

**Peoples' Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research
University of Abou Bakr Belkaid Tlemcen**



**Faculty of Natural And Life Sciences Earth And Universe
Department Of Biology**

Handout Entitled:

Course of FOOD SAFETY AND HYGIENE



Degree: AGRI-FOOD TECHNOLOGY AND QUALITY CONTROL 3rd year License

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Academic Year: 2023-2024

TABLE OF CONTENTS

Description of the course

Syllabus of the course

Basic data of the course

Aim of the course

Course objectives

Teaching method

Learning activities

Assessment methods

Prerequisites

Prerequisites test

CHAPTER I : INTRODUCTION TO FOOD SAFETY	1
I-1 Chapter I objectives	2
I-2 Generality	2
I-3 Types of Contamination	3
I-3-1 Biological Contamination	3
I-3-2 Physical Contamination	4
I-3-3 Chemical Contamination	4
Activities	
CHAPTER II : FOOD BORNE ILLNESS	7
II-1 Chapter II objectives	8
II-2 Generality	8
II-3 Classification of Food borne Illness	8
II-3-1 Food Borne Infections	8
II-3-1-1 Bacterial Food Borne Infection	9
II-3-1-2 Mycotic Food Borne Infection	9
II-3-1-3 Viral Food Borne Infection	10
II-3-1-4 Parasitic Food Borne Infection	11
II-3-1-5 Protozoal Food Borne Infection	11
II-3-2 Food Borne Intoxication	12
Activities	
CHAPTER III : QUALITY	15
III-1 Chapter II objectives	16
III-2 Generality	16
III-3 Quality Assurance	17
II-3-1 Characteristics	17
II-3-1 Quality Assurance Examples	17
III-4 Quality Control	18
II-4-1 Characteristics	18
II-4-2 Quality Control Examples	18
III-5 Quality In Agri-Food Industry	20
II-5-1 Quality Issues for Food Industry	21

II-5-2 Nutritional Quality	21
II-5-3 Hygiene Quality	23
II-5-4 Organoleptic Quality	25
Activities
CHAPTER IV : QUALITY TOOLS (FISHBONE DIAGRAM)	26
IV-1 Chapter IV objectives	27
IV-2 Generality	27
IV-3 Seven Quality Tools (The Deming Chain)	27
IV-4 Fishbone Diagram (Ishikawa's Diagram)	28
IV-4-1 Description	28
IV-4-2 Fishbone Diagram Procedure	28
IV-4-2-1 M1 Materials	28
IV-4-2-2 M2 Machines	28
IV-4-2-3 M3 Management	29
IV-4-2-4 M4 Methods	30
IV-4-2-5 M5 Manpower	30
IV-4-2-6 M6 Measurement	31
IV-5 Quality Tools (Other Tools).....	32
IV-5-1 Histogram	32
IV-5-1-1 Constructing a Histogram	33
IV-5-2 Check Sheet	34
IV-5-2-1 Check Sheet Procedure	34
IV-5-2-2 Check Sheet Benefits	34
IV-5-3 Stratification	35
IV-5-4 Pareto Chart	36
IV-5-4-1 Pareto Chart Procedure	36
IV-5-5 Control chart	37
IV-5-6 Scatter Diagram	37
Activities
CHAPTER V : HACCP	39
V-1 Chapter V objectives	40
V-2 Generality	40
V-3 Features of the HACCP protocol	40
V-4 Hazards	41
V-4-1 Types of Hazards	41
V-5 Critical Control Points	42
V-6 Principles of HACCP	42
V-7 Steps of HACCP Implementation	45
V-8 Advantages of HACCP	46
Activities
CHAPTER VI : ISO 22000	48
VI-1 Chapter V objectives	49
VI-2 Generality	49
VI-3 Various ISO Standards	50
VI-4 ISO 22000	50

VI-4-1 Features	52
VI-4-2 Requirements	52
VI-4-3 Content of the Standard	52
Activities	
REFERENCES	

List of Figures

Fig 1. Examples of Contamination	2
Fig 2. Contamination of Fruits	2
Fig 3. Three types of Contamination	3
Fig 4. Examples of Biological Contaminants	3
Fig 5. Examples of Physical Contaminants	4
Fig 6. Examples of Agrochemical Contaminants	5
Fig 7. Examples of Environmental Contaminants	5
Fig 8. Bacterial Food Borne Infection (Example: Salmonellosis)	9
Fig 9. Mycotic Food Borne Infection (Example: Candida sp)	10
Fig 10. Viral Food Borne Infection (Example: Hepatitis A)	10
Fig 11. Parasitic Food Borne Infection (Example: Taeniasis)	11
Fig 12. Protozoal Food Borne Infection (Example: Toxoplasmosis)	12
Fig 13. Chemicals that cause Intoxication	12
Fig 14. Seafood that cause Intoxication	12
Fig 15. Quality Perspectives	16
Fig 16. Types of Quality	17
Fig 17. Quality Assurance	17
Fig 18. Audit , Training , Selection Of Control Tools	17
Fig 19. Quality Control	18
Fig 20. Inspection , Product Testing , Statistical Sampling , 7 Quality Tools.....	18
Fig 21. Quality System	19
Fig 22. Quality in Food Industry	21
Fig 23. Nutritional Labeling	21
Fig 24. Nutritional Optimization	22
Fig 25. Good Practice in Food	23
Fig 26. Funding of Researches	23
Fig 27. Some names of standards organisations	24
Fig 28. .ISO Standards	25
Fig 29. Seven Quality Tools	27
Fig 30. The Deming Chain	27
Fig 31. Ishikawa’s Fishbone	28
Fig 32. The M Techniques	28
Fig 33. Raw Materials	28
Fig 34. Machines Disinfection	29
Fig 35. Manpower	30
Fig 36. Fishbone Diagram (Restaurant Chain)	32
Fig 37. Anatomy of Histogram	32
Fig 38. Histogram with normal Distribution	32
Fig 39. histogram	33
Fig 40. Check Sheet	34
Fig 41. Stratification	35
Fig 42. Revenue of Costumers	36
Fig 43. Costumer Complaints	37
Fig 44. Control Chart	37

Fig 45. Scatter Diagram	37
Fig 46. Types of Scatter Diagram	38
Fig 47. Food Hazards	41
Fig 48. HACCP Principles	43
Fig 49. Shell Egg Flowchart	45
Fig 50. Entry of Hazards in Food Chain	51
Fig 51. Food Safety Management Standards (FSMS)	52

List of Tables

Table 1. Food Borne Illness Infection Vs Intoxication	13
Table 2. Metal Black Thickness	33
Table 3. Class Size	33
Table 4. Differences between HACCP & ISO 22000	54

❑ Description of the Course

The set of circumstances and actions required to manage risks and guarantee that a food item is fit for human consumption while considering its intended use at every level of the food chain is known as hygiene. Food safety is a scientific field that describes how to handle, prepare, and store food in a way that minimizes the risk of contracting a food-borne illness. A food-borne disease outbreak is the emergence of numerous cases of a common sickness brought on by eating that food. Everyone acknowledges that public health is a factor in food safety. To guarantee food safety from farm to table, preventative and instructional methods are usually combined with a legally required regulatory approach.

It's a serious issue that impacts everyone on the planet. Availability and safety of food supplies are becoming more and more important to many governments worldwide.

The course is divided into seven learning units, that introduce the principles of food hygiene and safety, food control, food inspection and supportive enforcement measures that can contribute to food hygiene and safety. Each learning unit is treated through educational sequences allowing the assimilation of the concepts provided, this assimilation is consolidated by learning activities where these concepts are put implemented.

This document is intended for agri-food technology and quality control 3rd year license.

