

Department of Food Science

Food Safety

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HACCP Principles

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Hazard Analysis Critical Control Points (HACCP) is a tool that can be useful in the prevention of food safety hazards. While extremely important, HACCP is only one part of a multi-component food safety system. HACCP is not a stand alone program. Other parts must include: good manufacturing practices, sanitation standard operating procedures, and a personal hygiene program.

Safety of the food supply is key to consumer confidence. In the past, periodic plant inspections and sample testing have been used to ensure the quality and safety of food products. Inspection and testing, however, are like a photographic snapshot. They provide information about the product that is relevant only for the specific time the product was inspected and tested. What happened before or after? That information is not known! From a public health and safety point of view, these traditional methods offer little protection or assurance.

New concepts have emerged which are far more promising for controlling food safety hazards from production to consumption.

HACCP was introduced as a system to control safety as the product is manufactured, rather than trying to detect problems by testing the finished product. This new system is based on assessing the

inherent hazards or risks in a particular product or process and designing a system to control them. Specific points where the hazards can be controlled in the process are identified.

The HACCP system has been successfully applied in the food industry. The system fits in well with modern quality and management techniques. It is especially compatible with the ISO 9000 quality assurance system and just in time delivery of ingredients. In this environment, manufacturers are assured of receiving quality products matching their specifications. There is little need for special receiving tests and usually time does not allow for extensive quality tests. The general principles of HACCP are as follows:

Principle #1 Hazard Analysis

Hazards (biological, chemical, and physical) are conditions which may pose an unacceptable health risk to the consumer. A flow diagram of the complete process is important in conducting the hazard analysis. The significant hazards associated with each specific step of the manufacturing process are listed. Preventive measures (temperature, pH, moisture level, etc.) to control the hazards are also listed.

Principle #2 Identify Critical Control Points

Critical Control Points (CCP) are steps at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to acceptable levels. Examples would be cooking, acidification or drying steps in a food process.

Principle #3 Establish Critical Limits

All CCP's must have preventive measures which are measurable! Critical limits are the operational boundaries of the CCP's which control the food safety hazard(s). The criteria for the critical limits are determined ahead of time in consultation with competent authorities. If the critical limit criteria are not met, the process is "out of control", thus the food safety hazard(s) are not being prevented, eliminated, or reduced to acceptable levels.

Principle #4 Monitor the CCP's

Monitoring is a planned sequence of measurements or observations to ensure the product or process is in control (critical limits are being met). It allows processors to assess trends before a loss of control occurs. Adjustments can be made while continuing the process. The monitoring interval must be adequate to ensure reliable control of the process.

Principle #5 Establish Corrective Action

HACCP is intended to prevent product or process deviations. However, should loss of control occur, there must be definite steps in place for disposition of the product and for correction of the process. These must be pre-planned and written. If, for instance, a cooking step must result in a product center temperature between 165°F and 175°F, and the temperature is 163°F, the corrective action could require a second

pass through the cooking step with an increase in the temperature of the cooker.

Principle #6 Verification

Verification has several steps. The scientific or technical validity of the hazard analysis and the adequacy of the CCP's should be documented. Verification of the effectiveness of the HACCP plan is also necessary. The system should be subject to periodic revalidation using independent audits or other verification procedures.

Principle #7 Record keeping

The HACCP system requires the preparation and maintenance of a written HACCP plan together with other documentation. This must include all records generated during the monitoring of each CCP and notations of corrective actions taken. Usually, the simplest record keeping system possible to ensure effectiveness is the most desirable.

HACCP offers continuous and systematic approaches to assure food safety. In light of recent food safety related incidents, there is a renewed interest in HACCP from a regulatory point of view. Both FDA and USDA are proposing umbrella regulations which will require HACCP plans of industry. The industry will do well to adopt HACCP approaches to food safety whether or not it is required.

HACCP is a Tool

HACCP is merely a tool and is not designed to be a stand-alone program. To be effective other tools must include adherence to Good Manufacturing Practices, use of Sanitation Standard Operating Procedures, and Personal Hygiene Programs.