

## HACCP IN PRODUCT PREPARATION

HACCP is a total quality management system with emphasis on safety based on a systematic approach to identification, assessment and control of hazards. It is a preventive control system in which hazard is controlled or eliminated before it occurs. It concentrates on prevention strategies on known hazards and the risks arising out of them occurring at specific points in the processing schedule.

### HACCP Concept

Food must be safe to consume and conform to certain standards. If some properties are monitored by plant, but without supplementary information, the tests will provide only a poor means for controlling and operation. If the product does not conform to specifications, it may have to be reprocessed or discarded. This contingency can be avoided if certain key variables in the process are monitored and controlled. Such a system is provided by HACCP. HACCP is based on a set of seven principles. The system envisages identification of potential hazards in seafood processing at all stages upto the point of consumption. The seven principles are

1. Hazard analysis- Assess the hazards associated with capture, storage, raw materials and ingredients, pre-process and process operations, and all other activities upto consumption. Prepare a flow diagram of the steps in the process. Identify and list hazards and specify control measures.
2. Determination of critical control points (CCP)
3. Specification of criteria – Establish target levels and critical limits that must be met to ensure that each CCP is under control.
4. Establishment of procedure and monitoring system to ensure control of the CCP and their implementation.
5. Corrective action when the monitor indicates any deviation from the critical limits or that the process is out of control.
6. Establishment of procedures to verify that the HACCP is working correctly and effectively.
7. Establishment of documents concerning all procedures and records appropriate to these principles and their application.

- **Hazard:**

A hazard is a biological, chemical or physical factor that has the potential to cause an adverse effect on human health. Biological hazards include pathogenic microorganisms, parasites, toxigenic plants, animals and products of decomposition like histamine. Pesticides, detergents, antibiotics, heavy metals, non-permitted food colours and food additives etc constitute the important chemical hazards. Extraneous matter like filth, metal or glass fragments, stones etc are important among physical hazards.

### **Hazard analysis:**

This is a system using which the significance of a hazard to consumer safety can be analysed. By using this system it can be decided which hazards are of such nature that their elimination or reduction to acceptable levels is essential to produce a safe food

product. Identification of hazards, their assessment and identification of control measures constitute the important functions of hazard analysis.

### **Critical control points:**

A critical control point (CCP) is a point or a stage in the processing operation where failure to control effectively would most likely result in the production of defective/ unsafe food. In other words, it is a step which, if properly controlled, will eliminate or reduce a hazard to an acceptable level. A step/ point is any stage in the production. This includes raw materials, transport to processing plants, processing and storage. CCPs require constant checking to ensure compliance with all the requirements of the product.

### **Control points:**

These are other points in the processing operation where failure to effectively control may not necessarily result in the production of defective/ unsafe food. These points require occasional checking throughout the production shift.

### **Determination of CCPs**

The relevance of each identified hazard in each stage of the process is considered. If the hazard can be reduced, prevented or eliminated through some form of control at a particular stage, it is a CCP.

There are two types of CCPs, CCP1 and CCP2. The CCP1 will ensure the control of a hazard, whereas CCP2 will minimise the hazard, but will not assure its control. Both are important and should be controlled. A judgement of risk also must be made so that a level of concern can be ascribed to it. The four levels of concern are

- High concern, where without control there is a life threatening risk.
  - Medium concern, where there is a threat to the consumer that must be controlled.
  - Low concern, where there is little threat to the consumer; still is advantageous to control it.
  - No concern, where there is no threat to the consumer.
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- The points which are not critical because of low risks need less control and monitoring. If a hazard can be controlled at more than one point, the most effective place for control should be decided.

### **Specification of criteria for control**

The team should next identify the means by which the hazard can be controlled at each CCP. These may include level of chlorination in wash water, temperature during storage, moisture content, level of toxic materials, sensory parameters, time and temperature requirements for thermally processed foods etc. All these must be documented as clear unambiguous statements or included as specifications in operating manuals. The team will also have to set target levels and specified tolerances of the control measures at each CCP. Critical limits may also be derived

from government regulations and guidelines, international codes of practices, experimental studies or any other recognised source.

### **Monitoring and checking system**

There must be a mechanism to monitor, check and measure to ensure that processing procedures at each CCP are under control. The monitoring must be able to detect any deviation from these specifications. It should be rapid enough so that corrective action can be taken in time and loss of the product is avoided or minimised. The main methods to monitor a CCP are

- Visual observation
  - Sensory evaluation
  - Physical measurement
  - Chemical testing
  - Microbiological analysis
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- Visual observation is basic, but gives rapid results. Sensory evaluation can be used to check the quality of incoming raw materials. Rapid chemical tests e.g. chlorine in water, are useful to monitor CCPs. Other measurements possible are time, temperature, pH and salt concentration. Microbiological test is of limited use in monitoring CCP. It can, however, be employed for testing before starting processing, and for testing finished products before release.

### **Corrective action, verification and documentation**

#### **Corrective Action:**

If monitoring indicates that there are deviations from the critical limits or that the process is out of control, corrective actions must be taken immediately. The corrective actions must be based on the assessment of hazards, risk and severity, and on the final use of the product. A plan should have been prepared in advance so that there will be no delay in taking corrective action. The team should prepare this plan specifying the corrective action, identify the persons to implement them and disposition actions needed to be taken with the food that has been produced during the 'out of control' period.

#### **Verification:**

Once the HACCP system has been drawn up for a product/ process it must be reviewed before it is installed and regularly reviewed while it is in operation. The appropriateness of the CCPs and control criteria can be determined and the extent and effectiveness of monitoring can be verified. The team should describe in detail the methods and procedures to be used to verify the system. Some of the methods that can be used in verification are

- Reviewing the HACCP study and its records
- Random sampling and analysis (microbiological)
- Detailed tests at selected CCPs
- Survey of conditions during storage, distribution, sale and use of products
- Interviewing staff

**Documentation:**

Proper records should be maintained on all actions in the HACCP system in order that origin, cause and point of occurrence of the hazard can be traced. Records should be maintained on the following aspects

- HACCP plan and supporting documentation
- Monitoring CCPs
- Records of corrective actions
- Records of verification activities and modifications
- Nature, coding and disposition of the product

**Training of Personnel**

Successful implementation of any programme will depend largely on the persons responsible for different activities in the programme. Individuals to whom quality assurance task is assigned should possess an in-depth knowledge of the various aspects of the discipline. This can be achieved only by education and training of the staff.