



Choose certainty.
Add value.

HACCP Training Program

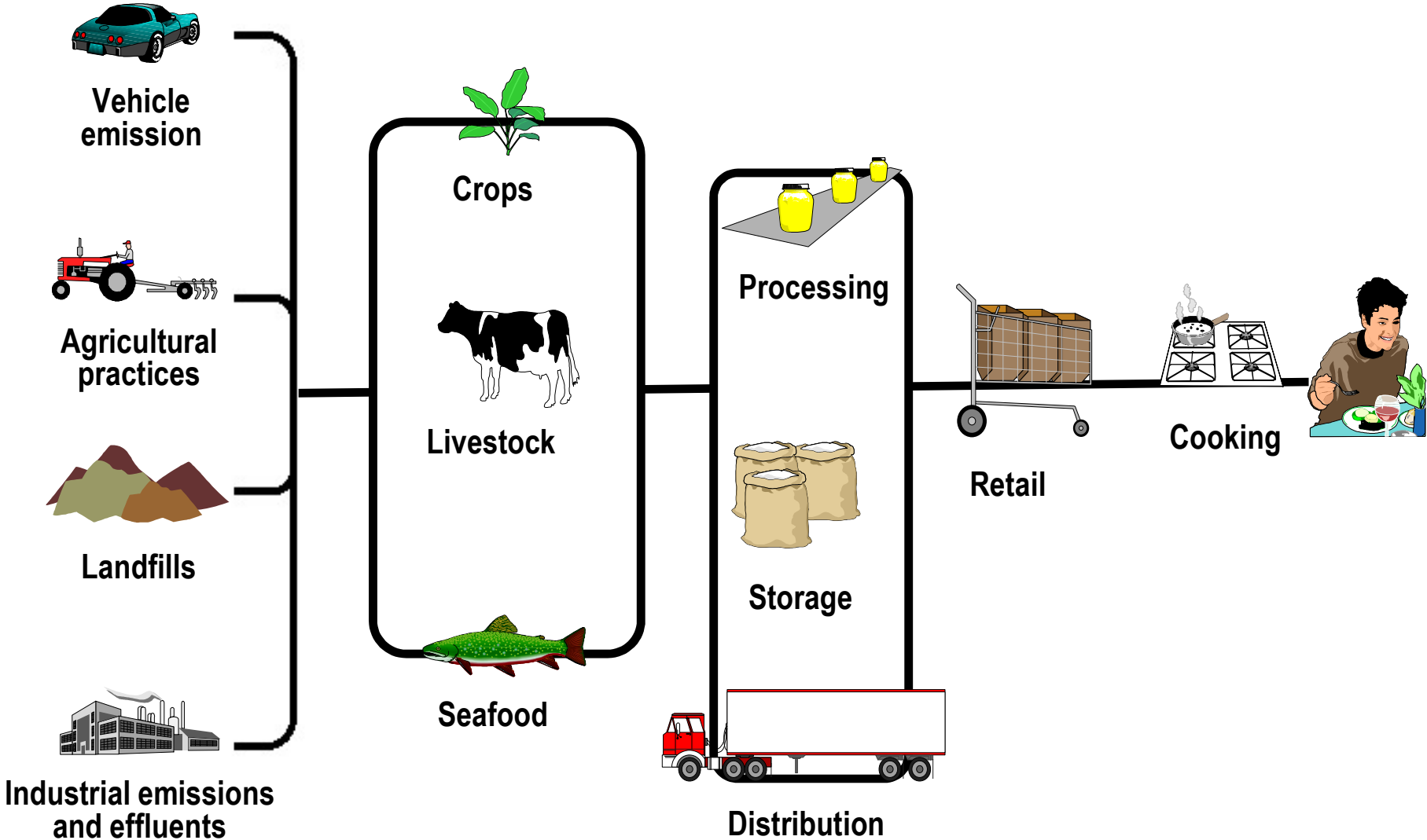
Why Food Safety?



- **New products are coming on the market at a fast pace**
- **New processing methods and equipment**
- **World market and changing patterns of consumption**
- **World trade need for international harmonization**
- **Emerging pathogens**
- **More and more customers scrutinize food they eat due to food scares**
- **Customers are better educated and informed**
- **Regulators Active in safeguarding food**
- **CODEX**
- **Shareholders/Insurers (Litigations/Claims)**
- **Retailers/Private Labels (Brand Protection)**



Food Chain and Sources of Contamination



Besides direct health consequences, food borne illnesses can result in:

- **Loss of consumers' confidence**
- **Reduce productivity,**
- **Impose substantial stress on health care system**
- **Reduce economic output**
- **Finally, Legal actions and closure of food business.**



Campylobacter: Undercooked Poultry



Hepatitis A: Improper Food Handling



E. coli: Fresh Produce



Salmonella: Processed Foods



Wrong practices followed neglecting food safety



Wrong practices followed neglecting food safety



Wrong practices followed neglecting food safety



Attitude towards food – 101 uses for a bin



Food Safety Guidelines and Standards



- Guideline: It is an advisory document which gives explanatory information to meet the requirements or conformity. For example: HACCP, GMP
- Standard: It is an agreed and authorized set of requirements which must be followed in order to be compliant. For example:
 - British Retail Consortium (BRC Standards)
 - International Food Standards (IFS Standards)
 - ISO 22000

About Codex



The Codex Alimentarius Commission is the body established to develop food standards under the Joint FAO/WHO Food Standards Programme

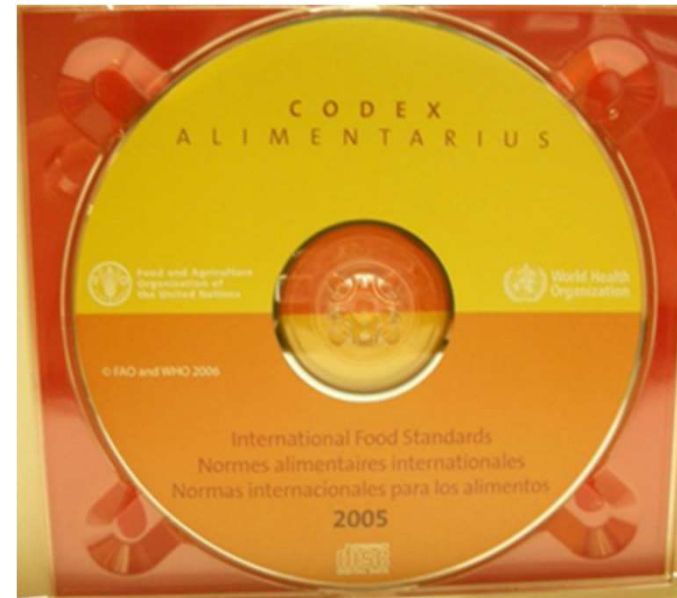
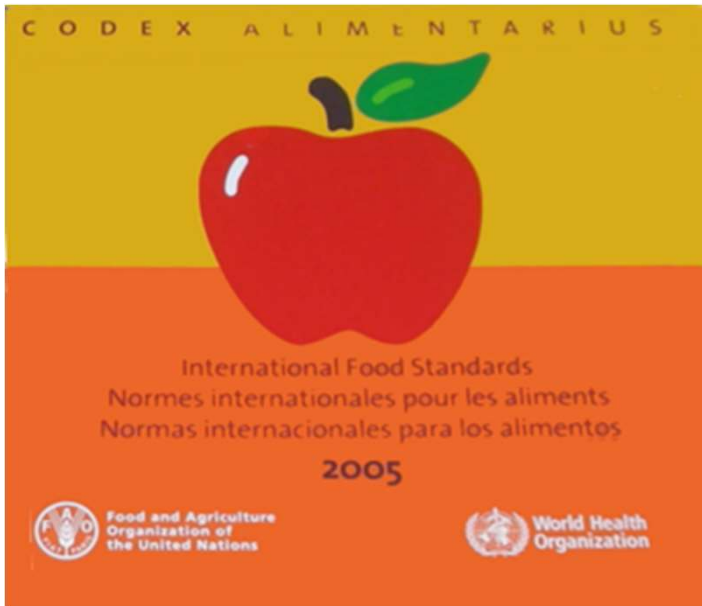
Codex Alimentarius (in Latin) = Food Book / Food Code



Codex Alimentarius



The collection of food standards and related texts adopted by the Codex Alimentarius Commission is known as the Codex Alimentarius.



About Codex



Codex General Principles of Food Hygiene



**Recommended International Code of Practice General Principles of Food Hygiene
CAC/RCP1-1969, Rev.4(2003)**



Objectives

- Identify the *essential* principles of food hygiene applicable *throughout the food chain*, to achieve the goal of ensuring that food is safe and suitable for human consumption
- Provides a baseline structure for other, more specific, codes applicable to particular sectors
- Such specific codes should be read in conjunction with this document and its appendix on HACCP and Guidelines for its application

Basic Principles of Codex Food Hygiene



1. Primary Production



2. Establishment: Design And Facilities



3. Control of Operation



4. Establishment: Maintenance And Sanitation



5. Establishment: Personal Hygiene



6. Transportation



7. Product Information And Consumer Awareness



8. Training



Food Safety can be achieved by implementing HACCP.

HACCP

PRP

(As per Codex Alimentarius eg;
CAC/RCP-01, ISO/TS 22002-1

GMP
GHP
GLP
GWP
GDP,
etc

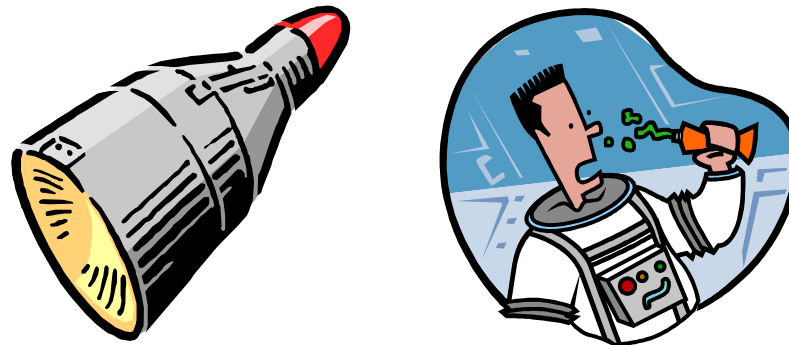
The HACCP (Hazard Analysis and Critical Control Point) System



The HACCP System



It was developed to ensure safe foods for NASA and the Apollo and Gemini program by controlling the environment and the processing parameters.





Dr. Howard E. Bauman

Dr. Howard E. Bauman- Father of HACCP (1925 – 2001)

- **Doctorate in Microbiology from University of Wisconsin, USA**
- **Joined M/s. Pillsbury in 1953 as Head-Research, Bacteriology Dept.**

History of HACCP System



YEAR	ORGANISATION/ EVENT	PRODUCT/COMMENT
1959	Pillsbury Company / NASA / US Army NATIK Laboratory / US Air Force Space Laboratory Project	Food for Astronauts (Apollo and Gemini)
1971	National Conference of Food Protection	Introduction of HACCP to the world (03 Principles)
1973	USFDA (United States Food and Drug Administration)	Low Acid and Acidified Canned Foods
1985	National Academy of Science (USA) International Commission for Microbiological Standards for Foods (ICMSF) International Association of Milk, Food and Environmental Sanitarians (IAMFES)	Food Industries (05 Principles)
1989	US National Advisory Committee on Microbiological Criteria for Food (NACMCF)	07 Principles
1993-1997	Joint FAO/WHO Food Standards Programme (CODEX)	Accepted the Principles
NOW	Recommended International Code of Practice General Principles of Food Hygiene (CAC RCP 1-1969, Rev.4 2003)	All over the world

The HACCP is..



