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Extension

Food Safety:

Hazard Analysis and Critical Control Points Overview

Extension Consumer Food Safety Fact Sheet

A Hazard Analysis and Critical Control Points (HACCP) plan is a regulatory requirement for processing some food products (meat and poultry, juice, seafood, some vacuum-packaged foods). However, more food buyers are now requiring other food producers to have an HACCP plan in place. Developing and implementing an HACCP plan can help food processors produce food with a risk-based, systematic, preventive approach to food safety. Since the FDA Food Safety Modernization Act (FSMA)[1] was implemented in 2011, food manufacturers, other than those listed above, may also be required to develop a Hazard Analysis Risk-Based Preventive Control (HARPC) food safety plan. Therefore, it is beneficial for all food processors to move toward having HACCP plans.

Prerequisites for HACCP

Before implementing an HACCP plan, processors must have certain pre-requisite programs in place. Note that the importance of these programs are more prominent under FSMA and will require more documentation (monitoring, corrective actions, etc.). More information on these pre-requisite programs is available in a Kansas State University/University of Missouri Extension Food Safety Fact Sheet MF3201, *Food Safety: Good Manufacturing Practices*[2]. These programs include the following:

Good Manufacturing Practices including

- Buildings and facilities
- Equipment and utensils
- Personnel
- Raw material/supplier control
- Process control

Other prerequisite programs

- Cleaning and sanitation
- Allergen control programs
- Pest control programs
- Chemical control
- Glass control
- Foreign material control
- Traceability and recall systems
- Food defense program
- Pathogen testing
- Preventive maintenance

Intent of HACCP

- HACCP aims to prevent hazards in the following categories:
- Biological (e.g. bacterial pathogens)
- Chemical (e.g. cleaner residues, allergens)
- Physical (e.g. glass and metal fragments)

Initial Steps to Developing an HACCP Plan

Once your prerequisite programs are in place, you should undertake the following steps[3]:

1. Assemble the HACCP team
2. Describe the food and its distribution
3. Describe the intented use and consumers of the food
4. Develop a flow diagram which describes the process

[1] Current information on FSMA is available from: *https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements/food-safety-modernization-act-fsma*

[2] Available from: *https://bookstore.ksre.ksu.edu/pubs/food-safety-good-manufacturing-practices_MF3201.pdf*

[3] A number of HACCP resources, including example forms that can be utilized are available from Kansas State University: *https://www.asi.k-state.edu/research/meat-science/haccp/*. Others are also available by searching online.

5. Verify the accuracy of the flow diagram.
   - For processed food products a separate HACCP plan is needed for each product or for a group of products that have the same processing steps and hazards. In retail and foodservice HACCP, each plan is usually organized around a different food preparation process.[4]

Develop Your HACCP Plan

These seven principles should be followed in order to ensure a robust HACCP plan:

1. Complete a hazard analysis for every step in your product flow diagram.
   a. Identify and evaluate biological, physical, chemical food safety hazards at each step of the process.
   b. Identify which hazards are likely to cause severe illness or injury if not controlled.
   c. Must include documentation that supports all decisions made in the hazard analysis, including[5]:
      i. Determining if something is or is not a hazard (decision-making documents).
      ii. The effectiveness of a control measure.
   d. For every step in the hazard analysis:
      i. The hazard that must be controlled is a critical control point, and the HACCP team must focus on the most severe or high-risk hazards because resources are limited; and
      ii. Non-significant hazards can be managed outisde the HACCP plan through prerequisite programs.
2. Identify Critical Control Points (CCPs) required to control identified hazards.
   a. All significant hazards must have a control measure implemented to prevent, eliminate, or reduce the risk to an acceptable level.
   b. For example, chilling, cooking, product formulation controls.
3. Determine Critical Limits (CL) or control steps that must be met at each identified CCP.
   a. Boundaries of safety to control identified hazard to ensure product is safe to eat.
   b. For example, cooking to > 170°F, obtaining pH <4.6
4. Develop procedures to monitor CCPs.
   a. Planned sequence of observations or measurements to assess and accurately document whether or not a CCP is under control.
   b. Need to think through and document who, what, where, when (how often), and how measurement will be taken. If there is a deviation from the CL, the CCP is 'out of control' and immediate action must be taken to correct the situation.
   c. For example, taking and recording product temperatures.
5. Establish corrective actions.
   a. Procedure to be followed when monitoring indicates a deviation from the critical limit at a CCP.
   b. Describe how to bring process back under control.
   c. Document and determine what to do with non-compliant product.
   d. Conduct an investigation to determine the root cause of deviation and how to prevent it from happening again.
6. Perform verification procedures.
   a. These are the activities performed to verify that:
      i. the HACCP plan is operating as intended, and
      ii. the control measures are scientifically valid for producing a safe product.
   b. Procedures include:
      i. Review of records (pre-shipment for meat and poultry; within 1 week for FDA products).
      ii. Direct observation (by a second person) of monitoring activities.
      iii. Calibration of equipment (thermometers, etc.).

[4] Information from numerous sources available from: *https://www.nal.usda.gov/programs/fsrio*
[5] For meat and poultry products, USDA/FSIS released Directive 5,000.6 "Performance of the Hazard Analysis Verification (HAV) Task" on June 29, 2018, which reinforces the need for this documentation.

iv. Review the HACCP plan annually — especially the flow chart and hazard analysis — to confirm updates and ensure all control measures remain scientifically valid.

7. Establish effective record-keeping systems.
   a. Documents that the HACCP system is operating according to the written plan.
   b. From an inspector's perspective: if something isn't recorded, it didn't happen.
   c. Good records allow producer to trace product if problems do arise.
   d. Records to maintain include the following:
      i. Summary of how the HACCP team conducted its risk assessment in the hazard analysis and what basis it used to determine significant hazards.
      ii. Details of your entire HACCP plan (CCPs, CLs, monitoring procedures, corrective actions, verification procedures).
      iii. Daily monitoring records (including equipment calibration, corrective action log, CCP records).
      iv. Pre-requisite program information and records, including Sanitation Standard Operating Procedures (SSOPs), allergen control plan, etc. This is particularly important for those programs that are used to support the decisions in the Hazard Analysis.

Other resources:

USDA (meat and poultry) website on HACCP: *https://www.fsis.usda.gov/inspection/compliance-guidance/haccp*

FDA (seafood, juice, retail and food service, others) website on HACCP: *http://www.fda.gov/food/guidanceregulation/haccp/default.htm*

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