❑ Syllabus of the course

- Basic data of the course

Academic Unit : **University of Abou Bakr Belkaid Tlemcen**

Faculty of Natural and Life Sciences and Earth and Universe

Department: Agronomy

Course Title : **Food Safety and Hygiene**

Degree : **Agri-Food Technology And Quality Control 3rd Year License.**

Teaching Unit : **Fundamental**

Coefficient : **02**

Credits : **04**

Total lecturing hours: **Semester 45 H (Course per Weak (1h30) + 1h30 Practical work)**

Total Exercise hours: **12 H**

Lecturer : **Dr Djahida HADJ MERABET**

Email : **djahida.hadjmerabet@univ-tlemcen.dz ; hadjmerabetd@gmail.com**

Availability: **Laboratory of Ppabionut (Physiology, physiopathology and Biochemistry of Nutrition Laboratory) Every Sunday From 9a.m to 11a.m.**

- **Aim of the course**

The aims of this course are: identifying of chemical hazards (pesticides, antibiotics, industrial chemicals); physical hazards (glass, wood, plastics, and metals) , basics of quality assurance and quality control , quality tools , dangers of food contamination during production; possible errors during production, and delivery to the client ;and discussion of practicing food safety policies (Concept Map).

- **Course Objectives**

At the end of the module, the student must be able to:

- **Recognize and identify** basic food science concept and terminology;
- **Identify** foods that do not meet food safety standards;
- **Learn** the basic concepts of the Hazard Analysis System and sanity in general;
- **Analyze** food contamination sites and the possible dangers for the customer;
- **Learn** the source of Foodborne Risk ;
- **Learn** the notion of quality in Food Science;
- **Understand** the basic principles of HACCP, ISO;

- **Teaching Methodology**

The course will be attended for 13 weeks with a duration of 1 hour 30 min for one lecture, when there will be discussed the orietical concepts and will be offered explanations regarding the food safety, and 1 hour 30 of group practice each week. During these hours, there will be a discussion with concrete examples on the specific subject covered during the conference, and field trips to food processing companies to better understand food hygiene and safety measures.

- **Learning activities**

The learning activities offered in the Food Safety and Hygiene course are based on multiple-choice questions MCQ, and single-choice questions SCQ, blank questions, free questions accompanied by a test correction.

- **Assessment methods**

Successful completion of this course will be validated by a **final average $\geq 10/20$ T** .
The final grade is calculated based on :

- **A Final Evaluation (Synthesis Exam = Summative Evaluation)**

This evaluation covers the entire program of this course during the semester, during this exam, which counts for **60% of the final average**:

- **Continuous evaluation (Continuous activities = Formative Evaluation)**

An evaluation during the directed work and which is calculated based on a weighting of 40%. This evaluation allows students to earn points throughout the semester.

❑ Prerequisites

The assessment of prior learning, in the form of prerequisite tests, is offered to learners to enable them to check whether they have the basics to follow the course.

Students must already have

- Basics of Microbiology, Biochemistry, Food biochemistry, Nutrition
- Basic understanding of the English language (Level B1) in terms of listening , reading comprehension, and writing .

- Prerequisites Test

Question 01: Define Microbes?

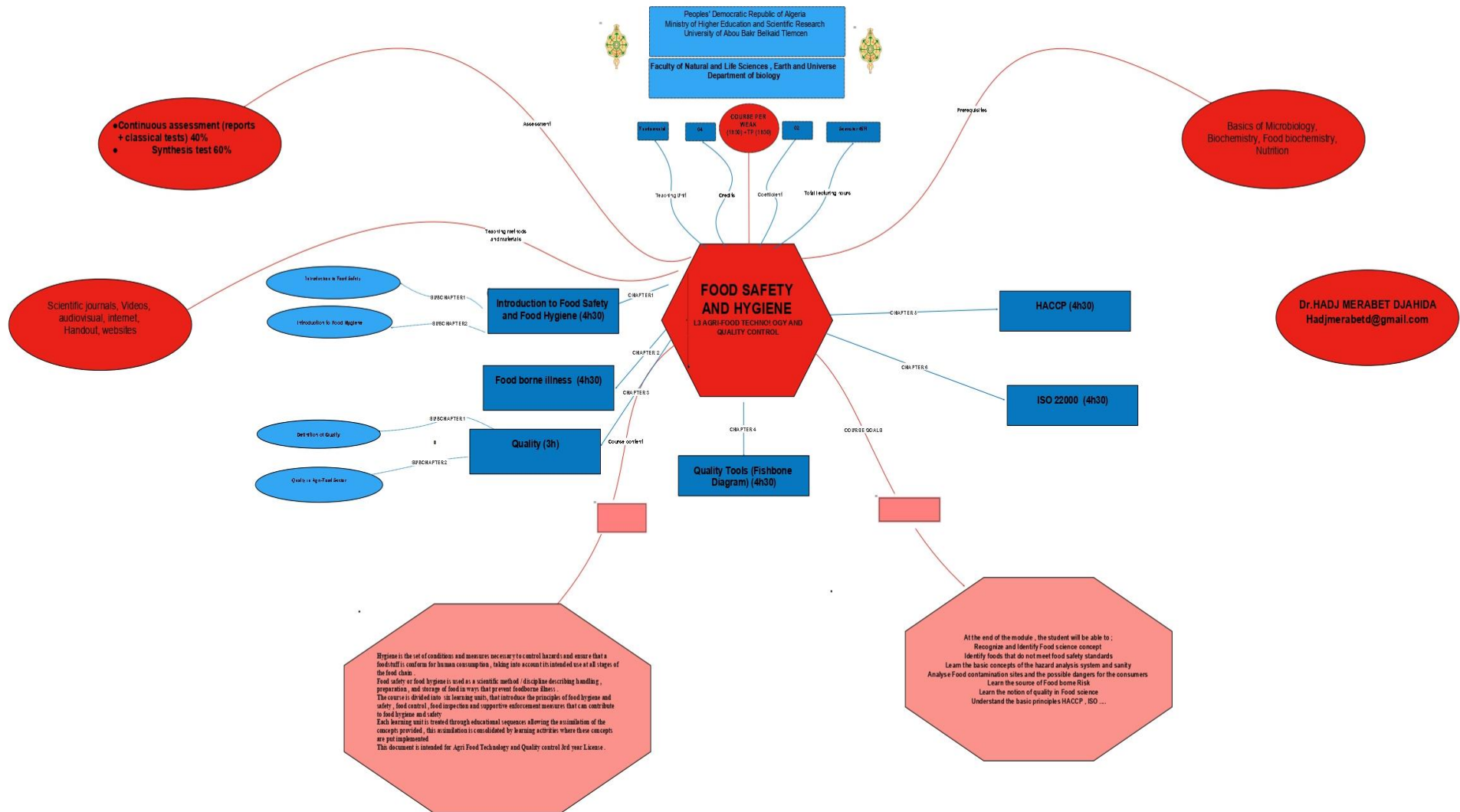
Question 02: What are the 7 types of microorganisms?

Question 03: The vast number of biochemical compounds can be grouped into just four major classes:;

Question 04: How many nutrients are there?

Question 05: How many types of food are there?

CONCEPT MAP : SCIENTIFIC MAP



Chapter I

INTRODUCTION TO FOOD SAFETY



- *Chapter I objectives*
- *Generality*
- *Types of Contamination*
- *Examples*
- *Activities*

I-1 Chapter I objectives

At the end of the Chapter I , in relation to the subjects covered, the student must be able to:

- **Recognize** the importance of food safety;
- **Learn** the food contamination and different types of contamination;

I-2 Generality

- Food safety is a scientific discipline that describes the steps from handling to serving of food in such a way as to avoid food-borne diseases.
- It contains a number of procedures to be followed to minimize potentially serious health risks.
- Safety of foods is a key concern for all countries.
- Microbiological and chemical contamination of food are two major causes of illness.



Fig 1. Examples of Contamination

➤ Activity 01 (Chap I) What is Food contamination?

Food that is spoiled or contaminated because it contains micro-organisms, such as bacteria or parasites, or toxic substances that make it unsuitable for consumption.