**What
I can
do?**

- ◆ How, When, Where can the food safety hazard can occur
- ◆ How to control it.

**Rather
than**



**What
I Should
do?**

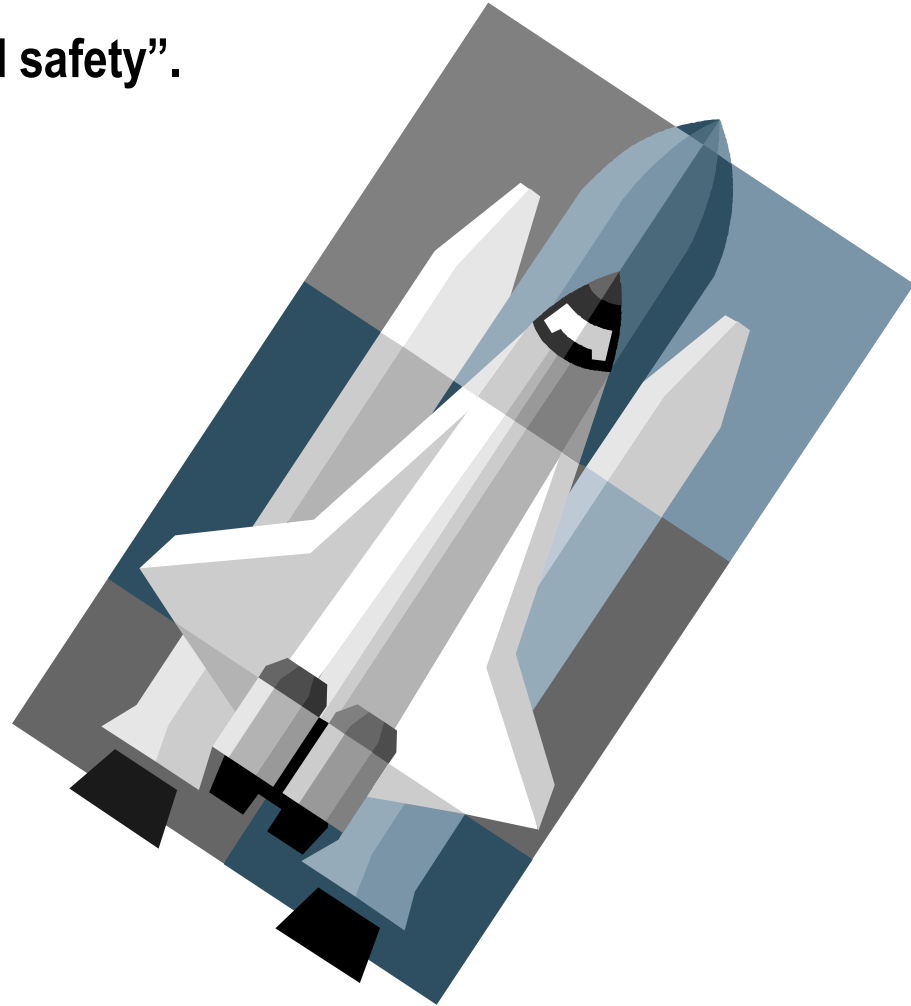
- ◆ How can save the spoiled food?.

Preventive and Proactive approach to control food safety hazards.

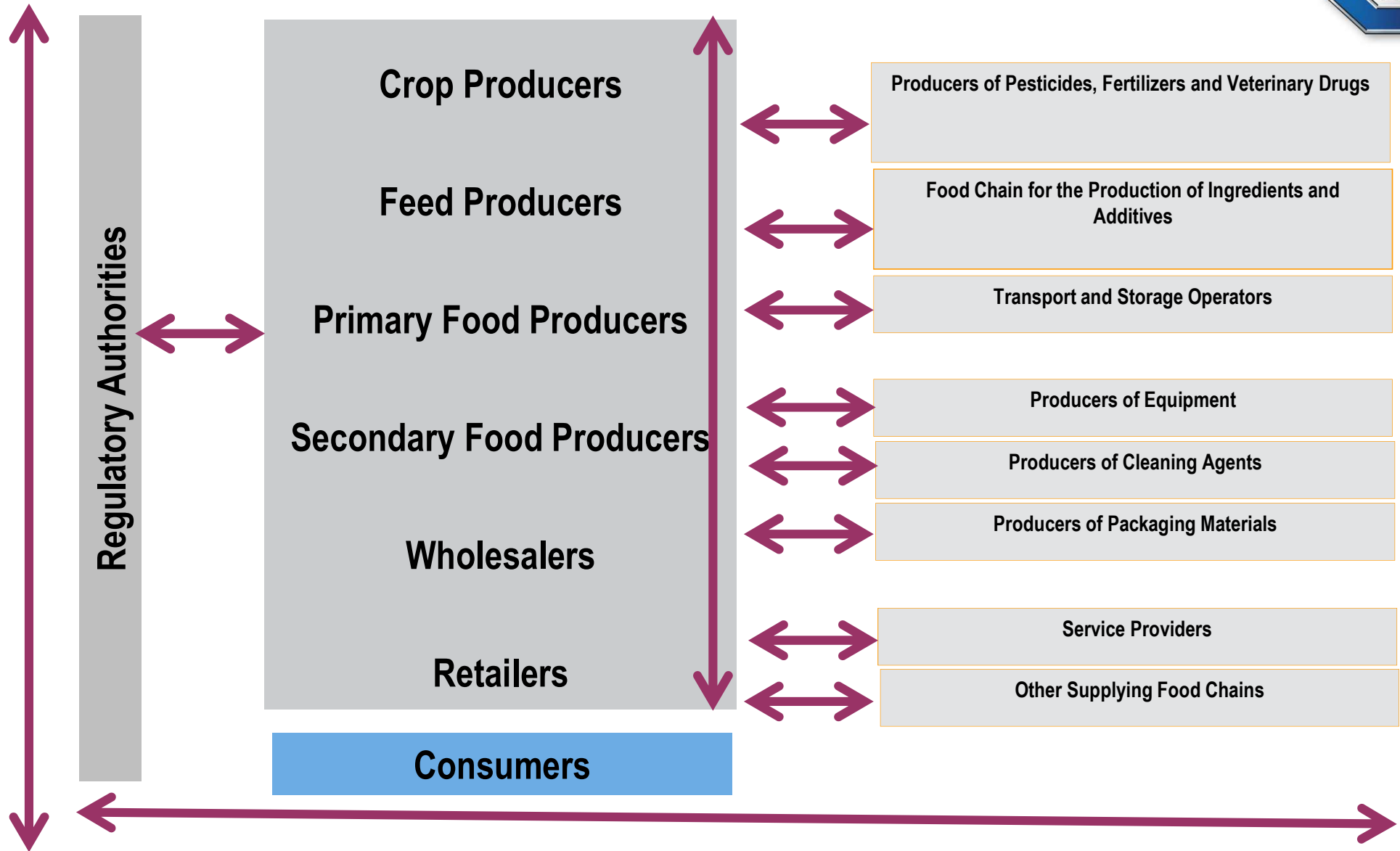
The HACCP System



Codex defines HACCP as “a system which identifies, evaluates and controls hazards which are significant to food safety”.



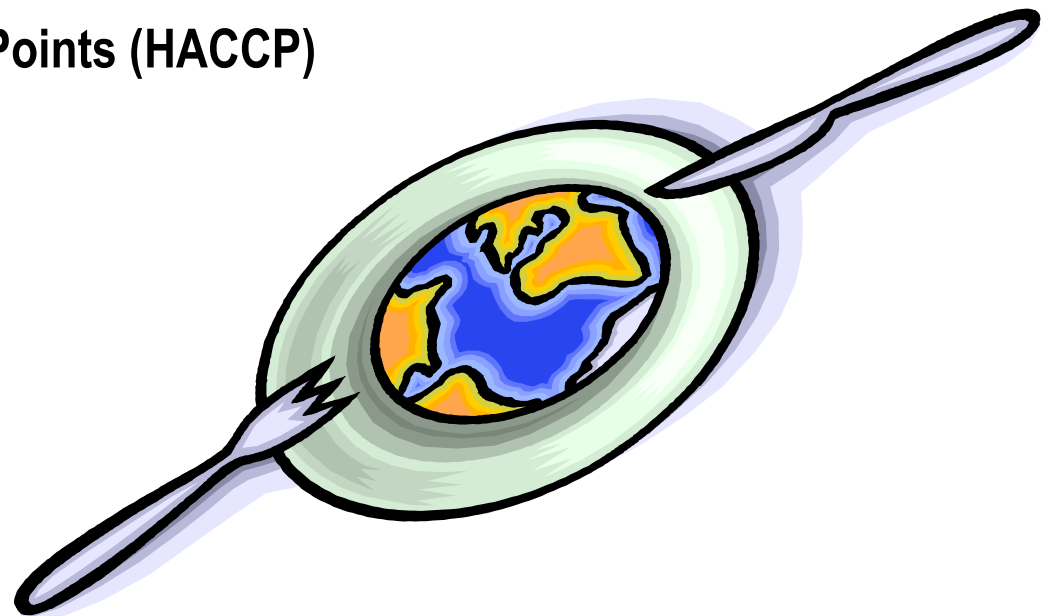
Organizations in the Food Chain



Key Elements of FSMS



- **Interactive Communication (Prevention of unsafe food; Food should be harmless to the consumers)**
- **Based on Prerequisites (GMP + GHP)**
- **Hazard Analysis and Critical Control Points (HACCP)**
- **Management System requirements**



Food borne illness



From 31 **known** food born pathogens –

- 9.4 million illness
- 55961 hospitalized
- 1351 deaths

From **Unspecified** agents –

- 38.4 million illness
- 71878 hospitalized
- 1686 deaths



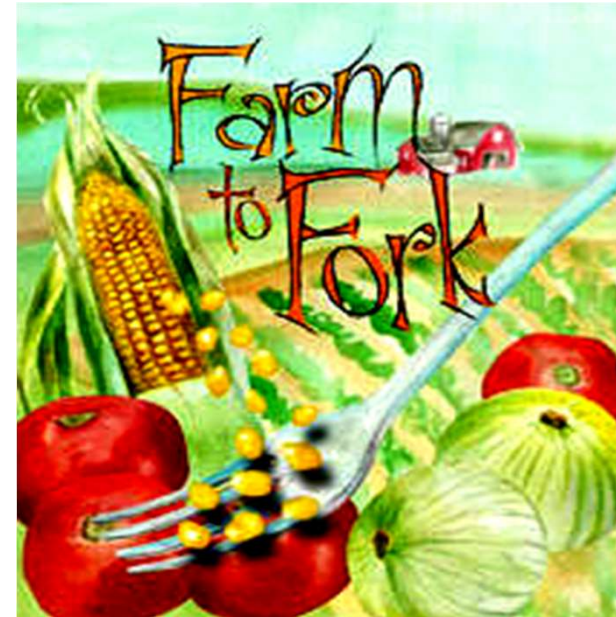
www.cdc.gov/foodborneburden/2011-foodborne-estimates.html

Aims at preventing hazards at the earliest possible point in the food chain.

