



# HACCP Concepts and Principle

- ✓ **HACCP is a system that relies on process controls to minimize food safety risks in food processing industry.**
- ✓ **It is a preventative food safety system and not a traditional quality control inspection system.**
- ✓ **International food safety system that deals with control of factors affecting ingredients, product and processing of food.**
- ✓ **Goal of HACCP is to identify biological, chemical and physical hazards and include preventive measures throughout process which would stop these hazards before they begin. These measures would prevent unsafe food from reaching consumer.**
- ✓ **Significant hazards for a particular food product are identified after a review of all the processing steps and use of scientific information.**

- ✓ **The steps at which these hazards can be controlled are identified and critical limits (process temperatures and hold times), at key process steps are set.**
- ✓ **Monitoring procedures are implemented to evaluate conformance with these critical limits.**
- ✓ **Should the process fall outside these limits, pre-planned corrective actions are taken to prevent potentially defective product from entering commerce stream.**
- ✓ **HACCP system relies on extensive verification and documentation to assure that food safety has not been compromised during any step.**



# History of HACCP

1. Pillsbury Company encountered this dilemma in the 1960's in its attempts to fulfill several food production contracts with the US Army and the National Aeronautics and Space Administration (NASA).
2. NASA had very stringent microbiological acceptance criteria, not wanting to risk the illness of an astronaut during space mission. In essence, nothing short of 100% product testing could assure NASA that a packet of food was safe to consume. HACCP is a system of product design and process control. HACCP system of food safety is very effective at controlling identified hazards. HACCP system used to assure 100% safety of food to be used in space was developed in **1960** and documented in **1971** in USA.
3. HACCP has been endorsed by joint FAO/WHO Codex Alimentarius Commission in **1985** based on its successful industrial application; HACCP became mandatory programs in all meat and poultry plants in **1994**.
4. HACCP program has been implemented in nation's processing plants with January **2000** as deadline.

# HACCP and Food Regulation

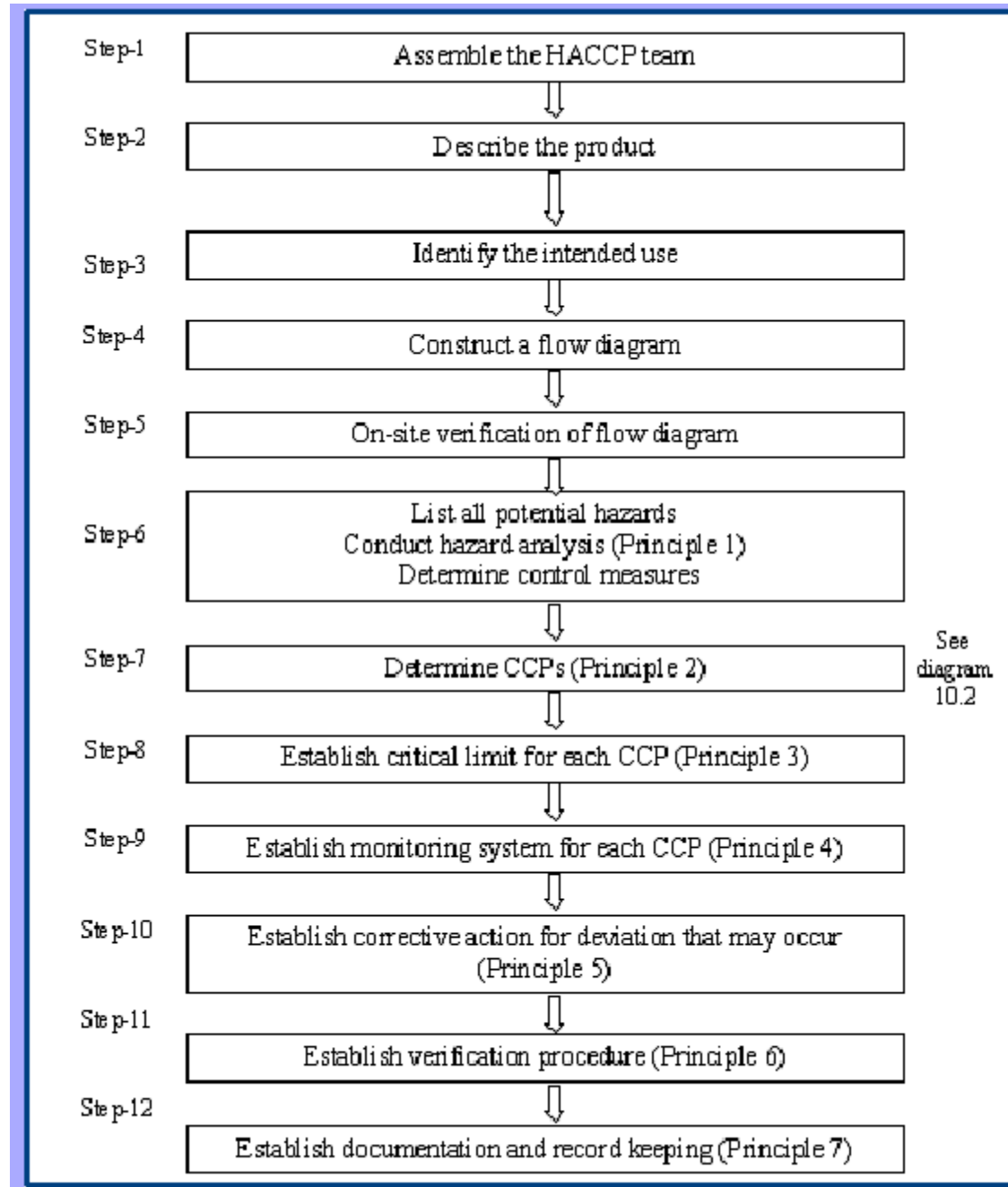
- 1. FDA used HACCP-based principles when setting up their low-acid food canning regulations in the 1970s.**
- 2. In 1995, FDA issued regulations that made HACCP mandatory for fish and seafood products and in 2001 they issued regulations for mandatory HACCP in juice processing and packaging plants.**
- 3. A voluntary HACCP program was implemented in 2001 for Grade A fluid milk and milk products under cooperative federal/state National Conference on Interstate Milk Shipments (NCIMS) program.**
- 4. FDA has also implemented pilot HACCP programs for variety of other food processing segments and for retail foods.**
- 5. HACCP has also been implemented by the USDA.**
- 6. In 1998, USDA's Food Safety and Inspection Service (FSIS) mandated HACCP for the nation's meat and poultry processing plants.**
- 7. HACCP system has also been implemented under regulations in Europe, Canada, Australia and New Zealand and is a high priority program under Codex Alimentarius.**

