Good Hygiene Practices along the coffee chain

Module 4.9

Establish a Monitoring System for each CCP (Task 9 / Principle 4)

Objectives and contents

- Objectives
  - To equip trainees with the necessary skills to establish monitoring systems in a HACCP plan
- Contents
  - The ‘What’s’, ‘Why’s’ and ‘How’s’ of monitoring
  - Designing a monitoring system
  - Documentation of monitoring systems in a HACCP plan

Monitoring

Monitoring

The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control

Effective monitoring ensures that critical limits for each CCP are not exceeded

Purposes of monitoring

- Measurement of system performance at CCPs – performance trends
- To determine when there is loss of control at CCP
- To establish records of the system's level of performance at the CCP – demonstration of compliance with the HACCP plan

Characteristics of monitoring systems

- Can be done continuously
- Can be done on a batch basis
- Required to give rapid results because process control requires real-time adjustments
- Should be done with accurate devices
- Bear in mind that the monitored parameter is often an *indirect measurement of the control parameter* – e.g. fill volume is monitored to assure adequate heat killing

Design of a monitoring system

- What will be monitored?
- How will critical limits and preventive measures be monitored?
- What frequency of checking is required?
- Who will monitor?

What is monitored?

- Monitoring may mean measuring a characteristic of a product such as pH or A_w
- Or of a process
  - Minimum (heat treatment) or maximum (storage) temperature
  - Time before drying, etc.
- It may require measurement of more than one parameter such as time exposed to temperature, or time for drying
- Measurement is not the only form of monitoring - some CCPs are controlled by visual inspection:
  - Split coconuts at harvest
  - Integrity of packaging
  - Verification of vendor's certificate

How is monitoring carried out?

- Monitoring procedures need to provide rapid results (*real-time*)
  - Instant (or almost instant) readings: clocks, thermometers, pressure gauges, pH meters
  - Rapid readings: A_w meters, chlorine colorimetry, ATP-based microbial load, redox colorimetry
  - Microbial or chromatographic analysis is *rarely* used for monitoring

How is monitoring carried out?

- Monitoring procedures need to be reliable, accurate and relatively precise
  - Measuring devices should be calibrated regularly
  - Operators should be thoroughly trained in the principle and application of measurement

Frequency of monitoring

- Continuous monitoring is preferred whenever possible
  - Necessary to review monitoring results at appropriate intervals
- To determine the sampling frequency of non-continuous monitoring, consider
  - The normal variation in the process
  - Difference between critical and operating limits
  - Assessment of potential product loss during monitoring interval if there is loss of control

Who monitors?

- Any individual with a production or quality assurance function may be appropriate for assigning responsibility for monitoring
- Individual responsible for monitoring must
  - Be adequately trained in the monitoring techniques and reporting responsibilities
  - Understand the importance of CCP monitoring
  - Have the authority to take appropriate action

Form 10 - documenting monitoring systems - example of *boia*

Process step	CCP No.	Hazard description	Critical limits	Monitoring procedures	Deviation procedures	HACCP records
6.*Boia* sun-drying	CCP1a (B)	Long residence time in a partially dried condition can allow development of mould and production of OTA	5d or less between A_w 0.95 and 0.80	A_w /mc measurement nightly from day 3		
	CCP1b (B)	Reintroduction of water after drying mostly accomplished can lead to growth of mould	No exposure to condensation at night; No exposure to rain	Continuous visual assessment of weather conditions; inspection of covering of coffee in the evening		

Form 10 - documenting monitoring systems – copra production

Process step	Description of hazard	Possible control measures	Control step	Critical limits	Monitoring procedures	Corrective actions	Records
Farm harvest / dehusking	Mould	Select sound nuts only	CCP1	No visible crack	Inspection of nuts		
Farm drying	Mould	Smoke drying < 16%mc Hot air drying < 12%mc Within 48 hrs	CCP2A CCP2B	▪Into drier within 12 hrs ▪Dry for 24 hrs ▪Turn copra every 8 hrs	▪Time period to drying ▪Time drying ▪Scheduled stirring		
Oil mill expelling / pelleting	Aflatoxin	Control Moisture of pelleted product	CCP3	Final moisture content <12%	Moisture determination of samples		

Summary

- What is monitoring - and how and why is it carried out?
- Considerations in designing a monitoring system
- Documentation of monitoring systems in a HACCP plan