- Contaminants
- Pathogenic micro-organisms
- Physical objects
- Chemicals
- Raw Materials
- A process
- Inadequate directions for use to the consumer
- Storage conditions



- Safe food is obtained by applying HACCP “**from farm to fork**”
- Hazards are all kinds of agents when present at unacceptable levels
- Control means “having things under control”



HACCP



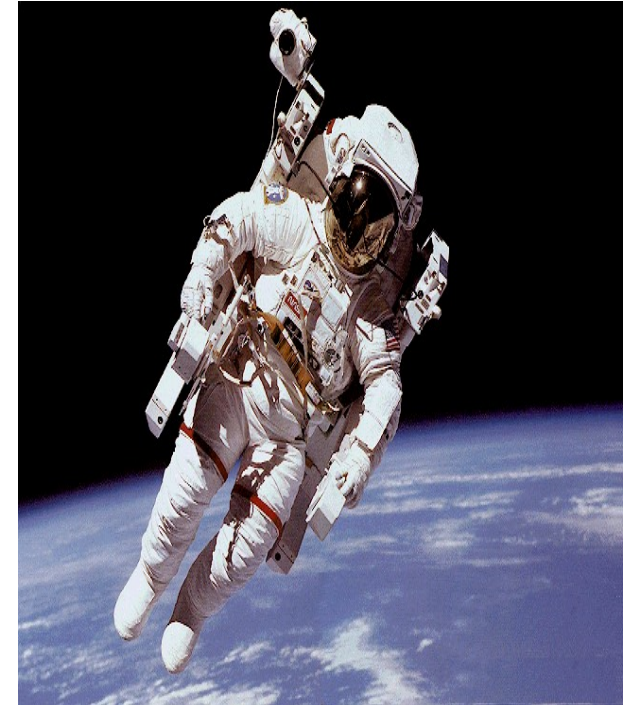
- A system for food safety control
- Preventive not reactive
- A management tool used to protect the food supply against “Hazards”
- Not a zero-risk system (it minimizes the risk but not completely eliminates)



Origin of HACCP



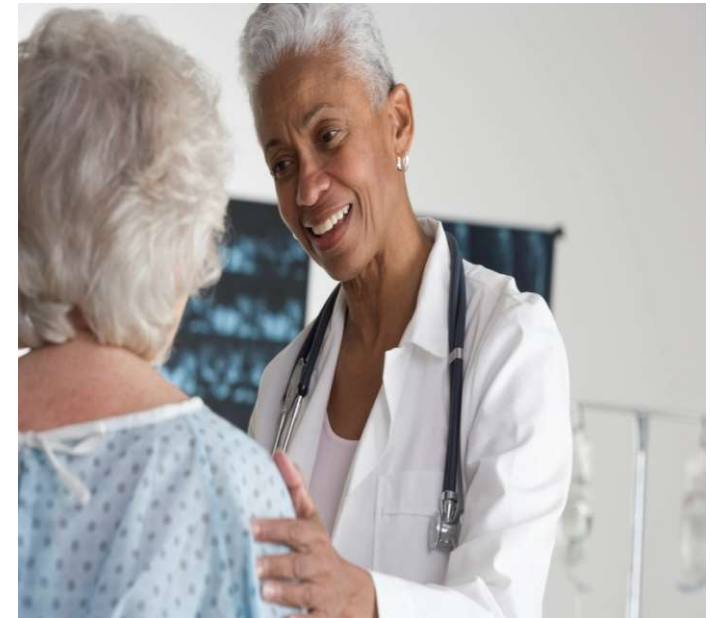
- Pioneered in 1960's by Pillsbury company, US Army and National Aeronautics and Space Administration (NASA)
- First used when foods were developed for the space program.
- Based on “Failure, Mode and effect Analysis”
- During 1970's and early 1980's HACCP was used to some extent for non canned foods, but it was in 1985 that it was applied seriously to various categories of food.
- Adopted by many food processors and the U.S. Government.



Why HACCP?



- Contaminated products: wide variety of potentially harmful materials
- Occur worldwide
- Three types of hazards; biological, chemical and physical.
- Human health implications
- Huge cost implication
- May result from tampering or shopper abuse.



Why should food companies use HACCP?



- It is a proven system, which gives assurance of effectively managed food safety
- Enables co. to maintain top priority on food product safety
- Involvement of personnel from different disciplines ensures that all employees have the same fundamental objective – *food safety is a must*
- Assures customers of the safety of its operations, indicating that it is a responsible and professional company
- It is a legislative requirement in most of the countries

Why should food companies use HACCP?



- HACCP is becoming popular as an industrial food safety system and as a tool to meet regulatory requirements because:-
- Encourages prevention rather than correction
- It is a scientific approach
- It encourages people to take an active role in the planning and implementation of food protection controls.
- It makes people aware of food safety hazards
- It makes it unnecessary to engage in random sampling and end product testing
- It results in a safe products and systems
- It encourages the application of uniform HACCP Specification at all levels of the food system

Advantages over traditional methods



- Emphasizes process control
- Concentrates on the points in the process that are critical to the safety of the product
- Stresses communication between the regulator and the industry.



Standards of HACCP



- Joint FAO/WHO Codex Alimentarius committee (1993)
- Recommended International code of practice – General Principles of Food Hygiene CAC/RCP 1-1969 (Seven principles recognized internationally)
- FDA Sea Food HACCP Regulations
- Assured Safe Catering
- SQF 2000(Safe Quality Food 2000) based on HACCP

Standards of HACCP



EC Directive 93/94/EEC, 14/6/93

The directive suggests the integration of

- The hygiene practices of the recommended international code of practice,
- General principles of food hygiene of the codex alimentarius and
- The principles of HACCP with the quality management practices of ISO 9001

HACCP



- The basis of HACCP - GMP and SSOP
- No SSOP - No HACCP
- SSOP documented and implemented
- Facility sanitation
- Cleaning schedule
- P.H, GHPs, GMPs
- The entire system verified by QA personnel and Records kept



Support programs for HACCP



- Management commitment
- Plant design as per GMP
- Insect and pest control
- Product identification and traceability
- Trained personnel
- Good warehousing practices
- Calibration
- Recall procedures



Hazards

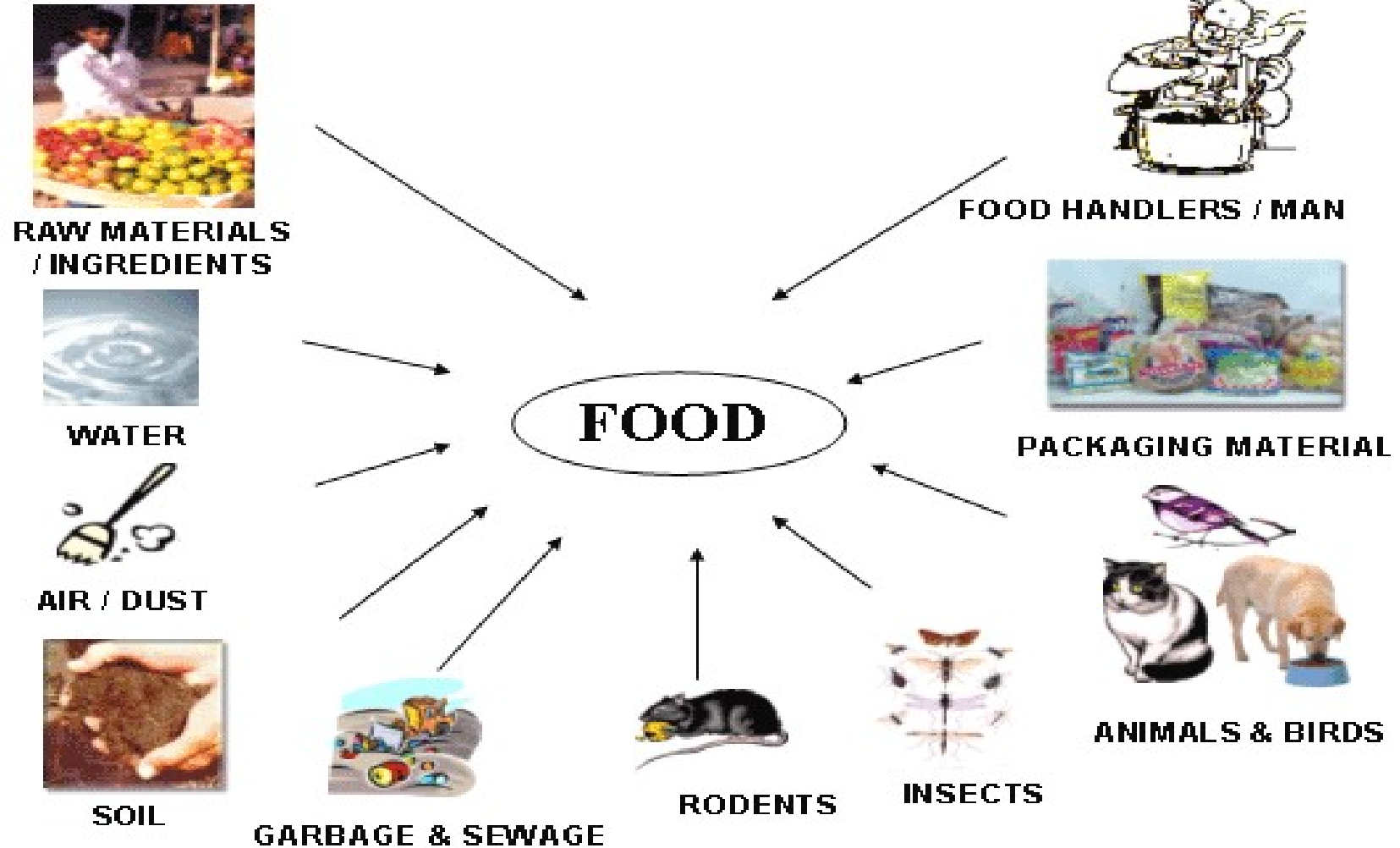


A Biological, Chemical or Physical property that may cause a food to be unsafe for consumption.

In HACCP it refers to conditions or contaminants in foods that can cause illness or injury



Possible Sources of Hazards



Microbiological include

1. Harmful bacteria

Food Infection and Food Intoxication
Spore forming and Non spore forming Bacteria.

2. Viruses

Hepatitis A to E
Norwalk virus group

3. Parasitic Hazards

Worms and Protozoa

4. Fungi

Yeast and Mould



HARMFUL

Bacterial hazards



Micro-organism	Why a hazard
Clostridium botulinum (spore forming)	Causes intoxication that affects the central nervous system and causes shortness of breath, blurred vision, loss of motor capabilities and death.
Listeria monocytogenes (non spore forming)	Causes an infection with mild flu-like symptoms. Severe forms of listeriosis are possible in people with weakened immune systems causing septicemia, meningitis etc.
Salmonells spp (non spore forming)	Causes an infection with the following symptoms: nausea, vomiting, abdominal cramps, diarrhea, fever and headache. Death is possible in people with weakened immune system.

Viral hazards



Micro-organism	Why a hazard
Hepatitis A virus	Causes fever and abdominal discomfort followed by jaundice
Norwalk virus	Causes nausea, vomiting, diarrhea and abdominal pain (gastroenteritis). Headache and low grade fever may also occur.