8. In India, quality control with regard to food products are being enforced through various regulatory mechanisms like PFA, Agriculture Grading and Marketing (AGMARK), Fruit Products Order (FPO), etc.
9. BIS has recently launched a HACCP certification programme for food industry.
10. Mother Dairy of Delhi and Punjab Cooperative Milk Federation have received HACCP certificates.
11. The Agriculture and Processed Food Export Development Agency (APEDA) has helped mango processing units in AP in implementation of HACCP.
12. A need to implement HACCP in the unorganized sector as it accounts for 70-80% of food produced and processed in India.



# Steps and Principles: HACCP Concepts

HACCP concept is based on the 7 principles of the Codex Alimentarius as laid down in Article 5 of the Regulation (EC) 852/2004 on hygiene of foodstuffs. HACCP concept must be updated according to reflect any changes to product or manufacturing process as well as new scientific discoveries concerning potential risks.



## **Establishment of a multi-disciplinary HACCP team:**

- HACCP team is formed of specialists from the areas of production, quality assurance, food law and development.
- HACCP team should report directly to company's management.
- As development of HACCP based food safety management programme requires a multi-disciplinary team effort, it should include expertise in veterinary health, production, microbiology, toxicology, public health, food technology, environmental health, chemistry and engineering.
- This cross-functional expertise is necessary to adequately analyze all physical, chemical and biological hazards through food chain.
- If the people drawn in team are not specialists and not properly trained and experienced, HACCP system is unlikely to be effective.



- **Identify potential food hazards.**
- **Evaluate existing system and data in a logical manner.**
- **Assign levels of severity and risk to identified hazards.**
- **Analyze problems and recommend controls, criteria and procedures for monitoring and verification to bring solutions to recurring problems, recommend appropriate corrective actions when deviations occur.**
- **Communicate both within team and with people across all levels of dairy.**
- **Predict the success of HACCP plan.**
- **Right blend of people in the HACCP team (five to eight people depending on size of organization and complexity of operations).**

<b>Product Name</b>	Chicken Ball
<b>Product Description</b>	A precooked small (12 - 13 g) ball shaped product prepared from chicken meat, salt, sugar, spice, flour etc
<b>How it is to be used?</b>	Ready to eat but 1 - 2 min. fry in oil or 2 min boil in hot water or 30 second in oven is recommended
<b>Packaging</b>	Poly bag, Vacuum sealed
<b>Shelf life</b>	2 weeks
<b>Where it will be sold?</b>	Retail store
<b>Labeling Instruction</b>	Keep chilled (0 - 4 °C)
<b>Distribution condition</b>	Chilled (0 - 4 °C)



