HACCP

What is HACCP?
Hazard Analysis and Critical Control Point system

Sometimes referred to as
• Hazard Analysis and Critical Control Points
• Hazard Analysis of Critical Control Points (incorrect)

What is HACCP?
• A preventive system for assuring the safe production of food products
• Common-sense application of technical and scientific principles
What is the purpose of HACCP?

Prevent, reduce, or eliminate hazards in foods

Control = Prevent, reduce, or eliminate

Objective of HACCP

To make the product safely and be able to prove it

History of HACCP

Developed by Pillsbury in 1959 as a non-testing approach to assure the safety level required by NASA for foods produced for the space program
History of HACCP

NASA’s major concerns
• Food crumbs
• Foodborne illness

History of HACCP

Initial Development
• NASA’s Zero Defects program
  ♦ Testing materials

  • Natick’s Failure Mode program
    ♦ Hazard Analysis and Critical Control Points

History of HACCP

Introduced during the National Conference on Food Protection, 1971
• Three principles:
  ♦ Identification and assessment of hazards
  ♦ Determination of critical control points to control any identified hazard
  ♦ Establishment of systems to monitor critical control points
History of HACCP

- National Research Council - 1985
  - *An Evaluation of the Role of Microbiological Criteria for Foods and Food Ingredients*
    - Microbiological hazards not controlled by testing
    - Recommended using HACCP for food safety assurance

History of HACCP

- National Advisory Committee on Microbiological Criteria for Food (NACMCF)
  - 1988
    - Encourage adoption of HACCP
    - Develop a consensus for HACCP application

History of HACCP

- NACMCF proposed 7 principles of HACCP application
  - Published in 1989
  - 1st. Revision in 1992
  - 2nd. Revision (latest) in 1997
    - Released immediately on the Internet
    - Published in 1998 (*Journal of Food Protection*)
History of HACCP

The 7 principles of HACCP
- Conduct a hazard analysis
- Identify the critical control points
- Establish critical limits
- Establish monitoring procedures
- Establish corrective actions
- Establish verification procedures
- Establish record-keeping and documentation procedures

HACCP is international

The Codex Alimentarius Commission has adopted HACCP principles similar to those of NACMCF

Reasons for HACCP

- Failure of inspection procedures to prevent hazards from being present on foods
- End-product testing does not guarantee the safety of the product
Reasons for HACCP

- Sampling plans
  - Examination of entire lots is not feasible
  - Depend on probabilities for calculating sampling size

Reasons for HACCP

- Two-class plan
  - n = No. sample units to be tested
  - c = No. sample units allowed to yield unsatisfactory results
  - Example: n = 5, c = 2

Two-class plans

No. carcasses = 300

If 1% of the lot is defective, and n=5, c=0
The probability of accepting this contaminated lot of beef carcasses is 95%

Two-class plans
No. carcasses = 300
If 1% of the lot is defective, and \( n=5, \ c=0 \)

Probability of accepting a defective lot

Operating Characteristic (OC) Curve
\( n=5, \ c=0 \)

True percent defective

Prob. of acceptance

Reasons for HACCP

- Allows to provide consumers with safe foods
- Creates production records
- Many processors require their suppliers to operate under HACCP
Meat, seafood and juice Producers:

It is the law!

Overview of the 7 Principles of HACCP

HACCP is a procedure which applies 7 principles to produce safe foods
The 7 Principles of HACCP

- Conduct a hazard analysis
- Determine the critical control points (CCP)
- Establish critical limits
- Establish monitoring procedures
- Establish corrective actions
- Establish verification procedures
- Establish procedures for record keeping and documentation

Pre requisite programs

- Facilities
- Supplier control
- Specifications
- Equipment
- Sanitation
- Personnel hygiene
- Training
- Chemical control
- Reception, storage and transport
- Traceability and recalls
- Pest control

GMP and SSOP are fundamental for a sound HACCP plan
Before starting writing the HACCP plan, the team must conduct 5 preliminary activities

Pre HACCP activities

1. Assemble the HACCP team
2. Describe the food and its distribution method
3. Identify the intended use and the target consumer for the product
4. Develop a flow chart describing the process, marking points where a potential health hazard may exist
5. Verify the flow chart

Principle 1. Conduct a hazard analysis

◆ Hazard identification
◆ Hazard evaluation
◆ Prepare a list of steps in the process where significant hazards may be introduced or increased
◆ Describe control measures
Hazards in foods

• Chemical
  ♦ Pesticide, antibiotic residues, additives etc.
• Physical
  ♦ Wood chips, pieces of gloves, metal fragments etc.
• Biological
  ♦ Bacterial pathogens, parasites, viruses

Principle 2. Determine the CCP

♦ Critical control point:
  ♦ Point, step or procedure where a control measure is applied and the control is necessary at that point to keep a safe production
  ♦ Use the decision tree to determine whether a step in the process is a CCP

Principle 3. Establish critical limits

♦ Critical limit (CL):
  ♦ Criterion that must be met at each CCP to ensure that the hazard is under control
  ♦ Temperature/time, pH, salt concentration, $a_w$ etc.
Principle 4. Establish monitoring procedures

- Monitoring is a planned sequence of observations to determine if the CL is being met. El monitoreo es una secuencia planeada de observaciones para evaluar si un PCC se mantiene bajo control.
- Monitoring results are used for adjusting the process and keep control of every significant hazard.

Principle 5. Establish corrective actions

- What do we do if the monitoring indicates that the CL was not met (deviation)?

Corrective action should be taken to:

- Correct the problem to continue production now under control.
- Decide how to dispose of the product finished under deviation.
Corrective Action
FSIS rule

• When monitoring indicates that a CCP is out of control, actions need to be taken to:
  • Identify and eliminate the cause of the deviation
  • Bring the CCP under control after corrective action is taken
  • Establish measures to prevent recurrence
  • No product that is injurious to health or adulterated enters the commerce

Principle 6. Establish verification procedures

• CCP verification
• HACCP plan verification

• Are we doing the right thing?
• Do we say what we do
• Do we do what we say?

Principle 7. Establish procedures for record keeping and documentation

What did I do with the monitoring data?