Fig 2. Contamination of Fruits

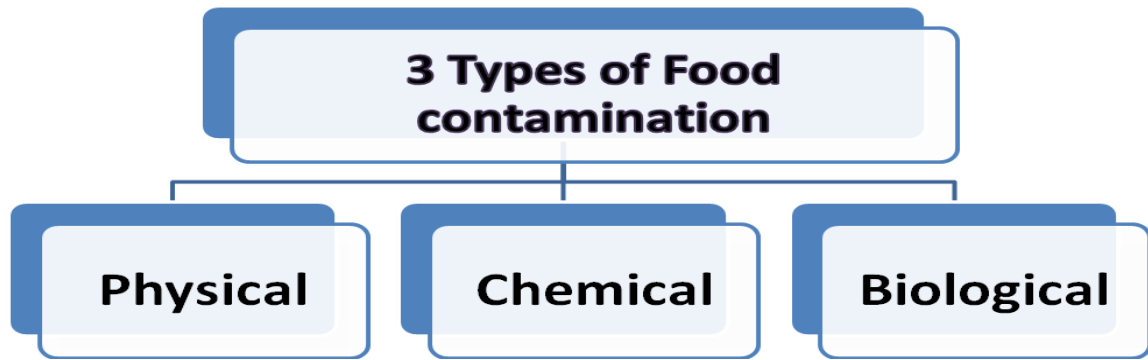


Fig 3. Three Types of Contamination

➤ **Activity 02 (Chap I)**

What are the differences between Physical, Chemical, and Biological Contamination?

Give examples for each type of contamination

I-3 Types of Contamination

I-3-1 Biological Contamination

A contaminant of this type is a substance that an organism produces. This contamination refers to the materials produced by microorganisms, insects, humans

Viruses and Bacteria are the major causes of this contamination. They can be a cause of a lot of foodborne diseases.

Biological contaminants are microscopic, single-cell organisms found everywhere and are quite hard to detect until they have formed large colonies.

EXAMPLES

Bacteria, viruses, moulds, yeasts and fungi.



Fig 4. Examples of Biological Contaminants

• **Hazardous Foods**

- Some foods are more vulnerable to biological contamination than others, because they provide all the conditions for bacteria to grow and multiply: the right pH, nutrition and water.
- Food handlers must always adhere to safe food handling procedures in order to reduce the growth of bacteria and remove the possibility of biological contamination;
- Foods that pose a high risk, such as meat, poultry, seafood, eggs, and dairy products, should be kept out of the danger zone.
- Acquire, thaw, store, prep, cook, and present high-risk meals appropriately.
- Make sure you adhere to the proper procedures for cleaning and sanitizing all equipment and surfaces that come into touch with food by keeping a regular cleaning and sanitizing routine.
- Maintain the personal hygiene of all staff and comply with standards in terms of sanitation..

I-3-2 Physical Contamination

A physical contaminant is the presence of one or more foreign objects in foodstuffs, which enter the food during production, preparation or service.

EXAMPLES

Pieces of plastic, glass, Metal ,steel wool, Equipment part



Fig 5. Examples of Physical Contaminants

I-3-3 Chemical Contamination

Chemical contaminants are natural or artificial substances that got into food. Chemical contaminants include toxic substances.

The impact of a food contaminant on consumer well-being is often not apparent for many years.

EXAMPLES

Agrochemicals

Agrochemicals are chemicals used by farmers, including insecticides, herbicides and rodenticides. They can also exist within-side the surroundings wherein we process, package, store, transport, and eat food.



Fig 6. Examples of Agrochemical Contaminants

Environmental

Environmental contaminants include chemicals that we found in the environment where we grow food. They may exist within the surroundings wherein we process, package, store, transport, and eat food

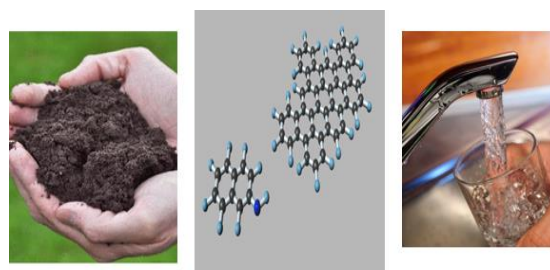


Fig 7. Examples of Environmental Contaminants

➤ **Activity 03 (Chap I) Drag and drop the correct answer on the lines below :**

Washed , Blood , Chicken, Vegetables, Shelves, Sanitized, Seafood, Hands, Cross contamination , Counter

- 1- Always keep raw meat likeseparate from ready to eat foods like
- 2- Is the unfold of micro organism from uncooked meat to different foods.
- 3- Always washafter handling raw meat
- 4- Use one cutting board for fresh produce and a separate one for raw meat, poultry and
- 5- Store raw foods onbelow ready to eat food to minimize contamination.
- 6- Food contact surfaces that touch raw meat must beand

➤ **Activity 04 (Chapter I) Circle anything in the picture that is an example of :**

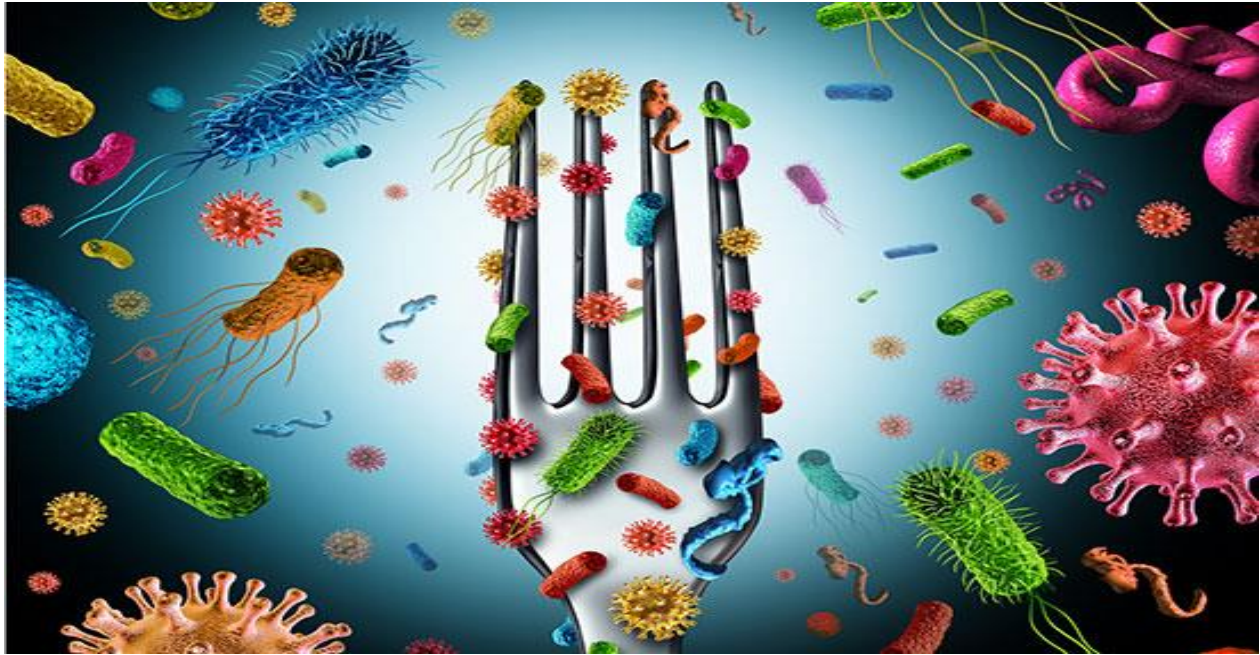
A hazard to Food

Any type of Food Contamination



Chapter II

FOOD BORNE ILLNESS



- *Chapter II Objectives*
- *Generality*
- *Classification of Food Borne Illness*
- *Food borne infection*
- *Food borne intoxication*
- *Activities*

II-1 Chapter II objectives

At the end of the Chapter II , in relation to the subjects covered, the student must be able to:

- **Provide** students with the meaning of food borne illness;
- **Provide** students with a basics of food borne illness;
- **Understand** the differences between infection & intoxication;

II-2 Generality

Food poisoning is caused by consuming tainted, spoiled, or poisoned food; its most typical symptoms are nausea, vomiting, and diarrhea; 1 in 6 persons will have food poisoning year, according to the Centers for Disease Control and Prevention (CDC);

o In addition to chemical or herbal toxins, foodborne illness is caused by consuming contaminated food, pathogenic bacteria, viruses, or parasites that contaminated meals.

- **Activity 05 (Chap II) Give examples of bacteria and viruses known to be predominant responsible of FOOD BORNE ILLNESS ?**

250 different foodborne diseases have been described and bacteria are the causative agents of 2/3rd of them.