- **Product characteristics, product composition, storage requirements, placing on the market.**
- Dairy should describe its product(s) (major raw materials, food ingredients, preservation and packing materials used and their impact on food safety). Brief description of how the process occurs and/products are made and stored.
- If hazards that exist either in ingredients/in packing material are identified.
- Description of method of distribution (type of transport and any special consideration to maintain product safety (eg., ice cream is described as a frozen ready to eat product containing both pasteurized (skim milk powder, butter, sugar and water); and unpasteurized components (flavourings, nuts and chocolate).
- Separate HACCP plan should be made for each product. Two or more products have identical raw material, ingredients, process operations, packaging, storage and distribution, they can be clubbed together in one HACCP plan.

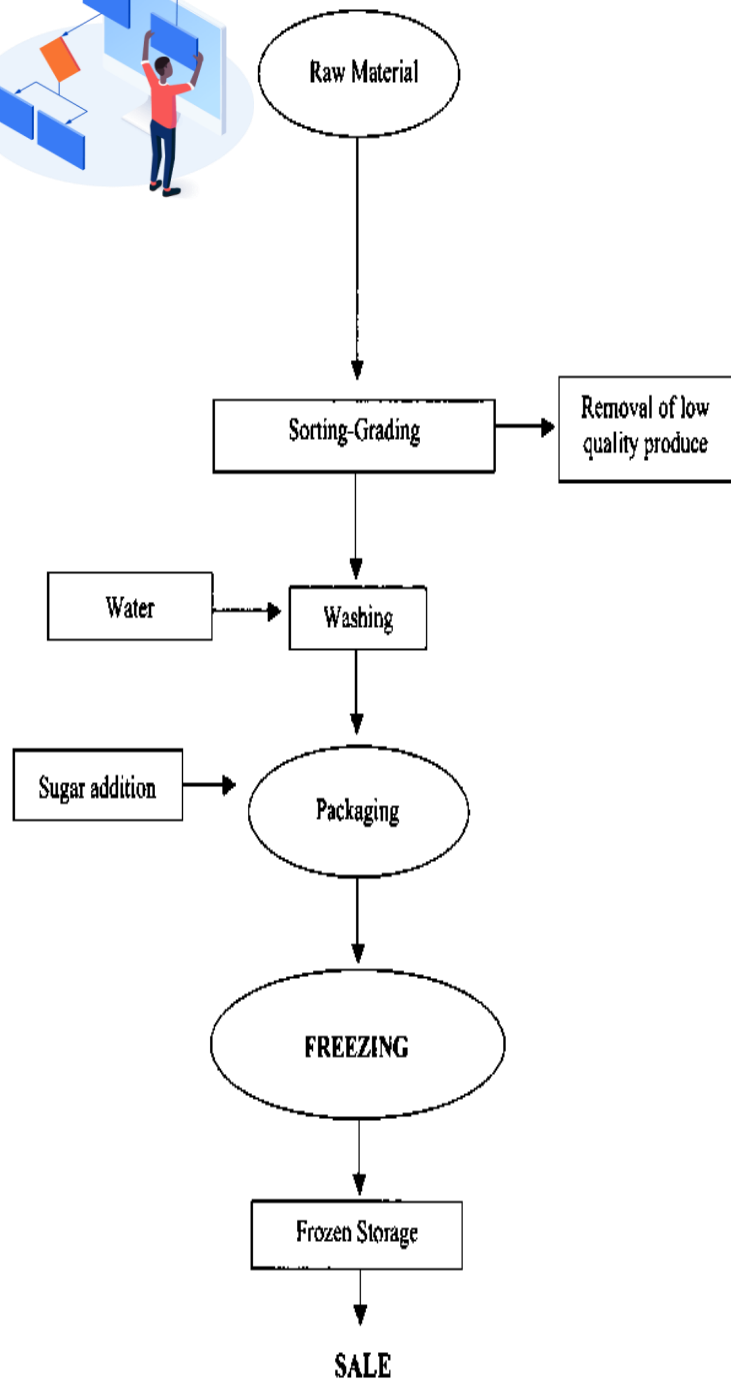
## Identify intended use:

- Based on the expected uses of product by the end user/consumer.
- Should be indicated how the product is to be used including if it is to be fully cooked before consumption, what preparations will be needed, what will be serving requirements, shelf life, etc.
- If consumer is infant, necessary emphasis to be given to safeguard their special interest (eg., ice cream is consumed without further processing by population including high risk groups but infant milk food is meant for infants and given special consideration).



