

## Chapter 2

# HACCP SYSTEMS EXPLAINED

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Food safety begins with effective controls and practices during farm production. It continues through processing, distribution, retailing and consumer handling. Thousands of operations around the world use HACCP-based food safety programs in various stages of food production.

This chapter gives an overview of HACCP and explains the basic requirements to set up and maintain an effective and successful HACCP system.

*Consumer awareness of food safety and changing regulations are good reasons to adopt a food safety system such as HACCP.*

## 1.0 WHAT IS HACCP?

HACCP (pronounced 'HAS-sip') stands for Hazard Analysis Critical Control Point. HACCP is an internationally recognized, science-based food safety system that focuses on preventing, eliminating and reducing hazards. It differs fundamentally from any inspection-based system because it identifies and deals with hazards before an incident occurs.

### HACCP **is**:

- Recognized as the best way to eliminate, reduce or control hazards in a food handling or processing environment;
- Developed and maintained by individual processors to control their particular food safety environment; and
- Suitable for use in various food processing and handling facilities because the same HACCP principles apply whatever the location or food process.

### HACCP **is not**:

- A quality control program. Although HACCP principles can be adapted to deal with quality control issues, this program is not intended to address quality control;
- A government controlled program. HACCP must be 100 percent owned and controlled by the processor;
- Maintenance free. Unlike inspection programs and other food safety control methods, HACCP is not a snapshot effort to deal with production processes. HACCP systems change continually and grow with a facility as it is developed and maintained; and

- A guarantee of food safety. Every step during the process from 'farm-to-fork' provides another opportunity for contamination of product. A well-designed HACCP system improves the chances that any hazards introduced in previous stages of the process will be detected.

HACCP first identifies potential food safety problems and then determines the best way to prevent, reduce or eliminate them. All potential hazards are considered ahead of time. These are designed out of the production process. Safety is built-in.

## 2.0 FOOD SAFETY HAZARDS

Hazards are defined as situations with the potential to cause an injury or illness in consumers. The four classes of hazards most commonly associated with food safety are:

- Allergenic
- Biological
- Chemical
- Physical

These hazards may exist in raw materials or be introduced at any stage during the manufacturing process.



### Allergenic Hazards

Allergenic hazards are proteins that can cause an allergic response in sensitive individuals. Symptoms of an allergic reaction could include a runny nose, watery and/or itchy eyes, a rash, wheezing, respiratory distress or even death.

*Some sources of food safety hazards include:*

- *Facility environment*
- *Improper handling*
- *Unsanitary equipment*
- *Poor employee practices*
- *Raw materials or ingredients*

In Canada, the Canadian Food Inspection Agency (CFIA) recognizes 10 priority allergens known to cause life threatening reactions:

1. Egg
2. Peanut
3. Sulphites
4. Fish and shellfish
5. Milk
6. Wheat
7. Tree nuts
8. Sesame seeds
9. Soy
10. Mustard



### **Biological Hazards**

A biological hazard is any danger to food safety caused by contamination with microorganisms. This type of hazard includes disease causing bacteria, viruses (e.g. Hepatitis A), parasites (e.g. Trichinella or Cryptosporidium), and moulds.



### **Chemical Hazards**

Chemicals that can contaminate food products include:

- Naturally occurring toxins (e.g. alkaloids in potatoes, toxic wild mushrooms or aflatoxin in peanuts);
- Normally added ingredients (e.g. sodium nitrite can be toxic if added in high enough levels); and
- Unintentionally added hazards (e.g. pesticides used to treat insect infestations or cleaning chemicals that may not have been safely rinsed from equipment).



### **Physical Hazards**

Physical hazards are any foreign materials not normally found in food (e.g. rocks, broken glass, metal fragments or bone pieces).

*Product and employee flow are major considerations in controlling cross-contamination.*

## 2.1 Assessing Hazards

Some hazardous agents are more dangerous than others. There are significant differences in severity depending on the type of hazard and who is consuming it.