- ❑ These include **E. Coli, Salmonella, Shigella, Bacillus cereus, Clostridium, Staphylococcus aureus, Vibrio, Listeria monocytogenes, Campylobacter, Yersenia, Brucella, Mycobacterium, and others.**
- ❑ These are some of the most common bacteria observed. The most common viruses are rotavirus, norovirus (like Norwalk viruses), hepatitis (A&E) virus, etc.

II-3 Classification of Food Borne Illness

II-3-1 Food Borne Infection

The body reacts to the presence of harmful microbes in food by allowing them to enter the body and causing food-borne Infection. These could be bacterial, viral, parasitic, fungal, or protozoal in nature. Fever is typically the hallmark of food-borne infection, which has lengthy incubation times.

II-3-1-1 Bacterial Foodborne Infections

Include Cholera, *Vibrio parahemolyticus*, salmonellosis, typhoid fever, *Escherichia coli* infection, ... etc

- While almost any food or beverage can potentially harbor the bacterium that causes a *Salmonella* infection, the most prevalent sources are meat, cheese, and eggs.
- Gram negative Bacteria
- More than 2500 Serovars / Serotypes
- Many are zoonotic
- Species : *S.Bongori* & *S. Enterica*
- Outbreak in 255 people



Fig 8. Bacterial Food Borne Infection
(Example : **Salmonellosis**)

❑ How *Salmonella* progresses

Bacteria enter the small intestine, stick to the lining, and start their life cycle. If left untreated, severe cases of germs that have penetrated the intestinal wall and entered the bloodstream can be fatal.

❑ Symptoms

- Within 12 to 72 hours (vomiting, cramping in the abdomen, fever, diarrhea, and nausea).
- 4–7 days (the majority of patients recover without treatment; illnesses range from mild to severe).
- Severe cases (more common in young children, the elderly, and those with weakened immune systems)

❑ Treatment

Oral or injected antibiotics: usually for 2 weeks

II-3-1-2 Mycotic Foodborne Infections

Include *Candida* spp., *Sporothrix* spp , *Wangiella* spp. etc)

CII- Food Borne Illness

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- Phylum: Ascomycota;
- Family: Sachharomycetaceae;
- Approximately 200 species
- Approximately 20 linked to pathology in both people and animals
- Chief pathogenic species: *Candida albicans*, *Candida glabrata*, *Candida krusei*, and *Candida*

☐ Types of Candidiasis

- Invasive Candidiasis (Organs , Brain, Eyes , Bones)
- Cutaneous Candidiasis (Skin)
- Thrush (Oropharyngeal Candidiasis)
- Penile Candidiasis (Penile yeast infection)
- Vaginal Candidiasis (Vagin yeast infection)
- Nail Candidiasis onychomycosis (Nails)



Fig 9. Mycotic Food Borne Infection (Example : *Candida* SP)

II-3-1-3 Viral Foodborne Infections

Include hepatitis A & E, Norwalk virus and poliomyelitis virus

The hepatitis A virus is the cause of hepatitis A. Contact with an infected person's stool can spread the infection.

This may occur if you :

- Be in close physical proximity to a person who is hepatitis A positive.
- Consume food prepared by someone who has the virus and neglect to wash their hands adequately after using the restroom.
- Drink infected water or consume food that has been rinsed with contaminated water.

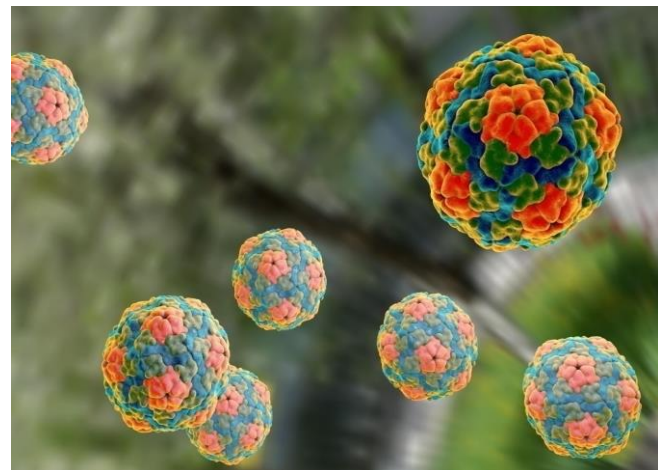


Fig 10. Viral Food Borne Infection (Example : *Hepatitis A*)

□ Symptoms

- Nausea
- Abdominal pain on the right side
- Vomiting
- Fever
- Jaundice
- Feeling weak
- Digestion disorders
- Dark urine

II-3-1-4 Parasitic Foodborne Infections

Include hydatidosis, Taeniasis, Anisakiasis, Trichinosis

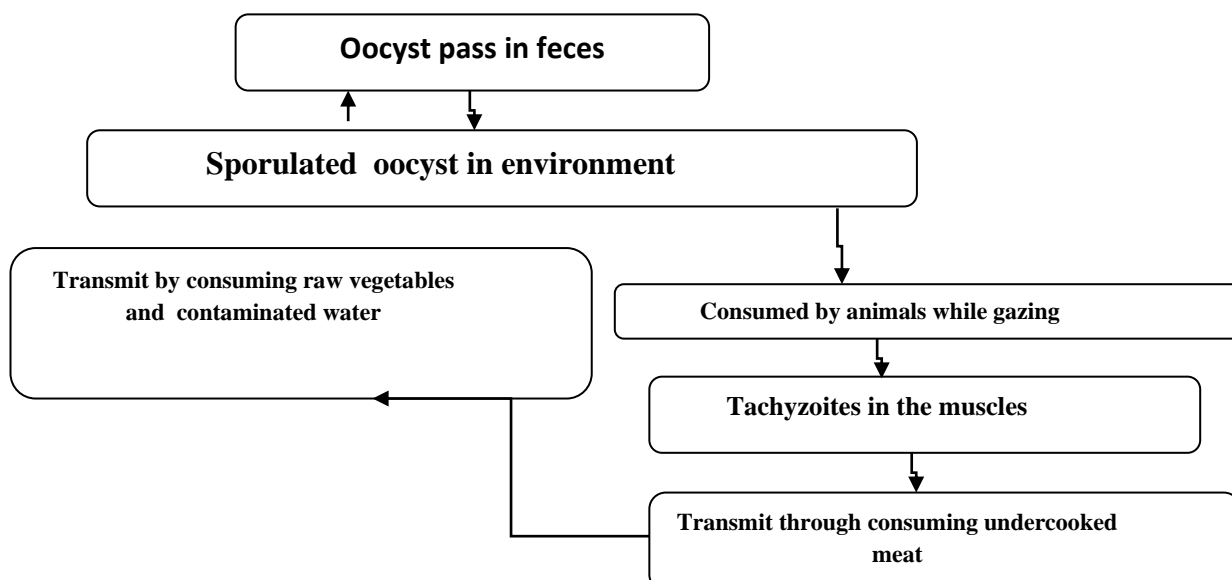
- ✓ By consuming larvae from undercooked beef; *
- ✓ Through consuming egg-contaminated food, drink, or vegetables;
- ✓ Rarely, reinfection by egg transfer from the intestines to the stomach ;
- ✓ Incubation time: eight to fourteen weeks;



Fig 11. Parasitic Food Borne Infection
(Example : : Taeniasis)

II-3-1-5 Protozoal Foodborne Infections

Include Cryptosporidiosis, toxoplasmosis, Sarcocystosis and cyclosporiasis.



Symptoms

- Fever
- Fatigue
- Body aches
- Headache
- Swollen lymph nodes



Fig 12. Protozoal Food Borne Infection
(Example : toxoplasmosis)

II-3-2 Food Borne Intoxication

Ingestion of harmful substances released or generated by bacterial development in food.

