

HACCP Principles and Application

Introduction

In the 1960s, the United States established the HACCP idea. The National Aeronautics and Space Administration (NASA) collaborated with Pillsbury to ensure crumb- and pathogen-free food with long shelf-life features for space travel - the food industry's first pathogen monitoring and measuring requirement. Although the initial HACCP plan only comprised three principles, rather than the seven we know today, its adoption allowed for decreasing the risk connected to foodborne pathogens in food. HACCP is a management method that addresses food safety by analyzing and controlling biological, chemical, and physical hazards from raw material production, procurement, and handling to final product manufacturing, distribution, and consumption.

Definition

The HACCP method is a seven (7) step systematic approach for preventing or controlling food safety hazards across your production activities.

When to Use it

It is widely used in the food manufacturing industry, although not mandatory. But it is best used when the food process involves critical areas that may affect the safety of the product.

Details

HACCP plans come in a variety of formats. The plans will often be product and process specific. Generally, the HACCP is a way of managing processed food, it is a preventive system that addresses food safety through establishing areas where hazards are prone to occur, analyzing and controlling biological, chemical, and physical hazards from raw material production, procurement, and handling to final product manufacturing, distribution, and consumption is the basic goal of the system.

HACCP is composed of several terms that one should become familiar with to implement a successful HACCP Plan.

Critical Control Point (CCP) - A stage in the food safety process that can be used to prevent or eliminate the danger or reduce it to an acceptable level.

CCP Decision Tree - A sequence of questions to assist in determining whether a control point is a CCP.

Control - is the management of conditions in the operation to ensure that stated standards are met.

Control Measure - Any action or activity that can be used to prevent, eliminate, or lessen a significant hazard is referred to be a control measure.

Control Point - A point where at which the biological, chemical, or physical factors is and can be controlled.

Corrective Action - These are the set of procedures to be followed when there is a deviation along the process, it is an action step.

Critical Limit - it is an established parameter, either a maximum and/or minimum value to which a biological, chemical, or physical parameter must be controlled at a CCP to prevent, eliminate or reduce to an acceptable level the occurrence of a food safety hazard.

Hazard Analysis - The evaluation and assessment process of the hazards associated with the processing of food under consideration to decide which are significant and must be addressed in the HACCP plan.

Severity - The level of seriousness or the gravity of the effect of the hazard, this is scaled according to its likelihood of occurrence.

HACCP is a seven-principle system for identifying, evaluating, and controlling food safety hazards that are based on the following seven principles:

Principle 1: Conduct a hazard analysis.

- Principle 2: Determine the critical control points (CCPs).
- Principle 3: Establish critical limits.
- Principle 4: Establish monitoring procedures.
- Principle 5: Establish corrective actions.
- Principle 6: Establish verification procedures.
- Principle 7: Establish record-keeping and documentation procedures.

Before acquiring or creating your HACCP plan, food manufacturing establishments are required to have passed or complied with the following pre-requisite programs. These programs are designed to help build a more solid foundation for the HACCP system to work effectively; prerequisite programs establish the fundamental environmental and operational conditions required for the production of safe, healthful food:

Good Manufacturing Process (GMP) - is a system that ensures that items are consistently manufactured and controlled in accordance with quality standards. GMP aids to assure consistent product quality and safety by focusing on five critical areas known as the 5 P's of GMP—people, premises, processes, products, and procedures (or paperwork).

Good Agricultural Practices (GAP) - Aim to provide rational direction in the implementation of optimal management practices that will aid in the reduction of the hazards of microbiological contamination of fruits and vegetables.

Good Hygiene Practice (GHP) - is the first stage in hygiene management. It is utilized across the food supply chain. GHP is concerned with food supply chain hygiene management, worker hygiene practices, sanitation facilities, pest control, and prevention of physical and chemical pollution.