It is the processor's responsibility to know the acceptable levels related of all types of standards. Some examples include the standard temperature that food can be safely stored or cooked to prevent the growth of microorganisms or the amount of normally added ingredients such as nitrates.

Some standards apply to the shelf life of ingredients, after which they are no longer safe to use in food. Each process will involve standards of handling and hygiene. It is the processor's responsibility to know all standards and to ensure they are understood and used by employees.



*For more information on Assessing Hazards, see Appendix D: Food Safety Risk Analysis.*

## 2.2 Cross-contamination

Cross-contamination occurs when micro-organisms, allergens, foreign matter or chemicals are transferred unintentionally from one food or surface to another.

It is important that a HACCP plan clearly indicates the actual movement of employees. It must also indicate the flow of goods and process steps for each product. Because employees do not always follow formal processes, it is important to observe what actually happens in daily operations. This information is then analyzed to identify situations where cross-contamination might occur.

## 3.0 REQUIREMENTS FOR A HACCP SYSTEM

Developing, starting, working and maintaining a HACCP system requires dedication, commitment and resources. Implementing HACCP is not an overnight process or a one-time effort.

The following steps will help to design and implement a HACCP system:

1. Obtain management commitment;
2. Assemble the HACCP team and assign a HACCP coordinator;
3. Train managers, frontline staff and the HACCP coordinator;
4.  Develop or revise and implement prerequisite programs (see Chapters 4 to 13);
5.  Develop or revise and implement HACCP plans (see Chapter 14: Developing a HACCP Plan); and
6.  Maintain the HACCP system by reviewing, verifying and validating once a year (see Chapter 15: Maintenance of HACCP).

### 3.1 Management Commitment

Management commitment is key to a successful food safety system. Management commitment ensures that a food safety system is as much a part of daily business as maintaining sales and reducing costs.

Even if management only plays a supporting role in the food safety system, management commitment must be visible to all employees.

Management commitment can be shown by:

- Promoting HACCP activities at internal meetings;
- Posting signs indicating in-house HACCP policies;
- Posting a sign indicating management commitment to HACCP;
- Supplying adequate resources for HACCP development, implementation and food safety training;
- Regular review of HACCP materials and progress reports;
- Regular attendance by management at HACCP training sessions; and
- Standardizing and enforcing disciplinary actions for employees who don't meet their HACCP responsibilities.

*A strong HACCP system that's developed and implemented effectively helps in maintaining sales and reducing costs.*

*Send a clear message that management is involved and that it cares about the success of the program.*

*Development of a HACCP system should involve people who can put the policies and activities in place in their respective areas.*

For HACCP to be successful, the entire food production team must work together. They must develop and maintain the system. Lack of management commitment is one of the most common reasons for failure of a HACCP system.

### 3.2 Selecting the HACCP team

A HACCP team explores options and makes recommendations during the development and maintenance stages of a HACCP system. The HACCP team should involve people from across the organization including:

- Production
- Sales
- Sanitation
- Maintenance
- Shipping and Receiving
- Quality Control
- Management

Involve people who will be responsible for developing or changing HACCP policies in their respective areas. They will have the best understanding of how changes will affect daily operations in that area.

Involve employees and management who have varied skills and experience. Make sure they can:

- Identify hazards;
- Determine critical control points (CCPs);
- Monitor CCPs;
- Verify operations at CCPs; and
- Examine samples and perform verification procedures.

Everybody on the team should have a basic understanding of:

- Technology and equipment used on the processing lines;
- Practical aspects of food operations;
- Flow and technology of processes;

- Applied aspects of food microbiology; and
- HACCP principles and techniques.

The size of the HACCP team will vary depending on the size and complexity of the food production process. At minimum, the HACCP team must consist of at least one person who is thoroughly familiar with all aspects of the facility and its products.

### 3.3 The HACCP Coordinator

The HACCP coordinator leads the development and maintenance of the HACCP system. A HACCP coordinator organizes the information provided from the HACCP team into a workable system.

The HACCP coordinator must have a solid understanding of HACCP systems. They must have working knowledge of the facility and its processes. They must also be able to make decisions based on science.