# Construct a process flow diagram:

- HACCP team constructs detailed process flow diagram for each product indicating critical steps of control.
- Each step within specified area of operation is analyzed for particular part of operation under consideration to produce flow diagram.
- When applying HACCP system to a given operation, consideration is given to steps preceding and following specified operation.
- Each step within specified area of operation should be analyzed for particular part of operation under consideration to produce flow diagram.



## **On-site verification of process flow diagram:**

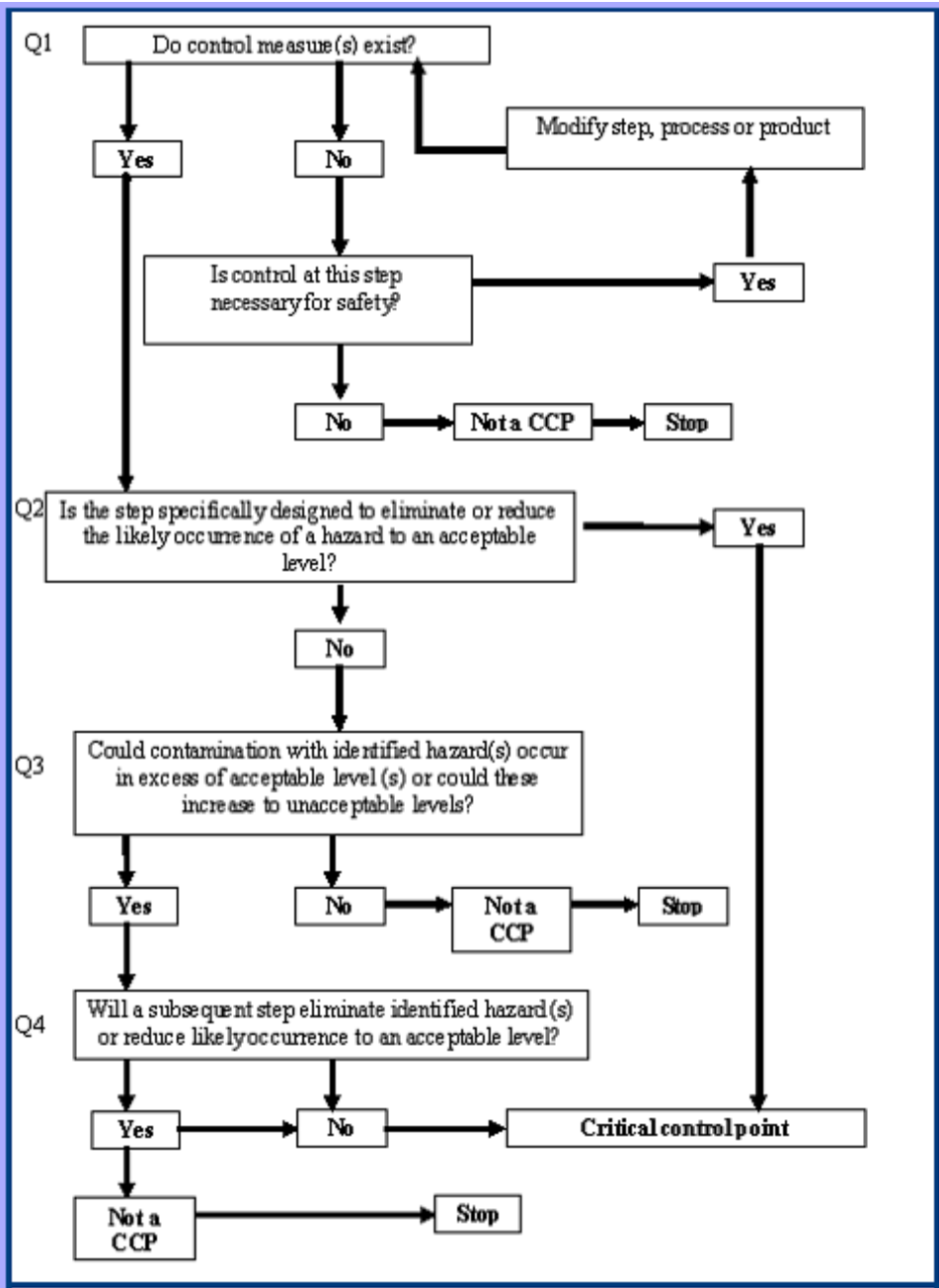
- **When the process flow diagram is complete, it is verified by the HACCP team at site to confirm processing operation against the flow diagram during all stages and hours of operation and amend the flow diagram.**
- **This is partly an in office exercise and partly on site activity. In office, exercise includes dissecting process stage and discussing implications of process parameters and then they are verified at the site.**
- **Verification of flow diagram at site is done by actually walking through the plant to check accuracy and completeness and make sure that the steps listed on the diagram describe what really occurs in producing the product.**

