GHP and HCCP Implementation

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Food Science

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• Overview

• GHP: Good Hygiene Practice

• GMP: Good Manufacturing Practice

• HACCP: Hazard Analysis Critical Control Point
QUALITY CONTROL

• Until the 1980s: Quality Control

**REACTIVE**

**Inputs + Process = Product**

(GOOD = Accept)

(BAD = Reject)
QUALITY ASSURANCE

• From the 1980: Quality Assurance

\[ \text{PREVENCTIVE} \]

\[ \text{Inputs} + \text{Process} \quad = \quad \text{Product} \]

\[ \text{(ZERO DEFECT)} \]

ACTION

ACTION

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PREVENCTION

GMP

HACCP

POP/PPHO/SOP

MANAGEMENT

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GOOD MANUFACTURE PRACTICES

- Set of principles and rules for the correct handling of food

- Covering from raw material to the final product

- Aimed to ensure health and consumer integrity
CLASIFICATION OF THE RULES OF GMP

- PERSONAL HYGIENE
- ENVIRONMENTAL HYGIENE
- HEALTH OPERATIONS
- CLEANING AND DISINFECTION
- INTEGRATED PEST CONTROL
PRE-REQUISITE

ANY ACTION OR PROCEDURE THAT MUST BE PERFORMED BEFORE BEING INITIATED AN IN PRODUCTION LEVELS:

- THE ENVIRONMENT
- RAW MATERIAL
- MACHINE / TOOL
- WORKFORCE
- MEASUREMENT

IN ORDER TO ENSURE THAT THERE AREAS WHICH HAVE CONTACT WITH THE PRODUCT IN THE PROCESS / FINAL PACKAGING

- OR OTHER RESOURCE WHICH IS NOT IN CONDITION OF GIVEN EFFECTIVE RESULTS
- **GMP**: management approach and process controls (including suppliers).

- **GHP**: system for maintaining hygiene and sanitation
GMP: management approach and process controls (including suppliers). Deals with:

- specifications;
- calibration;
- equipments;
- traceability and recall;
- equipment designs (for food safety),
- maintaining and monitoring;
- light and ventilation systems;
- storage conditions;
- control of operations;
- etc.
**GHP:** system for maintaining hygiene. Regards:

- personal hygiene,
- employee health,
- working conditions,
- maintenance of plant and equipment,
- hygiene of food contact surfaces,
- pest control,
- waste disposal,
- water quality,
- toilet and hand wash facilities,
- prevention of cross contamination,
- etc.
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- specifications;
- calibration;
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GHP:
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- pest control,
- waste disposal,
- water quality,
- toilet and hand wash facilities,
- prevention of cross contamination,
- etc.
Hazard Analysis
and Critical Control Points
WHAT IS HACCP

- Preventive, nonreactive
- A management tool used to protect the food supplied to consumers against potential biological, chemical and physical
WHAT IS HACCP

➢ Preventive, nonreactive

➢ A management tool used to protect the food supplied to consumers against potential biological, chemical and physical
HACCP

- HACCP is a system with zero risk.
- It was designed to minimize the risks associated with hazards in food safety.
Origin of the HACCP

- Developed in the 60s
- First used when developed to be used in foods space programs
- Adopted by many food processors and governments (e.g., U.S., EU)

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DEFINITIONS

NO
Codex
Alimentarius
HAZARD: is a biological, Chemical or physical agent in or condition of food with the potential to cause an adverse health effect

LIMIT SAFETY: is a margin of operational work, is narrower than the critical threshold, allowing corrective action before the critical limit is exceeded.

MANUAL HACCP / HACCP: the document containing the guidelines of HACCP / HACCP and the plan(s) HACCP / HACCP themselves.

SEVERITY: magnitude of the adverse effect that a contaminant the human health.
**POTENTIAL HAZARD:** Hazard that has a reasonable probability of occurring. (probability of occurrence = potential).

**SIGNIFICANT HAZARD:** is the potential hazard that presents unacceptable risk, for which it is necessary to establish control measure.

**FLOWCHART:** is the sequence in which the process steps occur, indicating where the inputs come.

**INPUT:** all raw materials, all packaging materials, additives and other materials that are part of the product or have contact with the product.
CONTROL POINT: point where there is a control, this is due to food safety or other quality factors.