Parasitic hazards



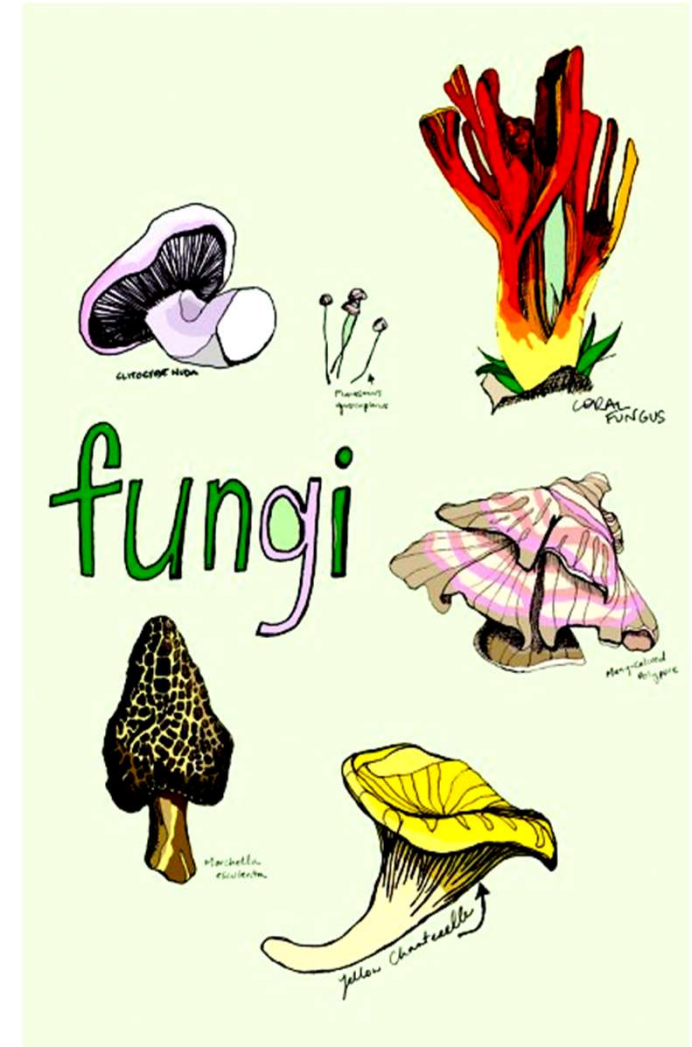
Organism	Why a hazard
Giardia lamblia	Causes diarrhea, abdominal cramps, fatigue, flatulence, and weight loss
Entamoeba histolitica	Causes dysentery (severe diarrhea with presence of blood in stool)
Ascaris lumbricoides	This roundworm causes intestinal and lung infection

Fungi



A number of fungal sp. are capable of producing metabolites that are toxic to humans and domestic animals. These are called mycotoxins.

- Aspergillus spp. and Fusarium spp
- Aspergillus: Cause aflatoxicosis.
- Symptoms: causes acute liver damage, cirrhosis. Suppresses the immune system and causes liver cancer e.g. nuts, seeds, cereals etc.
- Mushrooms: poisonous and non-poisonous look alike.
- Purchase from reputable suppliers..



1. Naturally occurring

Like Mycotoxin, Scombrototoxin, Ciguatoxin and Shellfish poisoning

2. Intentionally Added

Like food additives, preservatives, nutritional additives and color additives

3. Unintentionally or incidentally added chemicals.

Like agricultural chemicals, toxic compounds, lubricants etc.



Naturally occurring chemical hazards



Source	Why a hazard
Certain fish species (e.g., Tuna, Mahimahi)	Spoilage of certain species of fish can result in production of toxic levels of histamine
Mycotoxins	E.g., Nuts, cereals, etc.
Shell fish toxins	Oysters and other types of shell fishes

Intentionally added chemical hazards



Source	Why a hazard
FD & C Yellow 5	Can produce an allergic type reaction in (food colouring) sensitive people.
Sodium Nitrite (preservative)	Can be toxic in high concentrations
Vitamin A	Can be toxic in high concentrations
Sulphating agents	Can cause allergic type reaction in sensitive people

Unintentionally added chemical hazards



Source	Why a hazard
Agricultural chemicals (e.g. pesticides, herbicides)	Can be acutely toxic if present in the food at high levels and may cause health risks with long term exposure.
Cleaning chemicals (e.g. acids, caustics)	Can cause chemical burns if present in the food at high levels
Maintenance chemicals (e.g. lubricants, paint)	Chemicals that are not approved for food use and may be toxic

Physical hazards



Source	Why a hazard	Source
Glass	Cuts, bleeding; may require surgery to find or remove	Bottles, jars, light fixtures, thermometers, gauge covers
Wood	Cuts, infection, choking	Fields, pallets, boxes, buildings
Stone	Choking, broken teeth, cuts, infection	Fields, buildings, machinery, employees
Insulation	Choking	Building materials
Bone	Choking, trauma	Improper processing
Metal	Cuts, broken teeth, may require surgery to remove	Machinery, agricultural fields, wire, staples, buildings, employees

Logical sequence of application of HACCP



1. Assemble the HACCP Team

2. Describe the Product

3. Describe the Intended Use

4. Prepare Flow Chart

5. On-site Verification of Flow Chart

6. Conduct Hazard Analysis

Logical sequence of application of HACCP



7. Determine the Critical Control Points (CCPs)

8. Establish critical limits for each CCP

9. Establish a monitoring system for each CCP

10. Establish corrective action when there is a loss control at CCP

11. Establish verification procedures

12. Establish Documentation and record keeping

1. Assemble the HACCP Team



- The team should be multidisciplinary
- Include people who are familiar with the actual operations.
- Have the required knowledge and authority to implement changes.



2. Describe the product



- Product description
- Composition
- Method of preservation
- Packaging
- Storage conditions
- Distribution
- Intended use and consumers
- Preparation



3. Describe the Intended Use



- Who is the target group?
- How the end product is used?
e.g. for direct consumption or additive in
manufacture of a product



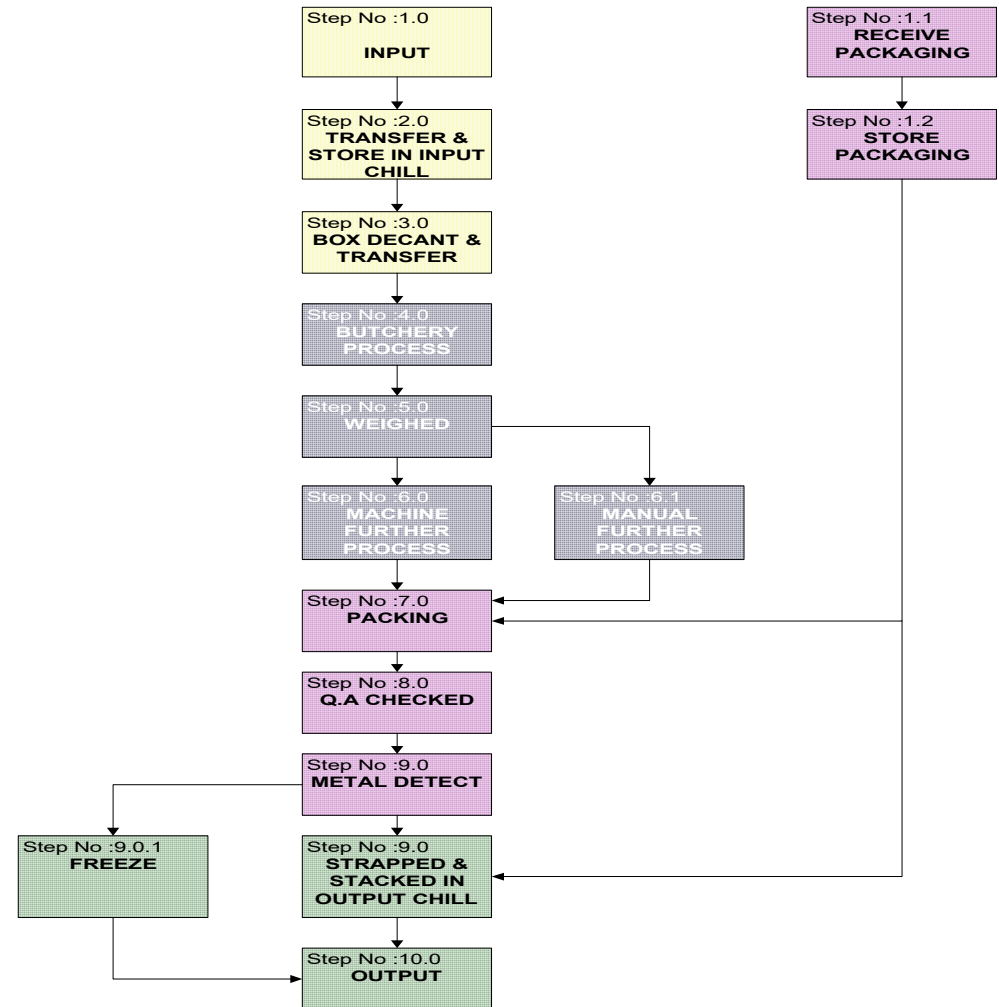
4. Prepare Flow Chart



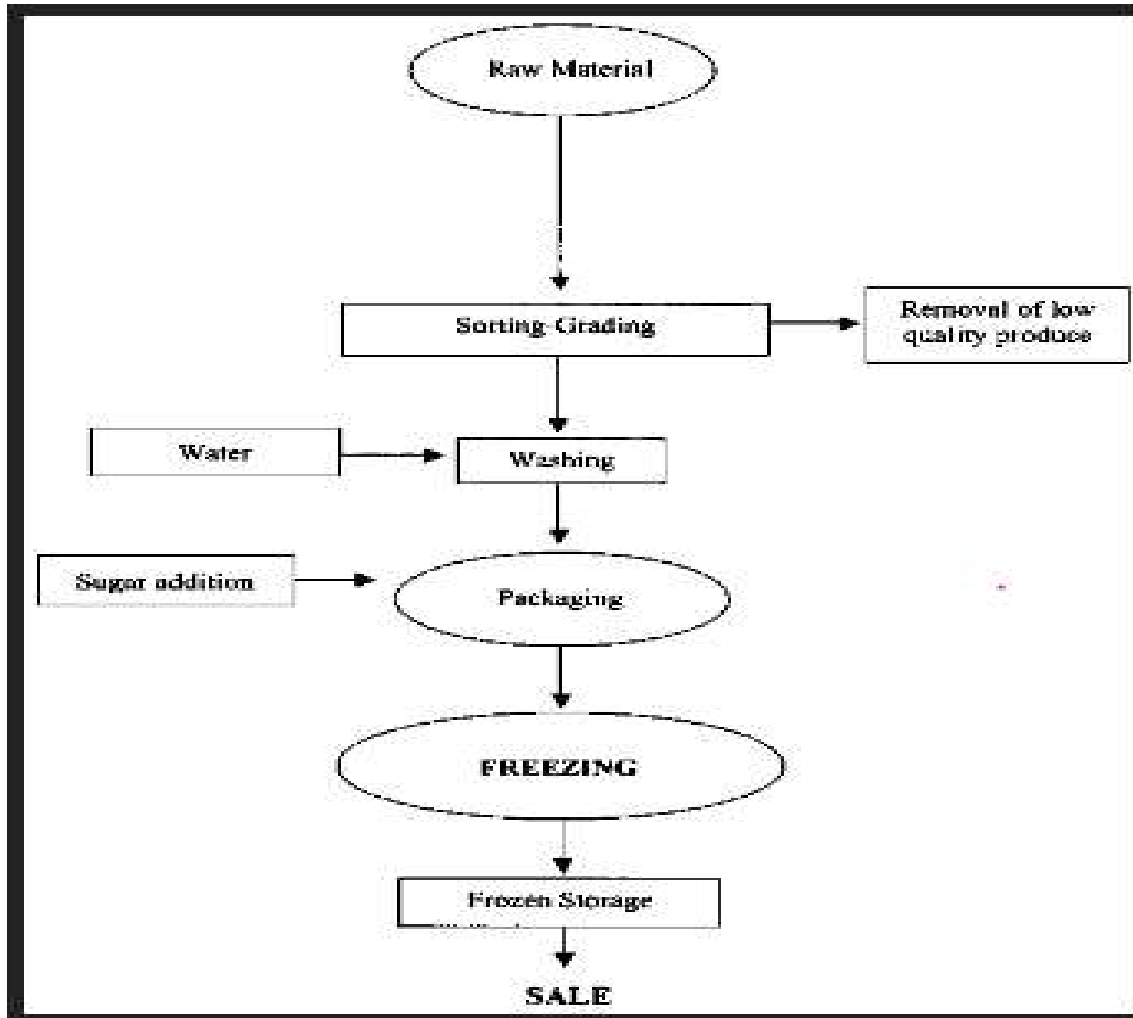
- Should include all steps
- Will be used in the hazard analysis process and HACCP Plans