## Conduct hazards analysis (principle 1):

- ❑ When process flow diagram is completed and verified, HACCP team conducts a hazard analysis and lists all biological, chemical and physical hazards that may occur at each step from primary production, processing, manufacture and distribution until the point of consumption.
- ❑ When conducting hazard analysis, consideration must be given to impact of raw materials, ingredients, manufacturing practices, role of manufacturing processes to control hazards, likely end-use of product, consumer populations at risk and epidemiological evidence relative to food safety.
- ❑ Team should then identify in the HACCP plan which hazards elimination or reduction to acceptable levels is essential to the production of safe food.
- ❑ Team must consider preventative measures for each hazard.
- ❑ Preventive measures are action that are required to eliminate hazards or reduce their impact or occurrence to acceptable levels.

# Identify the critical control points (principle 2):

- ❑ A critical control point is a point/procedure where food safety hazard can be prevented, eliminated or reduced to acceptable levels.
- ❑ Identification of a CCP in the HACCP system is facilitated by application of decision tree.
- ❑ If a hazard has been identified at a step where control is necessary for safety and no preventive measure exists at that step, or any other, then the product or process should be modified at that step, or at any stage to include preventive measure.
- ❑ Application of decision tree determines whether step is a CCP for the identified hazard.



## **Establish critical limits for each CCP (principle 3):**

- ❑ Since critical control points define the boundaries between safe and unsafe products, it is vital that they are specified at correct levels and validated at each criterion.**
- ❑ HACCP team should understand criteria governing safety at each CCP in order to set appropriate critical limits.**
- ❑ Critical limits must be specified for each preventive measure. More than one critical limit will be elaborated at a particular step.**
- ❑ Criteria often used include measurements of temperature, time, moisture level, pH, and available chlorine and sensory parameters.**



## **Establish a monitoring system for each CCP (principle 4):**

- Monitoring is one of most important aspects of HACCP system.**
- Monitoring procedures must be able to detect loss of control at CCP and provide information in time for corrective action to regain control of process.**
- Data derived from monitoring must be evaluated by designated person with knowledge and authority to carry out corrective actions.**
- If monitoring is not continuous, frequency of monitoring must be sufficient to ensure that CCP is under control.**
- Physical and chemical measurements are often preferred to microbiological testing because they may be done rapidly and often indicate microbiological control of product.**
- All records and documents associated with monitoring CCPs must be signed by person(s) doing monitoring and by a responsible reviewing official of the company.**

## **Establish corrective actions (principle 5):**

- Specific corrective actions must be developed for each CCP in the HACCP system in order to deal with deviations when they occur.
- Actions must ensure that CCP has been brought under control.
- Actions taken must also include proper disposition of non conforming product.
- Deviation and product disposition procedures must be documented in HACCP record keeping.
- Corrective action should also be taken when monitoring results indicate a trend towards loss of control at a CCP.
- Action should be taken to bring process back into control before the deviation leads to a safety hazard.

## **Establish verification procedures (principle 6):**

- ❑ HACCP system should include verification procedures to provide assurance that HACCP system is being compiled on day to day basis.
- ❑ Can be done most effectively by using audit method.
- ❑ Monitoring and auditing methods, procedures and tests, including random sampling and analysis, can be used to determine if HACCP system is working correctly.
- ❑ Frequency of verification should be sufficient to confirm that HACCP system is working effectively.
- ❑ Verification activities include review of HACCP system and its records, review of deviations and product dispositions, confirmation if CCPs are under control, validation of established critical limits.



## **Establish record keeping and documentation (principle 7):**

- Efficient and accurate record keeping is essential to application of a HACCP system.
- Records need to be kept of all areas which are critical to product safety to demonstrate that HACCP system is in compliance with the documented system.
- Documentation of HACCP operation at all steps should be included and assembled in a HACCP plan.
- Records are useful in providing basis for analysis as well as for internal investigation of any food safety incidents which may occur.
- Extremely useful to allocate a unique reference number to each HACCP record.
- Types of records are as follows: HACCP plan, Modification to HACCP plan, CCP monitoring records, Deviations and associated corrective action, Training records, Audit records, HACCP system

# Worksheet

1

Describe product

2

Diagram process flow

3

List							
Step	Hazard(s)	Control measure(s)	CCP's	Critical limits	Monitoring procedure(s)	Corrective action(s)	Records

4

Verification