- ❑ These toxins cause a range of illnesses in the consumers;
- ❑ The food's chemical qualities will be altered by these toxins, which are invisible to the unaided sight;
- ❑ Bacteria carried in food that can lead to intoxication
 - Clostridium Botulinum (Found in the ground and connected to meat and veggies)
 - Staphylococcus aureus (Found in human nose and throat and also skin)
 - Clostridium Perfringens (present in both birds and animals)
 - Bacillus cereus (found in cereals, spices, and soil vegetation)

- ❑ Chemicals that cause intoxication

- Cleaning products
- Sanitizers
- Pesticides
- Metals



Fig 13. Chemicals that cause Intoxication

- ❑ Seafood that cause intoxication

- Ciguatera toxin
- Shellfish toxins
- Systemic fish toxins
- Scombroid toxin



Fig 14. Seafood that cause Intoxication

➤ **Activity 06 (Chap II)**

What Are The Differences Between Food Borne Infection And Food Borne Intoxication?

➤ **Activity 07 (Chap II)**

- **MCQ 01 Which of the following is most likely to cause foodborne illness?**

- a) A vegetable cutting board that was cleaned, but not sanitized
- b) Cooks who did not wash their hands after going to the restroom
- c) Fried chicken held at 150 F for 4 hours
- d) Tuna salad held at 38 F for 4 hours

- **MCQ 02 Food contamination is caused by**

- a) Stained receptacles
- b) Unclean chopping board
- c) Insufficient Personal Hygiene
- d) Deficient refrigeration

- **MCQ 03 Bacteria that causes foodborne illness grow best in**

- a) Protein foods
- b) Acidic foods
- c) High sugar foods
- d) Water

- **MCQ 04 Trichinosis is a disease caused by**

- a) Virus
- b) Bacterium
- c) Parasite
- d) Fungus

- **MCQ 05 Which of the following is the most common pest found in food establishments?**

- a) Termites

CII- Food Borne Illness

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- b) Flies
- c) Mosquitos
- d) Moths

Chapter III

QUALITY



- *Chapter III objectives*
- *Generality*
- *Quality Assurance*
- *Quality Control*
- *Quality In Agri Food Industry*
- *Activities*

III-1 Chapter III objectives

At the end of the Chapter III , in relation to the subjects covered, the student must be able to:

- **Recognize** the notion of quality in Food Science;
- **Learn** the basic concepts of Quality Assurance and Quality Control;
- **Learn** the differences between the Quality Assurance and Quality Control ;

III-2 Generality

Meeting the needs of the customer is the essence of quality. Quality is the ability of procedures, operations, and organization (going for conformity, managing change via projects, emphasizing innovation) to boost output and, in general, promote operational excellence in both public and private enterprises.

- Quality is the ability of a product to satisfy its users (AFNOR definition).
- Every feature and attribute of a product or service that enables it to meet the stated needs of every user.

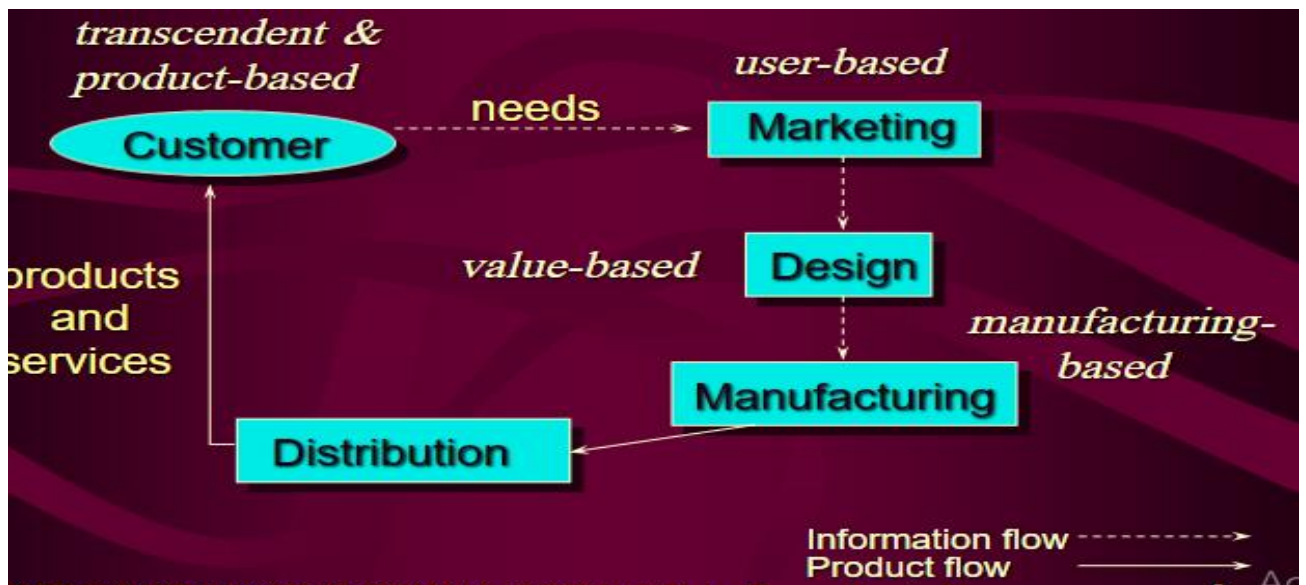


Fig 15. Quality Perspectives

➤ Activity 08 (Chap III)

- What is the difference between Quality assurance and Quality Control?

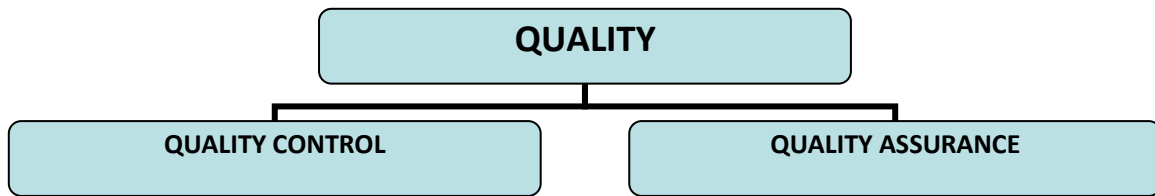


Fig 16. Types of Quality

III-3 QUALTY ASSURANCE

The caliber of the good, service, or outcome. It is the process of ensuring that a product is free from defects and meets all standards. The main goal of quality assurance is to prevent delivered flaws in order to save expensive rework.



Fig 17. Quality Assurance

III-3-1 Characteristics

- It is a process-based approach that is proactive.
- Begins from the outset of the project to comprehend the expectations and requirements for the product, both explicit and implicit.
- After that, creates the strategy to fulfill these demands and anticipations.
-

III-3-2 Quality Assurance Examples



Fig 18. : Audit , Training , Selection Of Control Tools.....;

III-4 QUALITY CONTROL

Concerned with the methods and operational actions utilized to meet quality standards. The steps involved in ensuring a high-quality product are part of the quality control process. The goal of these tasks is to find flaws in the real product that is being made.



Fig 19. Quality Control

III-4-1 Characteristics

- As soon as project work starts, control functions are activated;
- It is a reactive strategy that aids in identifying deliverable flaws;
- Ensuring that the deliverables are defect-free and fulfill the quality standards set during the quality assurance process is the aim of quality control.
- If the deliverables are not found in compliance with the requirements, the proper corrective action will be taken;