SHOW™ FLOW CHART

Product Name : FRESH BEEF PROCESSING (SOUTH KIRKBY)



Preparation of the flow diagrams



- Sequences of steps.
- Outsourced process
- Re-working
- Intermediate product
- By product
- Waste removal
- Addition of steam, air.
- Flow chart verification

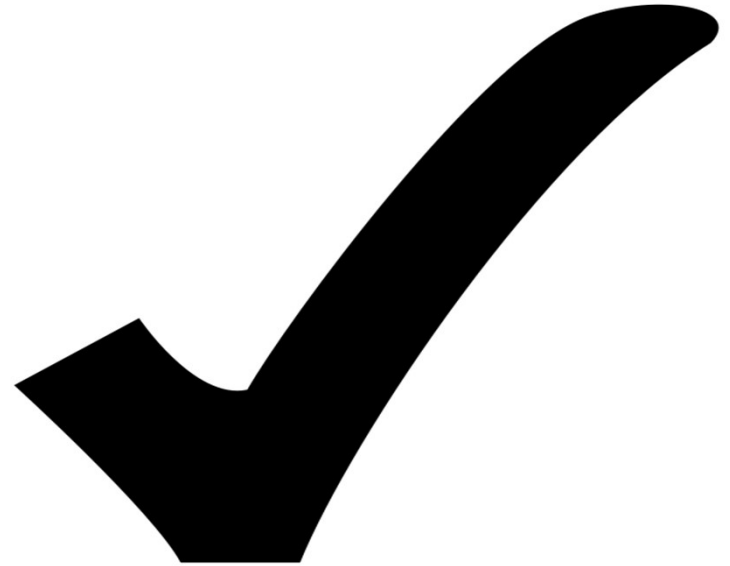
8.5.1.5.2 On-site confirmation of flow diagrams

8.5.1.5.3 Description of processes and process environment

5. On-site Verification of Flow Chart



- Check for accuracy and completeness
- Develop traffic flow diagrams
- Identifies possible contamination points



6. Conduct Hazard Analysis



In conducting the hazard analysis, wherever possible the following should be included:

- The likely occurrence of hazards and severity of their adverse health effects;
- The qualitative and/or quantitative evaluation of the presence of hazards;
- Survival or multiplication of microorganisms of concern;
- Production or persistence in foods of toxins, chemicals or physical agents; and
- Conditions leading to the above.



Areas to consider for Hazard Analysis



Raw Materials:

- What hazards are likely to be present in each raw material that may affect the process / product?
- Are any of the raw materials themselves hazardous if excess amounts are added?
- Design and plant equipment (premises)
- Risks of cross - contamination during process holding stages - microbiological, chemical, physical safety issues?





• 8.5.2 Hazard analysis

		HAZARD ANALYSIS					
		PRODUCT TYPE: Frozen PUD Shrimp					
PROCESS / STEP	TYPE OF HAZARD BIOLOGICAL PHYSICAL CHEMICAL	POTENTIAL HAZARD INTRODUCED, CONTROLLED OR ENHANCED AT THE STEP-CAUSE.	SEVERITY (A)	LIKELIHOOD OF OCCURANCE (B)	IS THE HAZARD SIGNIFICANT (RISK FACTOR = A X B)	JUSTIFICATION FOR DECISION	WHAT CONTROL MEASURES CAN BE APPLIED TO PREVENT THE SIGNIFICANT HAZARDS
Raw material receiving (shrimp/ lobster)	Biological	Presence of pathogenic microorganism					
	Chemical	Presence of sulphite residue					
	Physical	Glass pieces, wood, stones, and Metal pieces					



Hazard – Likelihood and Severity

i) Likelihood (Probability):

The probability of such hazard occurring is measured using the following parameters:

Frequent (Daily)	- 5
Likely (Weekly)	- 4
Occasional (Monthly)	- 3
Unlikely (Yearly)	- 2
Very Unlikely (Not yet observed)	- 1

ii) Severity (Impact):

The severity or impact of such hazard on the human health is measured using the following parameters:

Critical (Death)	- 5
High (Hospitalization/illness)	- 4
Medium (Absence from work)	- 3
Low (Complaint/economic loss)	- 2
Negligible (Almost no effect)	- 1



Significance

Quantifying Hazards

Hazard Impact / Severity	Critical	5	5	10	15	20	25
	High	4	4	8	12	16	20
	Medium	3	3	6	9	12	15
	Low	2	2	4	6	8	10
	Negligible	1	1	2	3	4	5
			1	2	3	4	5
		Never	Unlikely	Occasional	Likely	Frequent	
Hazard Occurrence Probability							

Significance Rating:
(Exposure)

10
Significant Hazards
(controlled by OPRP or HACCP Plan)

9
Non-Significant Hazards
(controlled by PRP)

Hazard Analysis



HAZARD ANALYSIS PRODUCT TYPE: Frozen PUD Shrimp							
PROCESS / STEP	TYPE OF HAZARD BIOLOGICAL PHYSICAL CHEMICAL	POTENTIAL HAZARD INTRODUCED, CONTROLLED OR ENHANCED AT THE STEP-CAUSE.	SEVERITY (A)	LIKELIHOOD OF OCCURANCE (B)	IS THE HAZARD SIGNIFICANT (RISK FACTOR = A X B)	JUSTIFICATION FOR DECISION	WHAT CONTROL MEASURES CAN BE APPLIED TO PREVENT THE SIGNIFICANT HAZARDS
Raw material receiving (shrimp/ lobster)	Biological	Presence of pathogenic microorganism	Low (2)	Likely (4)	(8)	1. Unhygienic conditions followed at catchments area 2. Unhygienic condition of transport vehicle. 3. Temperature abuse.	1. Adherence to GMP. 2. Supplier declaration 3. RM Inspection 4. Supplier evaluation
	Chemical	Presence of sulphite residue	High (4)	Occasional (3)	(12)	1. Improper supplier level practices 2. Improper transportation & Storage practices	1. Adherence to GMP. 2. Approved supplier 3. Supplier's declaration. 4. RM inspection 5. Rejection of the lot
	Physical	Glass pieces, wood, stones, and Metal pieces	Medium (3)	Occasional (3)	(9)	1. Unhygienic conditions followed at catchments area 2. Unhygienic condition of transport vehicle	1. Adherence to GMP 2. Hygienic condition of transport vehicle. 3. Incoming material inspection. 4. Supplier evaluation

OPRP PLAN FORM - Product: Raw Fish



(1) OPRP	(2) Significant Hazards	(3) Control Measures	(4) (5) (6) (7) Monitoring				(8) Correction and Corrective Action(s)	(9) Records	(10) Verification
			What	How	Frequency	Who			
Raw material Receiving	Biological:- Pathogenic micro organisms may be present	Proper Chilling of the Raw Material with Ice and Keeping the temp within 4° C	Temperature of the raw material during Receipt	Using calibrated thermometer	For Every 500 kg of raw materials	Purchase supervisor	1. Reject lot if the material temp > 4° C 2. Inform and Train the supplier on significance of RM Temp 3. Re evaluation of Supplier	1. Raw materials Inspection Record 2. Training Record 3. Supplier Evaluation n Record	1. Weekly verification of the process and records By QA Personnel 2. Training Record Verification by QA Mgr

HACCP PLAN - Raw Fish



	(1) CCP	(2) Significant Hazards	(3) Control Measures	(4) Critical Limits	(5) Monitoring			(8)	(9) Correction and Corrective Action(s)	(10) Records	(11) Verification
					(6) What	(7) How	(8) Frequency				
Packing (Metal Detection Process)											
Physical – Metal Fragments											
Metal Detection											
No metal pieces above 1.5 mm for Fe; 2.5 mm for non-Fe; 2.00 mm for SS											
Presence of metal fragments in the finished product											
Automatically by the machine- Metal Detector											
Continuous - For each and every final packet of materials											
Production Staff											
1) Separate the packet with metal contamination, segregate the metal pieces and attach with identification tags. 2) Check for the defective parts and proper maintenance / replacement of all the food contact surfaces. 3) Training of the technical personnel and their evaluation											
1) Metal Detector Monitoring Record; 2) Preventive Maintenance Record; 3) Calibration Record of Metal Detector; 4) Training Record; 5) Correction and Corrective Action Record											
1) Daily verification of the sensitivity of metal detector by QA Manager 2) Weekly Verification of the maintenance process by the technical manager 3) Calibration Record											

Hazard analysis



		HAZARD ANALYSIS					
		PRODUCT TYPE: Whole Spices					
PROCESS / STEP	TYPE OF HAZARD BIOLOGICAL PHYSICAL CHEMICAL	POTENTIAL HAZARD INTRODUCED, CONTROLLED OR ENHANCED AT THE STEP-CAUSE.	Likelihood of Occurrence (A)	Severity of Adverse Health affects (B)	Is the hazard significant (risk factor = a x b)	JUSTIFICATION FOR DECISION	WHAT CONTROL MEASURES CAN BE APPLIED TO PREVENT THE SIGNIFICANT HAZARDS
Steam Sterilization	Biological	Microbial Load	Likely (4)	High (4)	(16)	Steam sterilization is subjected to the reduction of microbial load and ample inactivation of enzymes.	Monitoring time and temperature gauges, Sterilization at 100- 110 C
	Chemical	Chances from machinery lubricants	Unlikely (2)	Low (2)	(4)	Since the entity is controlled by SOP, SSOP and GMP, contamination is not possible	1. Adherence to GMP 2. Hygienic condition of transport vehicle. 3. Incoming material inspection. 4. Supplier evaluation
	Physical	Stones, Foreign body	Never (1)	Negligible (1)	(1)	Not identified. Since the entity is controlled by SOP, SSOP and GMP, contamination is not possible	1. Adherence to GMP. 2. De-stoning, Sieving etc

Hazard analysis



		HAZARD ANALYSIS					
		PRODUCT TYPE: Whole Spices					
PROCESS / STEP	TYPE OF HAZARD BIOLOGICAL PHYSICAL CHEMICAL	POTENTIAL HAZARD INTRODUCED, CONTROLLED OR ENHANCED AT THE STEP-CAUSE.	Likelihood of Occurrence (A)	Severity of Adverse Health affects (B)	Is the hazard significant (risk factor = a x b)	JUSTIFICATION FOR DECISION	WHAT CONTROL MEASURES CAN BE APPLIED TO PREVENT THE SIGNIFICANT HAZARDS
Pulverizing	Biological	Yeast and Mold growth	Unlikely (2)	Low (2)	(4)	Moisture maintained through drying , heating etc.	Not likely to occur controlled by GMP and SSOP
	Chemical	Grease or oil	Occasionally (3)	Low (2)	(4)	As the unit is controlled by SOP, SSOP and GMPs contamination is not possible	Not likely to occur controlled by GMP and SSOP
	Physical	Metal Pieces	Likely (3)	High (4)	(12)	Likely hood of occurrence of discharge of metallic parts during processing due to breakage.	Magnets are placed at discharging outlet of gauze strength of 10000

Hazard Assessment



- Conduct the hazard assessment to determine whether its elimination or reduction to acceptable levels is essential,
- Its control is needed to meet the defined acceptable level
- Describe the methodology used and record

Selection and Assessment of Control Measures



- Select appropriate combination of control measures
- Categorized selected control measures whether manage through Operational PRP or HACCP plan

7.5 Establishing the Operational Prerequisites Programme



Document operational PRP

- Food safety hazard(s) to be controlled
- Control measure
- Monitoring procedures
- Correction and corrective action to be taken
- Responsibilities and authorities
- Record of monitoring