Examples:

HACCP for Dairy Processing - in the dairy industry, establishing your HACCP Plan is very efficient, for our dairy products are quite prone to spoilage if not heated properly. And may not sustain its shelf life if not stored well. Thus, the HACCP system will determine the critical control points that need to be addressed during the process.

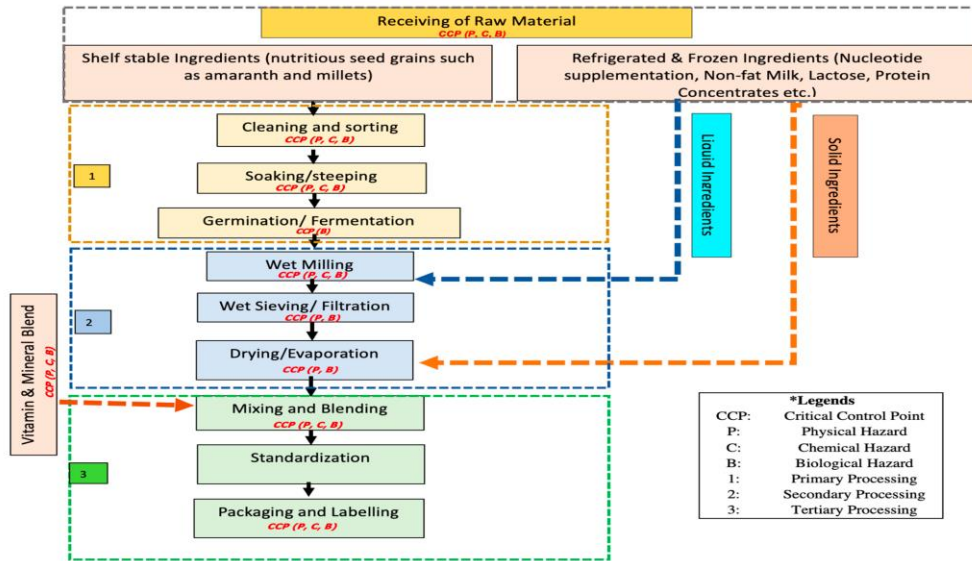
Hazard Analysis Table:

Process Level	Hazards	Control	Orientation
Raw milk taking	Raw milk infected with pathogen microorganisms	Bacteriological quality of milk	Not providing processed milk in contact with raw milk
Storage in cold	Growth of some bacteria in milk	Storage temperature at 5 °C or lower Storage milk more than specific time	Providing cleaning of store with appropriate hygienic rules after milk taken from store
Pasteurization (HTST- high temperature short time)	Not provide effective pasteurization	Doing phosphatase test Controlling working of equipments to be desired	The provision for keeping regular records of pasteurization Providing the prevention of infection using appropriate cleaning and disinfection methods
Cooling after pasteurization	Infection after pasteurization and growth of bacteria	Cooling fastly at -10 °C or below this	Providing cleaning of tanks
Filling th bottles or cartons	Infection of bottles and cartons	Being the bottles washed well and cartons cleaned	Providing protection of bottles and cartons in hygienic conditions
Storage in cold and transport	Growth of bacteria in infected ones	Protection at refrigerator temperature	Providing protection in cold

HACCP for Receiving Raw Materials - this is a generic HACCP Plan that is widely used in the manufacturing industry. Handling the raw materials is tricky and is the key element of producing a high-quality finished product. Establishing parameters that will prevent the food from acquiring bacterial load and maintain its quality all throughout the process.

HACCP Process diagram:

BUSINESS VITAMINS



Reference:

<https://www.ag.ndsu.edu/foodlaw/overview/introhaccp>

<https://www.fda.gov/food/hazard-analysis-critical-control-point-haccp/haccp-principles-application-guidelines#defs>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6951898/#:~:text=The%20HACCP%20concept%20was%20first,requirement%20imposed%20on%20the%20food>

<https://www.fda.gov/food/hazard-analysis-critical-control-point-haccp/haccp-principles-application-guidelines#app-a>