages 4 and 5.) Are handwashing facilities located strategically throughout the plant? Once inspection of seafood processing becomes a reality, a plumbing plan such as this will be required. A site plan to show the exact location of the official premises and a floor plan that shows the flow of product ensuring re-contamination does not occur will also be required by the regulatory agency.

Construct a good flow diagram utilizing the prints and knowledge of team members. Include every process the product encounters. (See Figure 5 on page 6.) Discuss each step until everyone on the team has a clear picture of what happens to the product at this particular step. For instance, the 14th step in Figure 5 is washing. Is the water potable, chlorinated, and if so, how many ppm?

4. Determine critical control points

This portion of development requires the most thought. It is sometimes difficult to separate an item that should be controlled but is not critical to human health. For example, a 4-ounce fillet found within a package supposedly containing 6-ounce fillets is mislabeling but is not an item critical to human health. However, inclusion of fecal material on the fillet, resulting from improper viscera removal and/or improper washing, would certainly be of concern. The HACCP team should determine CCPs after constructing the flow diagram with, perhaps, the help of a facilitator.

A critical control point is a point in operations which, if not controlled properly, could result in a human health problem. In contrast, a control point is a point in the operation which, if not monitored, may result in a definite reduction in product quality or marketability. Allowing a 4-ounce fillet to be packaged as a 6-ounce fillet does not endanger human health but it affects marketability and may be considered economic fraud. Some plans now being developed include economic fraud with human health problems when considering CCPS.

Individuals from the various areas of the plant should identify the CCPS, being careful to separate control points from CCPS. There may be areas where there are no CCPS. As the program progresses, areas may be added or deleted as conditions in the plant change. A plant may have four to six CCPS on which it should focus. In the plant in the centerfold there would be:

1. sampling live fish
2. viscera removal
3. washing
4. filleting
5. trucks
6. customer storage.

5. Set control procedures and corrective actions

Now that CCPS have been determined, what are you going to do about it? Who will do it? When will it be done? What happens to the product involved? These questions must be answered. The answers will test management’s commitment. Control procedures outlining exact parameters and corrective actions to enforce CCPs must be written.

Suppose the CCP at the filleting station is “presence of bones in the fillet.” The control procedure would be to inspect ten tubs of fillets from each lot for bone fragments and record the findings. If fragments are found, corrective action may include informing the filleters and requiring rechecks of fillets for bones.

6. Monitor, report and act

Three major areas of concern to be monitored include:

- Microbial – limiting the total load which would lead to spoilage as well as specific microorganisms; i.e., *Clostridium, E. coli, Staphylococcus, Campylobacter*, and *Listeria*, which could cause foodborne illness.
- Chemical – hazards such as antibiotics, algaecides and other chemicals introduced into the plant via the seafood. Care must also be taken with in-plant chemicals such as cleansers, sanitizers and lubricants. Strange as it seems, paint hasn’t been implicated in the contamination of food products.
- Physical – concerns include many items an employee may inadvertently add to your product. Tissues have been found in bread, cigarette filters in canned peas and bolts together with teflon filters in tomato products. These make for poor customer relations.

Very few of us like reports or forms but they are needed if the program is to be viable. Suppose you have determined that one of your CCPS is the temperature of your product cooler. Since fish freezes at 28°F and since we know *Listeria* can survive at 37°F, our goal maybe 33°F. We need to know how well our refrigeration unit is functioning. Will it uniformly maintain 33°F? A chart similar to the one shown in Figure 8 could be used in which the
Figure 5. A simplified flow chart diagram for a processing plant.

Employee assigned places an “X” at the proper temperature. Keep records simple and meaningful. An automatic recorder may be more useful for something this critical. Information should be transmitted to management and maintenance in the event of a malfunction. Should the temperature rise above the limits set, quality control personnel must make a determination as to the fate of the product. This will depend on: (1) temperature of the product, (2) length of time the CCP was violated and (3) corrective action procedures spelled out in the HACCP plan.

7. Training

Employees need to be trained concerning the new system of quality control. They will make or break the program. The training program may consist of breaking into groups and developing or revising the program. Remember this is NOT a static program – it will evolve as need for other CCPs becomes evident.

Summary

For a HACCP program to be viable, it must involve the commitment of management and the employees. The seafood industry has the opportunity to implement a program to regulate itself before government regulators make the decision for us. Identify CCPs, set parameters, create a procedure to monitor the CCPs, determine safeguards, set up a record system that works and continually verify that the system is working.

A HACCP system is not setup quickly and is not static, but, once in place, you will feel you have control of your operation.

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Figure 7. Prior to final packaging, fillets undergo quick freezing.

Figure 8. A simplified refrigeration record which charts acceptable and unacceptable temperatures.
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