CORRECTION (ISO 9000 and ISO 22000): action to eliminate detected non-compliance.

Corrective action (ISO 9000 and ISO 22000): action to eliminate the cause of non-conformity or other undesirable situation.
HACCP

- An internationally accepted methodology to reduce and manage risk
- A preventive system for food safety that addresses chemical, physical and biological risk
- Treats the production of food as a total, continuous system, assuring food safety from harvest to Consumption (Fram-to-Fork approach)
- 7 Principles & 12 Steps
HACCP Principles

1. Conduct a hazard analysis
2. Determine the CCPs
3. Establish Critical Limits
4. Establish a system to monitor Control of the CCPs
5. Establish the Corrective Actions to be taken when monitoring indicates that a particular CCP is not in Control
HACCP Principles

6. Establish Procedures for Verification to confirm that the HACCP System is working effectively.

7. Establish documentation concerning all procedures and records appropriate to these Principles and their application.
HACCP: 12 Steps (A)

Pre-Steps

1. Assemble HACCP team
2. Describe Product
3. Identify intended Use
4. Construct Flow Diagram
5. On-site Confirmation of Flow Diagram
HACCP: 12 Steps (B)

6. List all potential hazards associated with each step, conduct a hazard analysis and consider any measures to control identified hazards

7. Determine the CCPs

8. Establish Critical Limits for each CCP

9. Establish a monitoring system for each CCP

10. Establish Corrective Actions

11. Establish Verification Procedures

12. Establish documentation & Record Keeping
HACCP study

1. Assemble HACCP team
2. Describe product
3. Identify intended use
4. Construct flow diagram
5. On-site confirmation of flow diagram
6. List all potential hazards
   Conduct a hazard analysis
   Consider control measures
7. Determine CCPs
8. Establish critical limits for each CCP
9. Establish a monitoring system for each CCP
10. Establish corrective actions
11. Establish verification procedures
12. Establish documentation and record keeping

HACCP plan
1. Assemble HACCP team
2. Describe product
3. Identify intended use
4. Construct flow diagram
5. On-site confirmation of flow diagram
6. List all potential hazards
   Conduct a hazard analysis
   Consider control measures
7. Determine CCPs
8. Establish critical limits for each CCP

HACCP study
9. Establish a monitoring system for each CCP

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HACCP plan
HAZARDS ANALYSIS

INPUT

HAZARD ANALYSIS

STEPS OF PROCESS
HAZARDS PROVENIENCE

STEPS OF THE PROCESS

INPUTS

EQUIPMENT

MEASURE

ENVIRONMENT

WORKFORCE

METHODS

FINAL PRODUTO
HAZARDS

TYPES

PHYSICAL

CHEMICAL

ALERGENICS
AND BIOCHEMICAL
INTOLERANCE

PATHOGENIC
MYCROORGANISMS
INCLUDING THOSE WHICH
PRODUCE TOXINS
PHYSICAL

- GLASS
- PLASTICS
- FRAGMENTS OF WOOD
- FRAGMENTS OF BONE
- FRAGMENTS OF STEEL
- FRAGMENTS OF NON-FERROUS METALS
BIO/ MICROBIOLOGY
HAZARDS

BACTERIAS

PARASITES

VÍRUS

PRIONS

NATURAL TOXINES
(fungi or others sources)
CHEMICAL

- PESTICIDES
- RESIDS OF THE CLEANING PRODUCTS
- TOXIC PIGMENT (HEAVY METAIS PESADOS)
- LUBRIFICANTE NÃO ALIMENTÍCIO
- ANTIBYOTICS
- HORMONS
- METAIS PESADOS
CHEMICAL

- PESTICIDES
- WASTE OF CLEANING PRODUCTS
- PIGMENT TOXIC (HEAVY METAL)
- NO FOOD LUBE
- ANTIBIOTICS
- HORMONES
- HEAVY METALS
PRINCIPLE 2
IDENTIFICATION OF PCC

STEP PROCESS, WHERE A CONTROL MAY BE USED, AND IT IS ESSENTIAL TO PREVENT, REDUCE OR ELIMINATE AN ACCEPTABLE LEVEL A HAZARD TO THE SAFETY OF FOOD
THE IDENTIFICATION OF PCC MAY BE