III-4-2 Quality Control Examples

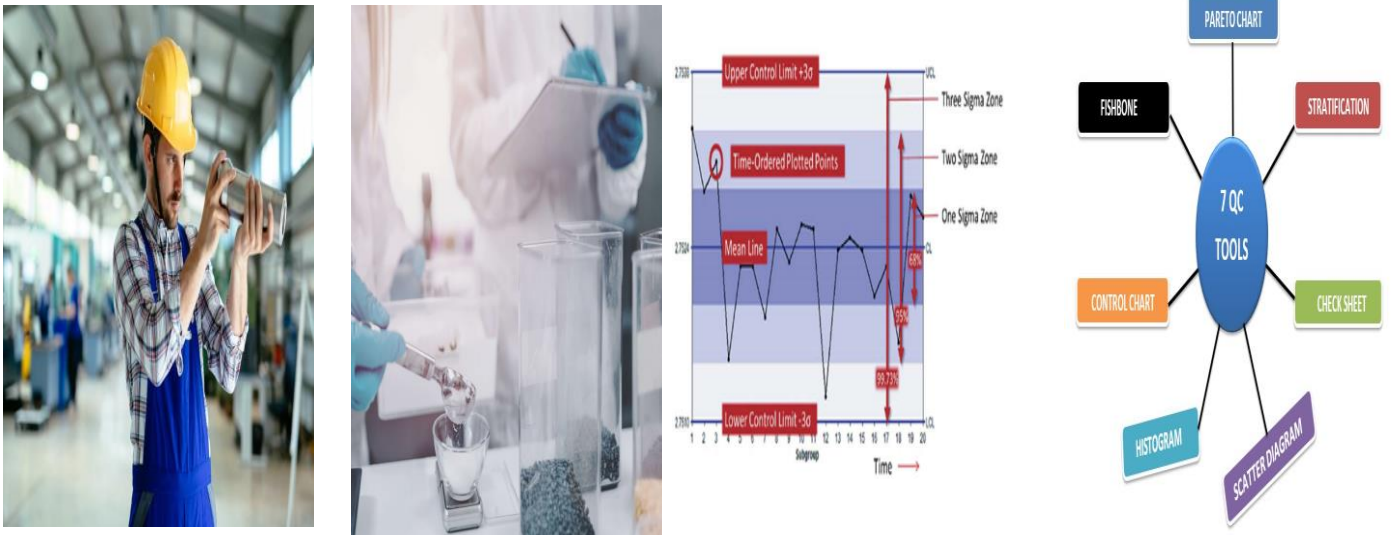


Fig 20. Inspection , Product Testing , Statistical Sampling , 7 Quality Tools

QA & QC both are part of the Quality System



Fig 21. Quality System



➤ Activity 09 (Chapter III)

- MCQ 01: Chemical analysis of a finished food product is an example of ?

- a) Food safety audit
- b) Quality Control
- c) Quality Assurance
- d) None of the above

- MCQ 02: Quality control is ?

- a) Managerial Tool
- b) Process oriented approach
- c) Product oriented approach
- d) None of the above

- **MCQ 03: Identify the correct one**

- a) Quality control and quality assurance are interchangeable in the current ISO;
- b) Quality control is a product-focused concept and quality assurance is a process-focused concept;
- c) Quality control is a process-focused concept and quality assurance is a product-focused concept.
- d) None of the above

- **MCQ 04: The main objective of Quality Assurance is**

- a) Proof of fitness of a product
- b) Inspection of quality of product
- c) Quality Conformance
- d) Customer satisfaction

MCQ 05: Regarding quality assurance, which of the following statement(s) is/are correct?

A- QA is a collection of procedures used to guarantee quality in the processes used to create products.

B- QA is a tool for correction and is focused on products.

- a) B is true
- b) A is true
- c) A and B
- d) None of these

III-5 Quality In Agri Food Industry

In addition to price, the quality of products and the services that accompany them are the real criteria for competitive differentiation: Quality, cost and delivery times - three constraints that must mobilize every organization around three inseparable challenges:

- Commercial: fulfillment of customer needs
- Human: inspiring all workers to strive for the same goal

- ❑ Economic: the organization's financial results.

Concerns about quality have long been present in the food industry and continue to be the main concerns of consumers. Food product quality refers to a variety of factors, including:

- **Nutritional Quality** Qualité Nutritionnelle
- **Hygienic Quality** Qualité Hygiénique
- **Organoleptic Quality** Qualité Organoleptique (goût).

III-5-1 Quality Issues For The Food Industry

A string of health emergencies at the end of the 1990s made consumers doubt the safety of food. Customers are becoming more and more demanding about the products' health-related qualities.

The rise in the prevalence of obesity and overweight has heightened consumer demands in terms of nutrition.

Quality is a crucial component of business strategy and a deciding factor in consumer choice in the modern food industry.



Fig 22. Quality in Food Industry

III-5-2 Nutritional Quality

The agri-food sector has established several nutrition-related programs, with a primary focus on four areas:

- Nutritional optimization of food stuffs
- Consumer information and education.
- Good practice in communication and marketing
- Support for research



Fig 23. Nutritional Labeling

- **Nutritional optimisation of food stuffs**



Reduction of sugar, salt, fat, trans fatty acids, saturated fatty acids....

Existing product reformulation is a methodical process that progressively acclimates consumers to the product.

These days, the "nutrition" component is considered when designing any new product.



Fig 24. Nutritional optimization

■ **Consumer information and education**

➤ **Activity 10 (Chapter III)**

- Describe the Figure below

Sample label for
Macaroni & Cheese

① **Start Here** →

② **Check Calories**

③ **Limit these Nutrients**

④ **Get Enough of these Nutrients**

⑤ **Footnote**

Nutrition Facts			
Serving Size 1 cup (228g)			
Servings Per Container 2			
Amount Per Serving			
Calories 250		Calories from Fat 11	
		% Daily Value	
Total Fat 12g			18%
Saturated Fat 3g			15%
Trans Fat 3g			
Cholesterol 30mg			10%
Sodium 470mg			20%
Total Carbohydrate 31g			10%
Dietary Fiber 0g			0%
Sugars 5g			
Protein 5g			
Vitamin A			4%
Vitamin C			2%
Calcium			20%
Iron			4%
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.			
	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

- **Food Labeling** is supported by the **FAO** as a useful instrument to safeguard consumer health in terms of nutrition and food safety. Food labels include details regarding the identity, composition, and safe handling, preparation, and consumption of the product.

The aim is to improve consumer information to promote healthy eating and physical activity in television programs and advertisements.

- **Good practice in communication and marketing**

➤ **Activity 11 (Chapter III)**

Decribe the Figures below



Fig 25. Good Practice in food



Deontology code, stop food advertising on children's television screens. There is strong evidence that children's eating habits are impacted by powerful food marketing messages in ways that are harmful to a healthy diet.

- **Support for research**

Many manufacturers fund research programs on nutrition and food.



Fig 26. Funding of Researches

III-5-3 HYGIENE QUALITY

The agri-food sector has been employing a range of strategies to guarantee that its goods are promoted in the most sanitary a manner for many years.

- **Raw material control on receipt;**
- **Work-in-progress, completed goods, supplier audits;**

- HACCP, good hygiene procedures, and progressively more efficient traceability systems ;
- The food industry has created and is still creating a number of standards related to sanitary quality.
- Certification

The act of an impartial body attesting to a company's quality organization's compliance with a standard is called certification.

- Standards

A standard is an openly available, non-free document that lays out an optional set of guidelines created by a reputable organization following consensus-building and discussion among all parties.

- AFNOR .Association Française de Normalisation
- ISO International Organisation for Standardisation
- Organisme certificateur = AFAQ standard France
- ALGERAC Algeria



Fig 27. Some names of standards organisations

-ISO

A commonly used document that is created by consensus and approved by an established organization. It describes characteristics, regulations, or directions for actions or their results that offer the maximum degree of order in a certain situation. Standards (public/private) = standard.

- ISO 9001: general quality management standard (also known as ISO 9001:2000)