OPRP Plan Form – Product: Spice Powder



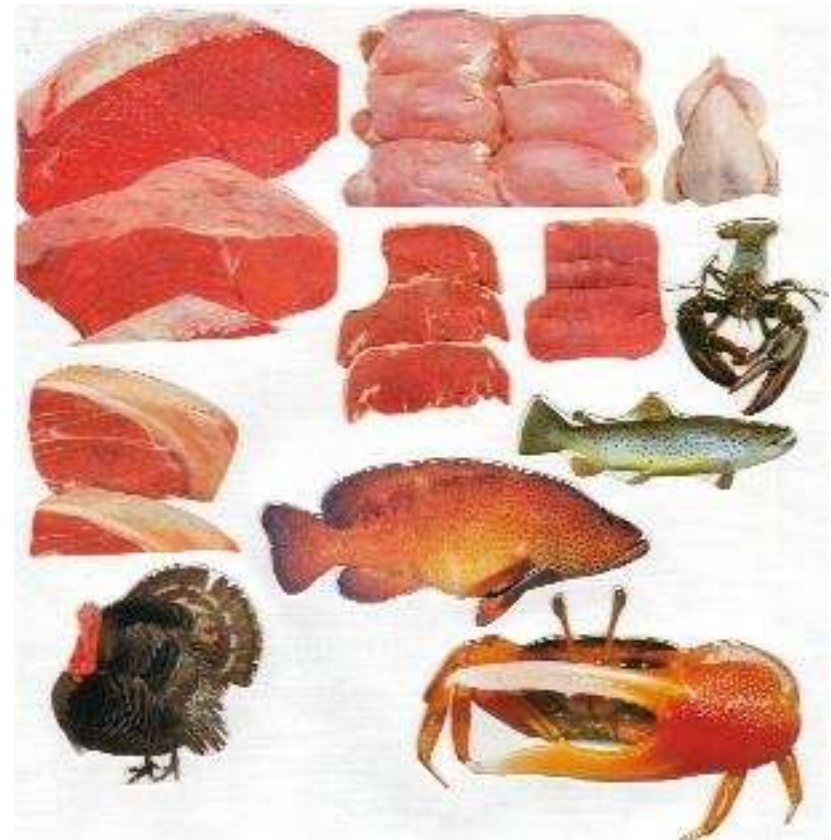
(1) OPRP	(2) Significant Hazards	(3) Control Measures	(4)	(5)	(6)	(7)	(8) Correction and Corrective Action(s)	(9) Records	(10) Verification
			Monitoring						
			What	How	Frequency	Who			
Pulverizing	Metallic contaminants	RM Inspection/ Approved Supplier/Magnets are placed at discharging outlet of gauze strength of 10000	Metal Pieces on Magnet	Weighing metal pieces on Magnet	Once in a shift	Operator	1. Reject the lot if the material contains > 5 gm/kg Preventive maintenance, Supplier evaluation etc.	1. Magnet inspection record	1. Weekly verification of the process and records By QA Personnel 2. Training Record Verification by QA Mgr

Potentially hazardous food



The most frequently implicated (contaminated) foods include:

- Meat
- Poultry
- Seafood.



Food safety issues and contaminants



Dioxin	Cola
Harmones	Meat and banana
BSE (Mad Cow Disease)	Meat from Europe
B.H.C.	Cashew
Staph. Toxin	Ice cream
Listeria	Dairy products
Salmonella	Chicken, egg, and spices
Sulphites and antibiotics	Sea foods

Food safety issues and contaminants



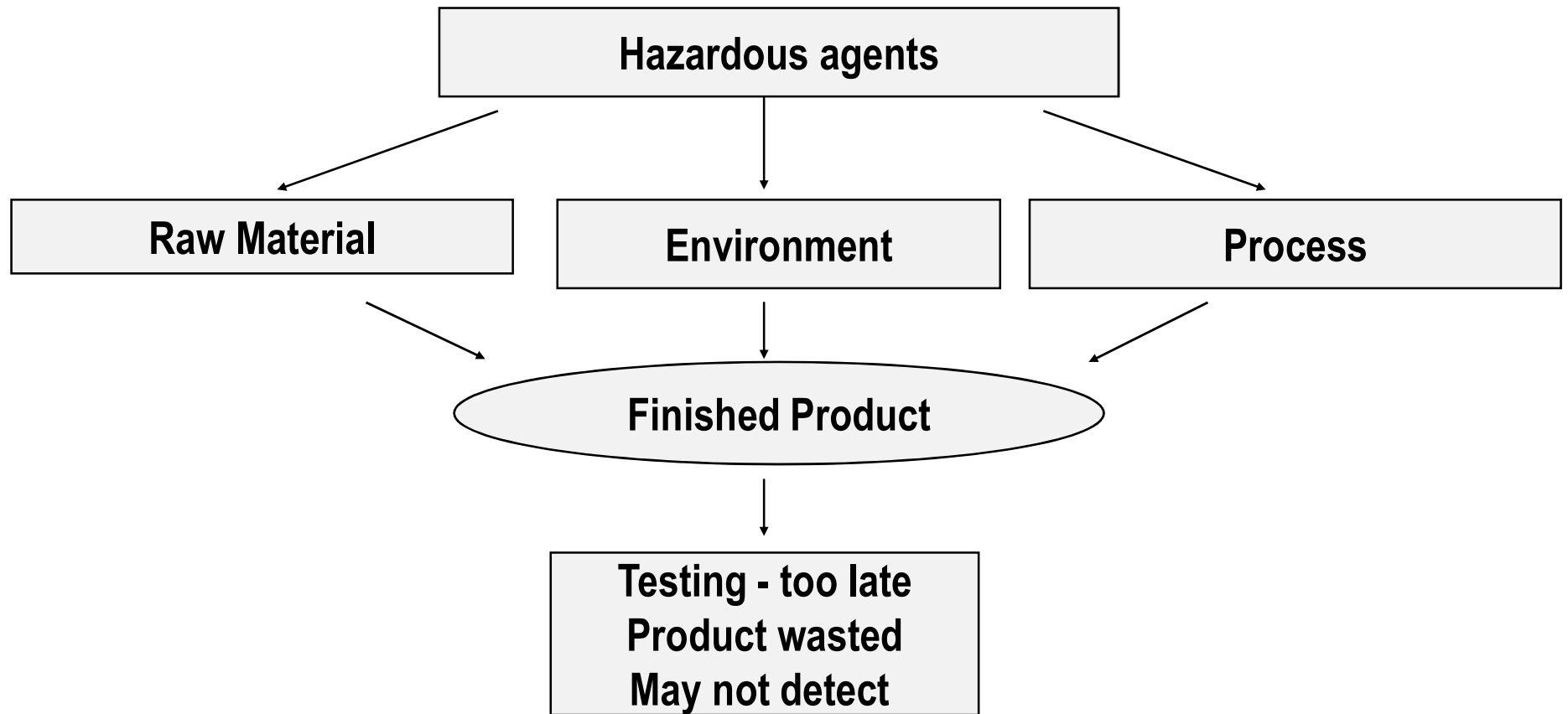
Non-permitted coal tar colours

Industrial pollutants

Petroleum products

All these hazards could be controlled only through preventive strategy

Hazard Identification



Establish Preventive Measures



For each identified hazard detail the preventive measures to control the hazard. e.g.

1. Sanitation
2. Time control
3. Temperature control
4. Labels
5. Equipment maintenance
6. Training
7. GMP



7. Determination of Critical Control Points (CCP)



A point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to acceptable limits.

CCPs are product and process specific.

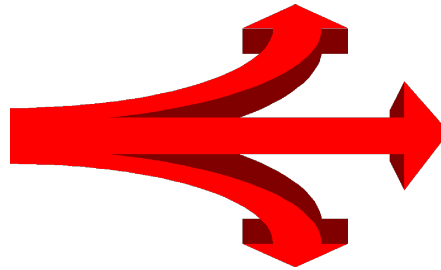
e.g.

- Cooking,
- Metal detector,
- pH,
- Formulation control etc.

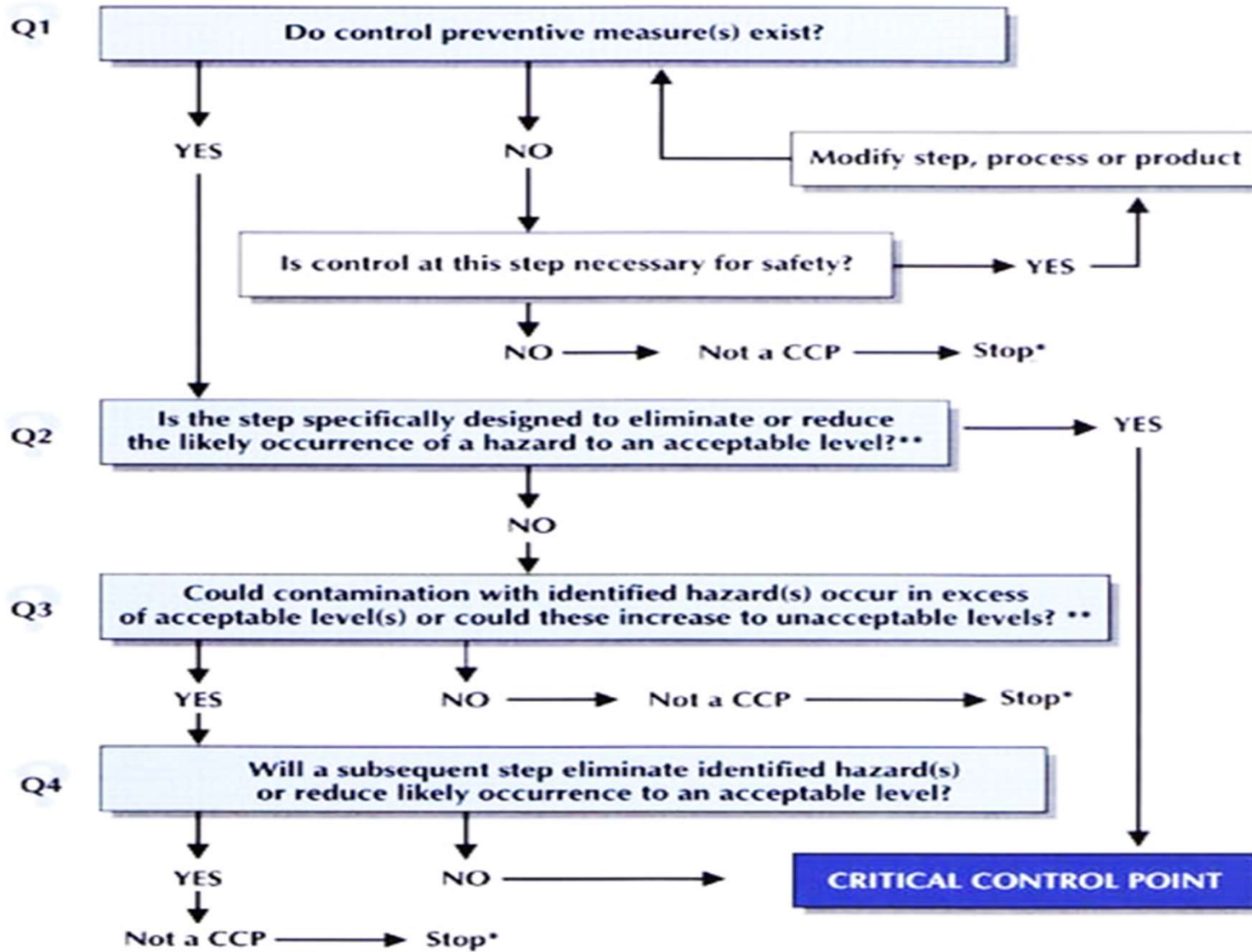
To determine CCP



» Focus on the Flow of Food



CCP Decision Tree



8. Establish Critical Limits

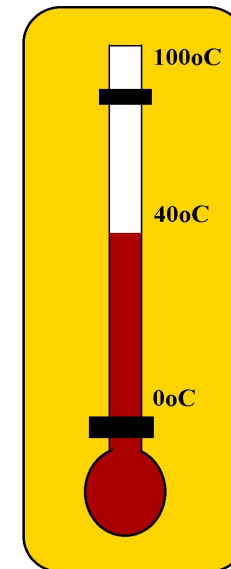


Critical limit:

A criterion that must be met for each preventive measure associated with a CCP.