EASIER BY APPLICATION OF A DECISION-MAKING TREE

IMPLEMENTATION OF DECISION-MAKING TREE MUST BE FLEXIBLE

OTHER SYSTEMS LOGIC CAN BE USED
PRINCIPLE 3
LIMIT CRITICAL CONTROL

- VARIABLE ATTRIBUTE VALUE OR / CRITERIA

That separate the acceptable not acceptable
CONDUCT OF A SEQUENCE PLANNED OBSERVATIONS OR MEASURES OF THE CONTROL PARAMETERS
TO EVALUATE IF THE PCC IS UNDER CONTROL
PRINCIPLE 5
CORRECTIVE ACTION AS * Codex Alimentarius

ANY ACTION TO BE TAKEN

WHEN THE RESULTS OF MONITORING IN

CRITICAL CONTROL – PCC INDICATE A LOSS OF

CONTROL
VERIFICATION AS CODEX ALIMENTARIUS

➢ IMPLEMENTATION OF METHODS, PROCEDURES, TESTS AND OTHER REVIEWS, AND MONITORING TO DETERMINE COMPLIANCE WITH HACCP PLAN

➢ OBTAINING EVIDENCE THAT THE ELEMENTS OF HACCP PLAN ARE EFFECTIVE
DOCUMENTATION AND RECORDS

SETTING DOCUMENTATION

REFERRING TO ALL APPROPRIATE PROCEDURES AND RECORDS

THOSE PRINCIPLES AND IMPLEMENTATION
Relationship between GHP & HACCP

- The HACCP system may be built up throughout the existing GMP facilities;
- Many hazards could be controlled through GMP ("low risk" hazards);
- HACCP takes care of significant hazards not controlled; by pre-requisites and GMPs;
- All the pre-requisite must be in place before approaching/starting a HACCP program
Relationship between GHP & HACCP

- GMP and GHP must outline the measures to be taken to ensure that: premises, equipment, transport, and employees do not contribute to become hazards for the food safety.

- Prerequisite to HACCP, including training should be well established, fully operational and verified in order to facilitate the successful application and implementation of the HACCP system.
Verification and Validation

**Validation**
- Objective is to ensure that hazards identified are complete, correct and will be effectively controlled by HACCP Plan.
- Requires objective evidence that all elements of HACCP Plan are effective

**Verification**
- Objective is to determine compliance with the HACCP system (Plan)
- Methods include: auditing, random sampling and analysis
Examples: swabs hand, parameters controls, etc.
Calibration and internal audits

- Management responsibility:
  - management commitment,
  - food safety policy, responsibility and authority
- Document control and record control
- Management review
- Resource Management
- Control of monitoring and measuring systems: methods and equipment
- Internal audits
- Improvements
HACCP: safety vs. quality

HACCP is defined as a system which identifies, evaluates and controls hazards which are significant for food safety. Basically designed to address safety.

However, HACCP can be applied to other aspects of food controls (ISO 22000) “While the application of HACCP to food safety was considered here, the concept can be applied to other aspects of food quality”

HACCP is also apply to other industries, e.g.: medical, oil, explosives, drugs, space, etc.
Implementation in primary production

Many hazards are due to environment, pests, diseases of animals and plants. We should implement any measures and strategies to control these, contaminants, and to improve the “hygienic conditions” of raw material.

Hazards associated with primary production may (or may not) be eliminated (or reduced to acceptable levels). It depends on subsequent processing/handling (e. coli in food = YES) (pesticide, heavy metals, and mycotoxins in food = NO)

Good practice recommendations need to be followed with the aim of ensuring food safety and wholesomeness (GAP / GHP) for not introducing/increasing hazards.
Responsibilities

THE PROCESSOR
Processors are responsible for:
  - upgrading the facilities;
  - designing the HACCP system;
  - implementing ICT;
  - documenting and maintaining records.

THE GOVERNMENT
Governments are responsible for creating a scientific, technical and financial environment favourable to HACCP implementation.
Costs of implementation

- Costs of consultants,
- Certification;
- Manpower time and training costs;
- Cost/Benefit studies not always available or easy to carry out;
- Lack of data and studies relating to impact of HACCP on food safety;
- Visible benefits not always evident;
- Implementation often due to external pressures (export, retail, buyers).
THANK YOU

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