- ISO 22 000, food safety standard
- ISO 14 000, environmental standard



Fig 28. ISO Standards

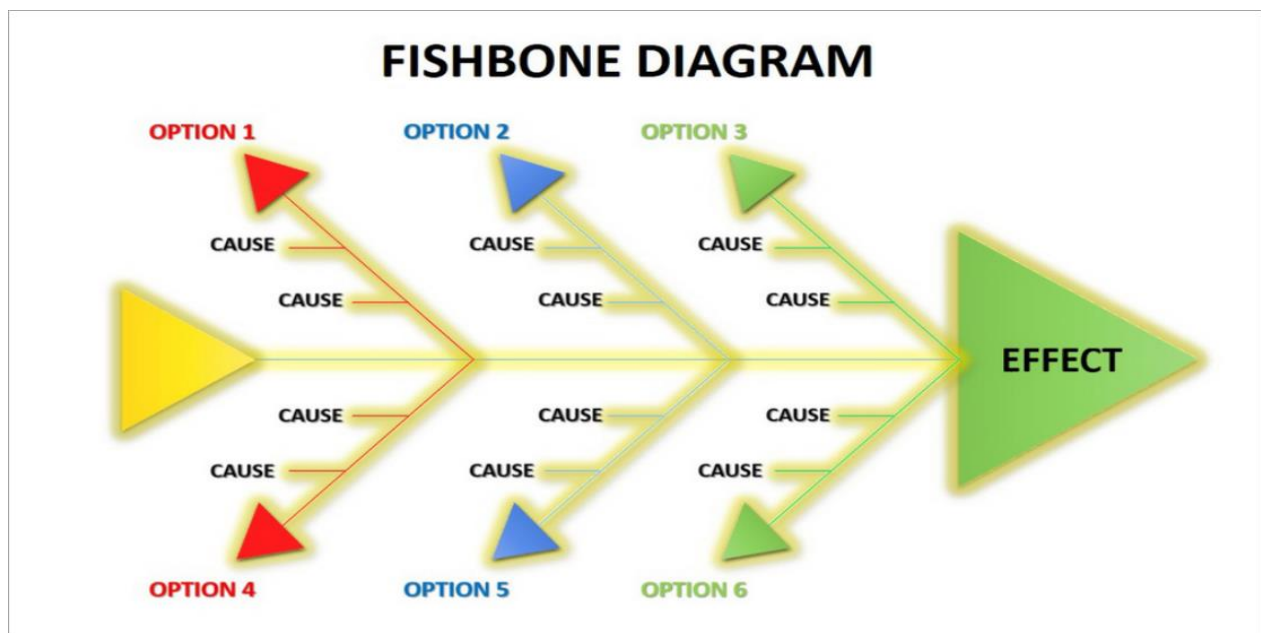
III-5-4 ORGANOLEPTIC QUALITY (TASTE)

Food is evaluated orally using an organoleptic method, which uses science to evaluate the product's sensory qualities in terms of taste, smell, sight, and touch.

Since consumers purchase items based on their taste, the food sector places a high value on innovation in this field. 'Taste' is the most important factor for determining meal quality.

CHAPTER IV

QUALITY TOOLS(FISHBONE DIAGRAM)



- *Chapter IV Objectives*
- *Generality*
- *The Deming Chain*
- *Fishbone Diagram*
- *Other Tools*
- *Activities*

IV-1 Chapter IV objectives

At the end of the Chapter IV , in relation to the subjects covered, the student must be able to:

- **Learn** the different types of quality tools ;
- **Learn** the basic concepts of Fishbone Diagram ;

IV-2 Generality

Quality is fitness for use. Quality is a subjective, conditional, and perceptual quality that can mean different things to different people. "Quality is about meeting the needs and expectations of customers," says Jim Relay.

Simple statistical techniques for problem solving are the seven quality control tools. Either of these tools was created in Japan. According to Kaoru Ishikawa, 95% of problems can be resolved with these 7 instruments. A series of graphical techniques that have been found to be particularly useful in diagnosing quality-related difficulties are referred to as the "7 Tools of Quality."

They are employed in the analysis of the production process, the identification of the main issues, the management of product quality fluctuations, and the provision of solutions to prevent more flaws.



Fig 29. 7 Quality Tools

IV-3 Seven Quality Control Tools (The Deming Chain)

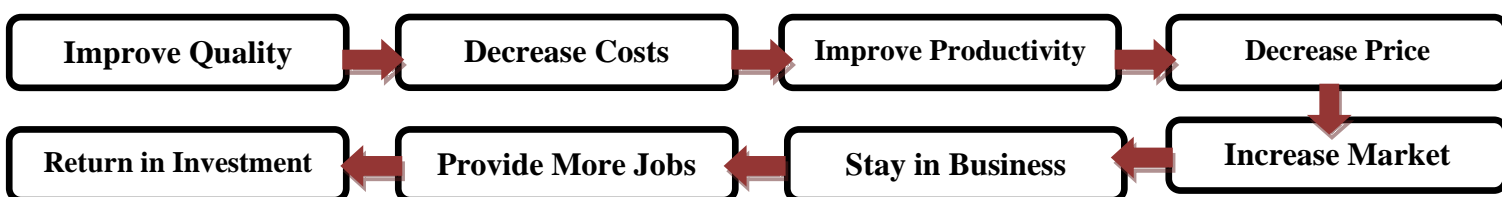


Fig 30. The Deming Chain

IV-4 FISHBONE DIAGRAM (Ishikawa's fishbone)

The diagram analysis, sometimes referred to as the "Fishbone Diagram," the "Ishikawa Diagram," or the "Cause-and-Effect Diagram," was created for the first time in the 1940s by Professor Kaoru Ishikawa of the University of Tokyo.

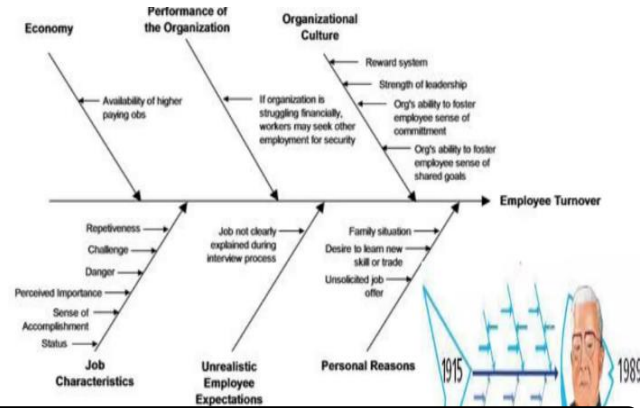


Fig 31. Ishikawa's fishbone

IV-4 -1 Description

- A multitude of possible sources for a problem or effect are displayed in the fishbone diagram. It helps with brainstorming session organization. Concepts are immediately grouped into useful categories.

We use this diagram when determining a problem's potential causes. particularly when a group's thought has a propensity to stagnate.

IV-4 -2 Fishbone Diagram Procedure

Method for Drawing a Fishbone Diagram: List the main categories of causes for the issue. It can be recognized using "6M" methods.

- 1) **Methods**
- 2) **Machines (Equipment)**
- 3) **Manpower (People)**
- 4) **Materials**
- 5) **Measurement**
- 6) **Management, Environment... etc**

CAUSE AND EFFECT DIAGRAM

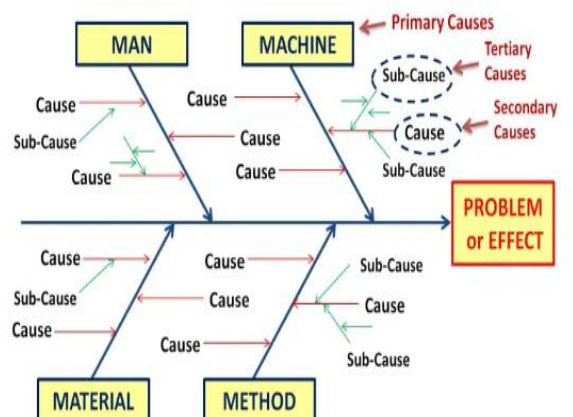


Fig 32. The M Techniques

IV-4 -2-1 M1- Materials (Raw Materials)

Thus, receiving raw materials is a crucial role in the food sector, requiring you to:

- Verify that the product matches the "specifications" using documentation and physical inspections (e.g. checking



Fig 33. Raw Materials

the temperature, etc.).

- Reject non-compliant products or damaged packaging.

➤ **Activity 12 (Chap IV) What Are The Three Major Contaminants In Raw Materials?**

The three major contaminants in raw materials are :

- Rotten and mouldy
- Soil and mud
- Fecal matter
- Store immediately under the right conditions (cold enough).
- Separate the different deliveries (e.g. separate tanks for different qualities of milk). Separate the washing and peeling of vegetables (=soil) from the "animal products" circuit.....): each product has its own "fridge".



IV-4 -2-2 M2- Machines

Many machines are susceptible to Cleaning In Place (CIP), and equipment will require regular cleaning and disinfection.

- The tools need to be easy to disassemble, have a straightforward design, no sharp edges or cracks, and be appropriate for the task at hand.
- . Materials that come into touch with food (i.e., food surfaces) need to be rot-proof, smooth, leak-proof, and compatible with the food. The ideal materials are glass and stainless steel (CrNi), as they are easier to clean. While wood is prohibited, there are several exceptions.