It represents the boundaries that are used to ensure that an operation produces safe products.

- Time,
- Temperature,
- pH,
- Moisture level,
- Water activity



9. Monitor Critical Control Points



Monitor:

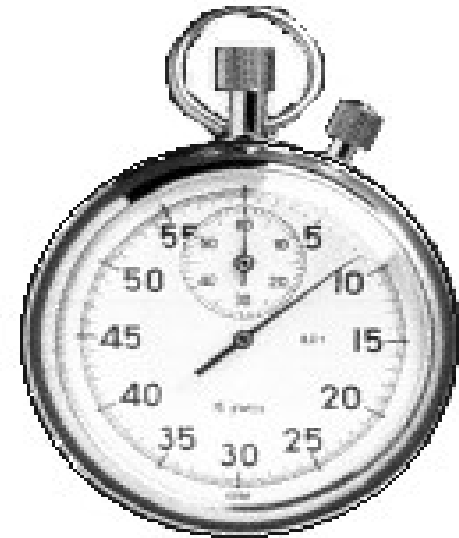
To conduct a planned sequence of observations or measurements to assess whether a CCP is under control and record the results for future verification.



Purpose of Monitoring



- To track the operation of the process and enable the identification of trends towards a critical limit that may trigger process adjustments.
- To identify when there is loss of control
- To provide written documentation of the process control system.



- What ?
- How ?
- Who ?
- When ?
- Sampling

Continuous monitoring is preferred

- Attribute sampling
- Must be statistically sound



Monitoring methods



- Visual observation includes :
- Sensory and visual checks
- Visual observation for physical characteristics
- Checks of sanitary conditions



10. Establish Corrective Actions



Any action to be taken when the results of monitoring at the CCP indicate a loss of control.



Corrective Actions



- Identify, isolate and evaluate products when critical limits are exceeded.
- Control deviations such as
- Identification of deviation,
- Isolation of affected product,
- Evaluation of affected product
- Corrective actions : cause of the deviation, take action to prevent recurrence and follow up with monitoring and reassessment to ensure that the action taken is effective.

11. Establish verification procedures



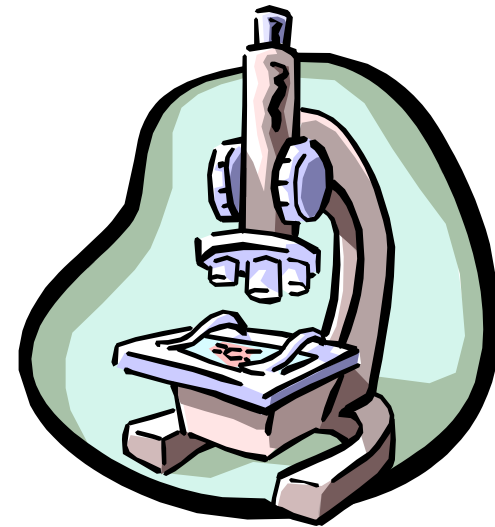
The Application of methods, procedures, tests and audits in addition to verify and determine compliance with the HACCP plan and/or whether the HACCP plan needs modification.



Elements of verification



- HACCP Plan Validation
- HACCP system Audits
- Equipment calibration
- Targeted sampling and testing



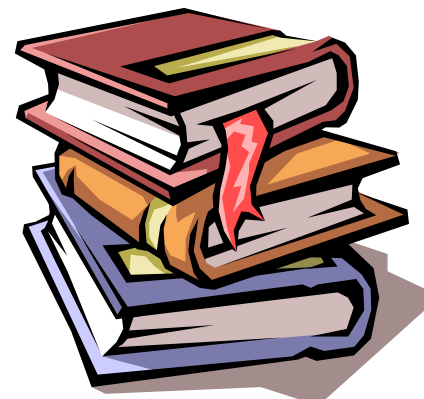
- Obtaining evidence that the elements of the HACCP plan are effective.
- It involves a scientific and technical review of rationale behind each part of HACCP plan, from hazard analysis through each verification strategy.



12. Establish Records



- Records provide evidence that the HACCP system is working
- Provide tracking system
- Help identify problems
- Evidence of compliance to critical limits
- Evidence of corrective action

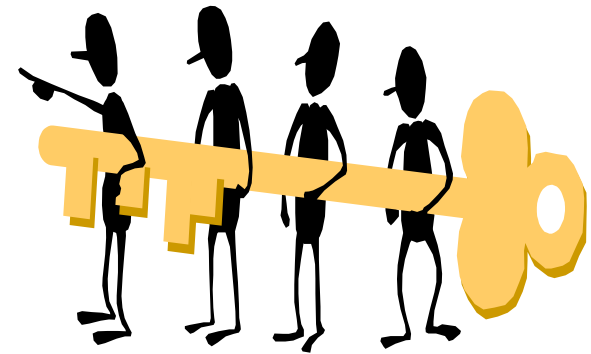


4 Kinds of records are needed:

- HACCP Plan and support documentation used in developing the plan.
- Information and data collected in order to arrive at critical limits
- Records of CCP monitoring
- Records of Corrective actions
- Records of verification activities
 - Training records
 - Time temperature logs



- Confirmation: All hazards are identified.
- Preventive measures identified for all hazards.
- Critical limits are sufficient.
- Procedures and equipment are calibrated adequately.
- Independent assessment: to enable client to confirm that supplier conforms to safety and Quality obligation
- To enable the quality system to be certified



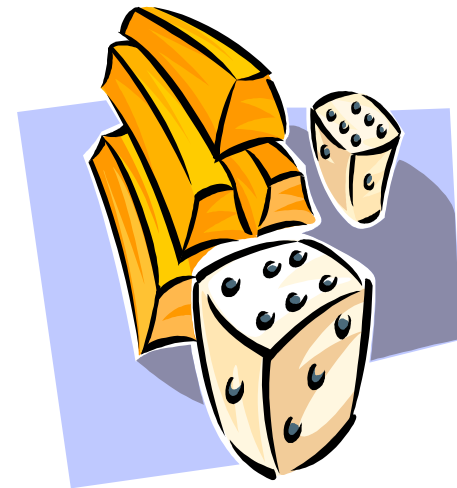
HACCP System Audits



- Audits performed to compare the actual practices and procedures written in the HACCP plan
- Systematic and independent
- It includes
 - On site observations
 - Interviews and
 - Review of records and documents



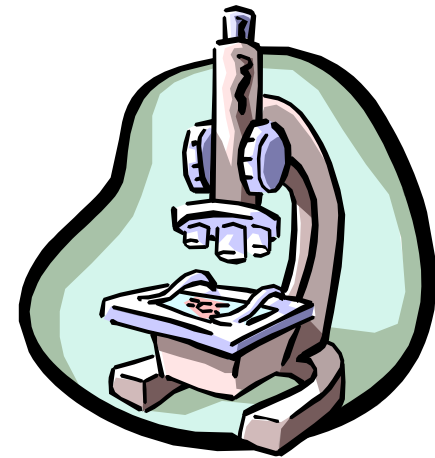
- Checking instruments against a standard to ensure reliability
- Frequency sufficient to assure continuous assurance
- Calibration record review



Targeted Sampling and Testing



- Microbiological analysis of the sample
- Organoleptic analysis.
- Samples can be taken to ensure that the equipment settings to control the CCP are appropriate for product safety.



Verification of the HACCP Plan



The assessment of the HACCP Plan before implementation to provide confirmation that it is valid, accurate and complete.



Verification Procedures



- Procedures other than those used in Monitoring to ensure that the HACCP Plan is implemented correctly and remains effective.
- Audit Plan
- Data Analysis
- Review of Consumer Complaints
- Microbiological Analysis



How to verify the HACCP Plan



Use personnel with audit skills

- Assess all elements of the HACCP Plan
- Process Flow Diagram
- HACCP Control Chart
- Assess the Process area
- Control Measures
- Process Capability



What types of data?



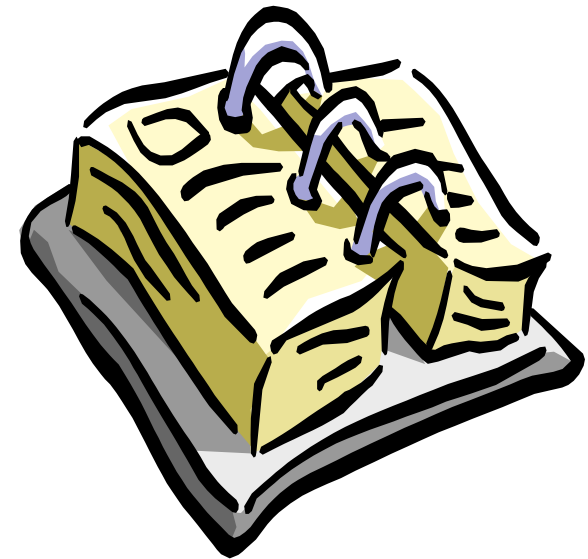
- CCP log sheets
- Process control charts
- Audit reports
- Customer complaint data
- Pest control record
- Minutes of meetings
- HACCP
- Hygiene
- Quality



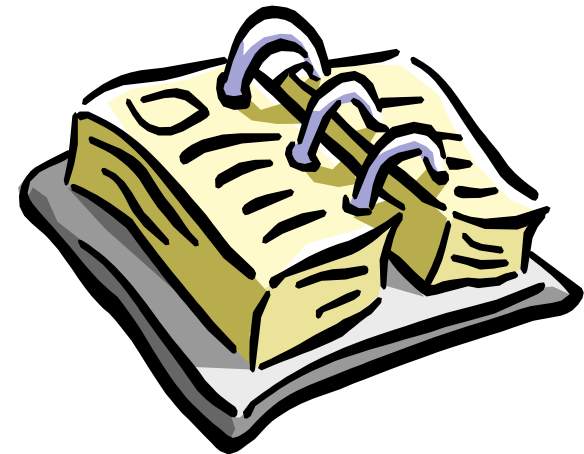
- Company Profile
- Introduction
- Organization Chart
- Hygiene Department organization Chart
- HACCP/GMP Committee
- HACCP Team
- HACCP Policy
- Definition and Terminology



- Training
- Prerequisite/Support Program includes GMP, SSOP etc.
- Machinery/Equipment Layout
- Staff Flow and Machinery Flow
- Hazard analysis Worksheet
- HACCP Plan
- Verification procedure/Audit



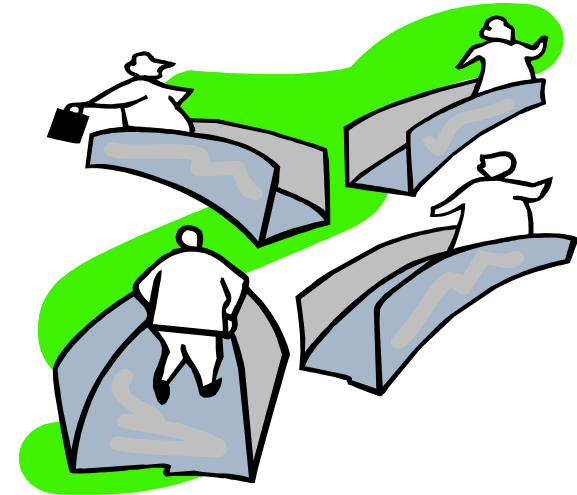
- Additional Documentation:
- Specifications
- Operating Procedures
- Work Instructions
- Records



Maintenance of HACCP System



- Verification and Updating Procedures
- Ongoing Internal Audits
- Data Analysis
- Keeping abreast of emerging hazards
- Updating and amending the HACCP Plan
- Ongoing training requirements
- Maintenance documentation



Keeping abreast of the emerging hazards



- New Technologies
- New natural foods
- New combinations of foods
- Changing legislation
- New information on existing issues
- New ways of packaging food
- Changing eating habits



On-going training requirements



- HACCP/ Food Hygiene Refresher Training
- New Personnel
- HACCP Teams
- CCP Monitors
- Awareness Training
- Cleaning and Sanitizing
- Proper use of Equipment
- Personnel handling



Updating and amending HACCP Plan



- New raw materials/suppliers
- Changes to process
- Factory environment alterations
- New packaging
- HACCP audit
- Changes resulting from “improvements”
- HACCP review
- Essential for the HACCP Plan to remain valid – changes need to be documented.