The coordinator is not necessarily the person who does the work related to putting together the HACCP system. The expertise of an independent consultant may be needed to make sure that hazards are addressed (e.g. an expert in public health risk associated with the product/process).

### 3.4 HACCP Training

HACCP training is required for managers, personnel and the HACCP coordinator. The level of HACCP understanding and knowledge required for each person depends on their role and responsibility:

#### Manager Training

- Importance of their role in HACCP;
- Benefits and costs of HACCP;
- Need for consistent and obvious management commitment; and
- Resources needed for HACCP system development and certification.

### Personnel Training

- Importance of food safety to the business, consumers and employees;
- Good Manufacturing Practices (GMP) and policies;
- Staff roles and responsibilities in the HACCP system;
- Importance of control measures; and
- How to perform specific tasks related to the HACCP system (e.g. monitoring, taking corrective actions, record keeping).

### HACCP Coordinator / HACCP Team Training

- Food safety hazards common to products and processes;
- Regulatory requirements needed and the purpose of prerequisite programs;
- HACCP principles (including hazard analysis and determination of critical limits);
- Record keeping, understanding of audits and internal audits including concepts of monitoring, corrective actions and verification;
- Resources needed for ongoing HACCP activities and certification including processes for certification, recognition and maintenance of the HACCP system.

### Sources for HACCP training and information include:

- Taking Food safety and HACCP related courses;
- Applying food processing environment experience;
- Researching regulatory requirements;
- Researching specific topics (e.g. reading scientific literature);
- Communicating with appropriate experts (e.g. sanitation company, government authorities); and
- Hiring HACCP trainers or consultants.

## 4.0 COMPONENTS OF A HACCP SYSTEM

A HACCP system includes putting together and using both prerequisite programs and a HACCP plan.

Prerequisite Programs + HACCP Plan = HACCP System

### 4.1 Prerequisite Programs

Most of the hazards that can be identified in a food processing operation are somewhat similar. They could happen at any stage of the process (e.g. contaminated blades, glass, pests, poor personal hygiene, etc.). These hazards are controlled by prerequisite programs.

Prerequisite programs are the foundation of any HACCP system. They are the standard operating procedures (SOPs) and environmental conditions necessary for safe food production and packaging and found in any comprehensive food safety system. Prerequisite programs control the facility, environment, staff and materials.

Prerequisite programs must be complete. They must provide all the information that is needed to ensure a safe environment to produce food. All employees should understand the importance of these programs and be fully committed to following food safety policies and procedures.

Prerequisite programs with trusted controls will reduce the critical control points (CCP) needed in a HACCP system. Reducing the number of critical control points needed lets processors focus on where food safety is most likely threatened.

HACCP plans should not control hazards that are normally controlled through the prerequisite programs. This guidebook groups the required procedures in eight prerequisite programs:

- Premises;
- Transportation and Storage;
- Equipment;
- Personnel/Training;
- Sanitation and Pest Control;
- Recall;
- Allergen Control; and
- Supplier Food Safety Assurance.

*Prerequisite programs (PRP) are called Good Manufacturing Procedures (GMP) or Good Hygienic Practices (GHP) in the United States. They are called Standard Operating Procedures (SOPs) in many other countries.*

*A critical control point (CCP) is a point, process step or procedure where a control increases food safety. A CCP is used for preventing a food safety hazard, eliminating it, or reducing it to an acceptable level (e.g. cooking).*

## 4.2 HACCP Plans

HACCP plans outline how food safety hazards connected with ingredients and process steps are controlled. HACCP plans identify the critical control points (CCPs) in the manufacturing process and identify how to control CCPs to ensure safe food production.

A HACCP plan controls hazards directly related to the food product, ingredients or the process. The plan identifies steps to control, eliminate, or reduce food safety hazards to an acceptable level. It's important to have fully functioning, effective prerequisite programs running before putting together a HACCP plan.



*For more information about developing a HACCP plan, see Chapter 14: Developing and Implementing A HACCP Plan..*

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