Responsibility for implementation



HACCP works best when it is part of an
employee's routine and not

EXTRA DUTY



Who should be involved?



- Involve those most directly in that step of the flow of food.
- Move to “lowest” level possible.
- Line employees need to be trained so that corrective actions are automatically done when a potential problem is found
- Managers should verify the log sheets regularly



- Management can not be in all CRITICAL places at all CRITICAL times

Activity



- Tutor shall assign each team any one process and they shall draw the flow diagram and conduct hazard analysis for any one process.
- Each team shall present their flow chart and hazard analysis in flip chart.
- Tutor shall give marks based on the content and presentations.



- Clean as you Go
- Handling of Chemicals
- Cleaning
- Sanitation
- Types of cleaning.
- Waste Handling
- Material Storage
- Equipment cleaning – CIP / COP
- Cleaning Schedules for different areas within an Organization. Eg: Rest room, office, roof, windows, parking etc.
- Inventory control
- Cross contamination by cleaning materials.
- Color coding of Cleaning Materials

Housekeeping Practices



GMP – Good Manufacturing Practices



- Environmental Hygiene
- Design and facilities
- Control of Operations
Infrastructure – Lighting, air, etc
- Maintenance
- Pest control
- Waste management
- Quality Control.

Quality Assurance is *process* oriented and focuses on defect *prevention*, while **quality control** is *product* oriented and focuses on defect *identification*.

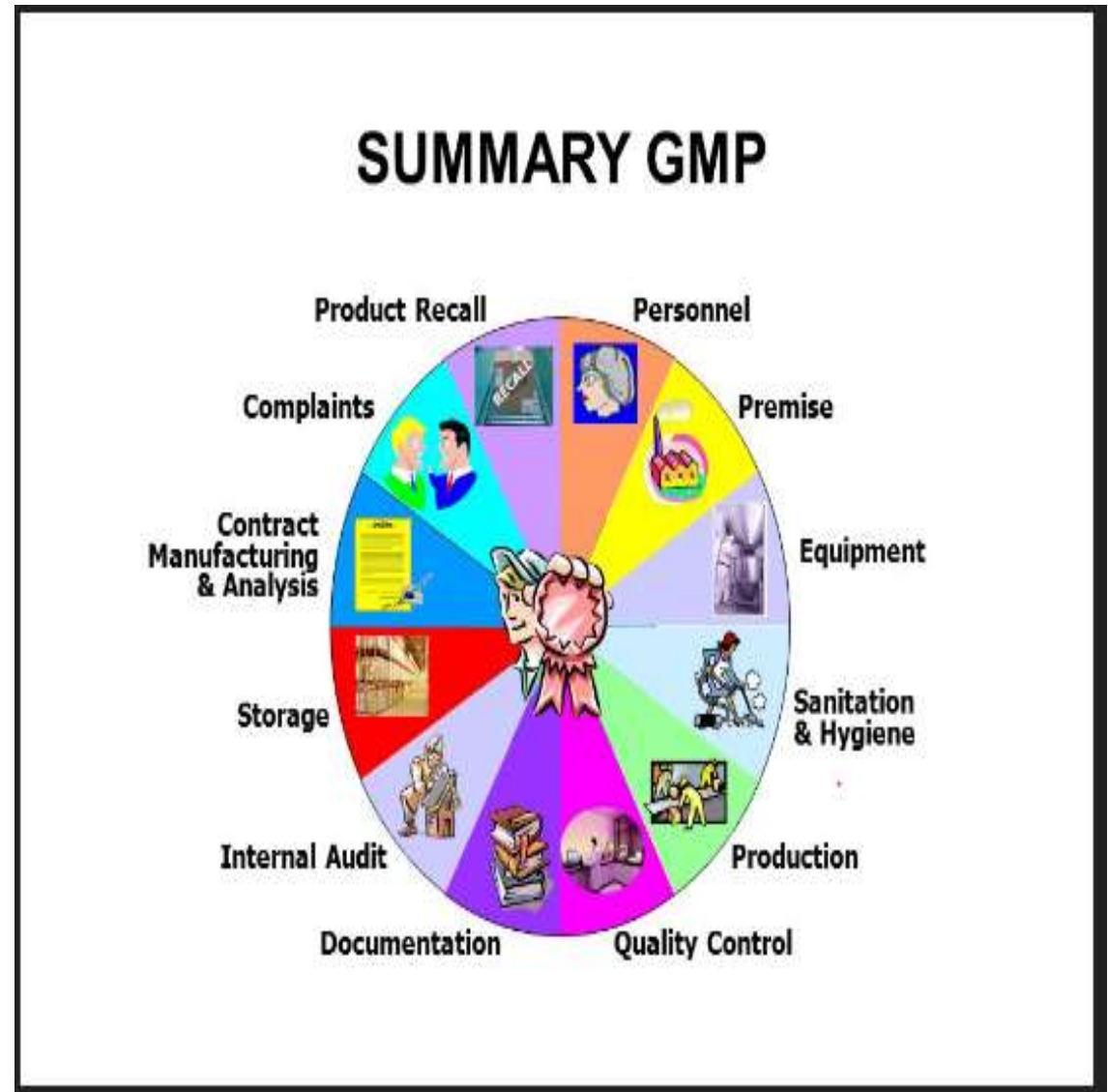
**Refer:- ISO/TS 22002-1 Or Codex
guidelines for interpretations.**



GMP – Good Manufacturing Practices

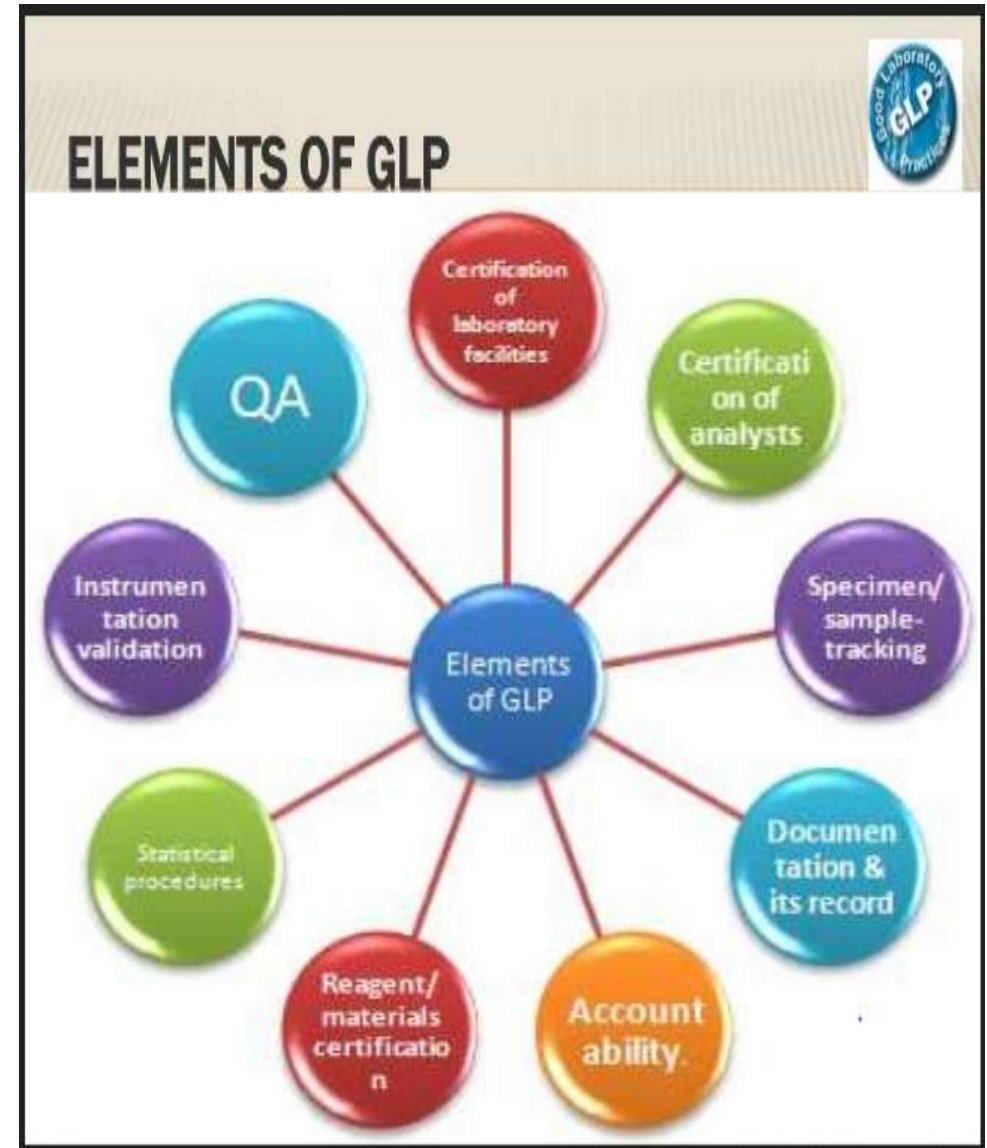


- Traceability & Product information
- Training
- Purchase
- Cross contamination
- Allergens Management.
- Complaint management.
- Re-call Or withdrawal
- Management and supervision.
- Documentation & Record keeping.



Best Practices of Good Laboratories

- Establish and Follow Procedures
- Maintain Your Proficiency
- Validate Methods
- Use Traceable Standard Reference Materials
- Run in Duplicate
- Keep Original Data
- Assign Instruments and Equipment to Analysts
- Calibrate Instruments
- Use Control Charts
- Document Everything and Maintain Good Records



- Warehouse Management – Eg:- WMS – Software, etc
- Warehouse Manpower Management
- Importance of food storage.
- Food storage in different temperature conditions.
- FIFO / FEFO
- Bin Card System
- Traceability
- Re-work
- Labelling
- Picking
- Segregation of Non-conforming products
- Handling Expired products.
- Equipment's handling eg: Pallet truck, fork lifts, conveyor, etc
- Housekeeping, pest control, training in Warehouse.
- Pallet cleanliness & inspection.

Good Warehouse Practices



- Good Food Handling Practices
- Proper Personnel Training.
- Good Cleaning and Sanitation Practices
- Effective Pest Control Program
- Proactive Shipping and Receiving Programs
- Temperature Abuse
- Personal hygiene of the products handlers.
- FIFO / FEFO
- Traceability
- Cross contamination.
- Time staggered receipt & dispatch
- Recall Program
- Institute a Food Defense Program

Good Distribution Practices