Fig 34. Machines Disinfection

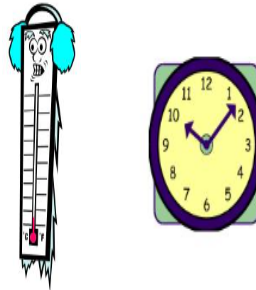
IV-4 -2-3 M3- MANAGEMENT (MOTHER NATURE)

- As a result, the factory or workshop needs to be far away from any potential sources of contamination (minimum separations from a road are 5 meters, a dwelling is 50 meters, and a livestock farm is 100 meters);
- To keep dust and vermin away, within the factory's perimeter and surrounding the property: The plant needs a loading dock and a tarmac road.

- Classified installations laws may cause annoyances for the surrounding community, even within the facility itself. Thus, a pre-construction survey will be conducted, and prefectoral authorization will be granted.

IV-4 -2-4 M4- METHIODS

- Avoids microbial input
- Prevents microbial multiplication
- Eliminates bacteria
- Prevents Recontamination



The ideal method is AMER C. Rosset for germs!

A- Apport

- An automated operation is less risky than "manual" handling.
- Mechanical activities (such as slicing, chopping, grinding, and mixing) expose the entire product to contamination. For this reason, we have to be very mindful of how clean the equipment are.

M- Multiplication

- Bacteria can only grow if they have enough time, and the risk goes down as the temperature and time go down: cold chain, organized and refrigerated workshop.

E- Elimination

- Heat treatment (cooking at 70°C, pasteurisation or sterilisation).
- Cleaning and disinfection (equipment and premises)

R- Recontamination

- Packaging (Protected Packaged Food).

IV-4 -2-5 M5- MANPOWER

The most important hygiene control



Fig 35. Manpower

- It manages the other "M": it maintains cleanliness of the equipment, regulates raw materials, protects the environment, and follows procedures;
- They are a significant source of harmful and common microorganisms. Therefore, employees in the food business need to be hygienic, well-groomed, and job-trained.

IV-4 -2-6 M6- MEASUREMENT

This section of the FISHBONE DIAGRAM contains all techniques for figuring out if a part or process meets the necessary quality standards. Here, in addition to sub-causes like: you might also include information on scales, vision systems, or human inspectors.

- Scale doesn't function properly
- Measuring tool broke off or is missing
- **Activity 13 (Chap IV) In our company, we have received fruits which is used as raw material to make jam. What measures must my company take when receiving this raw material ?**
 - Check that the product complies with the "specifications" on the basis of documents and by means of checks (e.g. checking the temperature). –
 - Reject non-compliant products or damaged packaging (rotten, mouldy,).
 - Store immediately in the correct conditions (cold enough).
- **Activity 14 (Chap IV) Dairy X wants to recruit employees, what are the characteristics that must be present in these new employees**
 - Body cleanliness and good health
 - Knowledge of hygiene principles
 - Knowledge of manufacturing techniques and procedures
- **Activity 15 (Chap IV) Draw the fishbone Diagram (Restaurant Chain Example) Try to guess the reasons for the long service time in the Restaurant X**

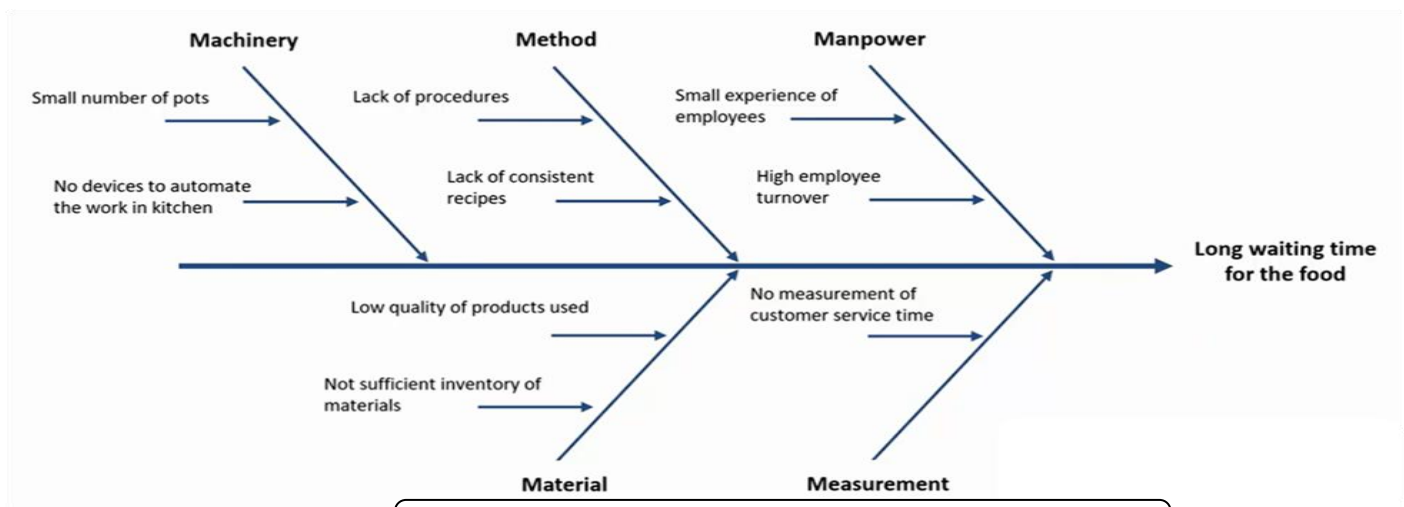
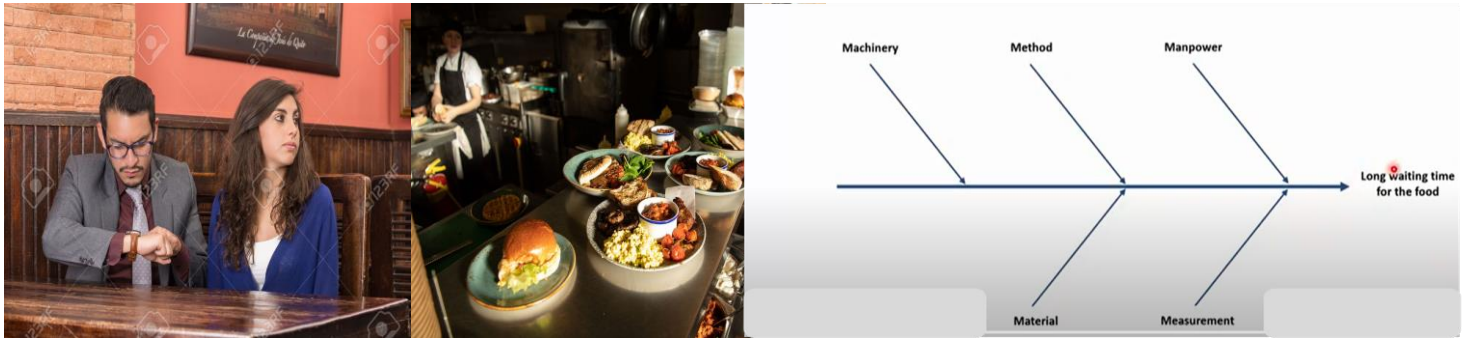


Fig 36. fishbone Diagram (Restaurant Chain)

IV-5 QUALITY TOOLS(6 OTHER)

IV-5-1 Histogram

Graphs of a data distribution called histograms are used to show the shape (relative frequency), dispersion (spread), and centering of the data. They aid in addressing the query, "Is the process capable of meeting customer requirements?," "by showing how a process's output relates to the expectations of the client (targets and specifications).

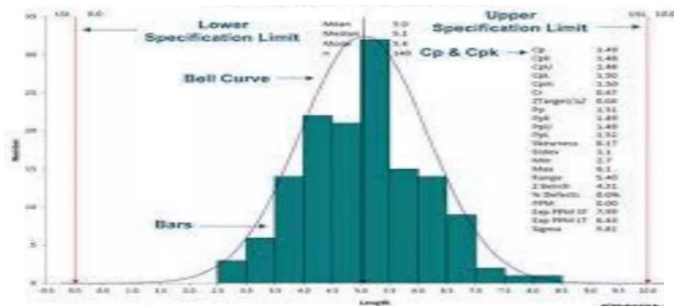


Fig 37. Anatomy of a Histogram

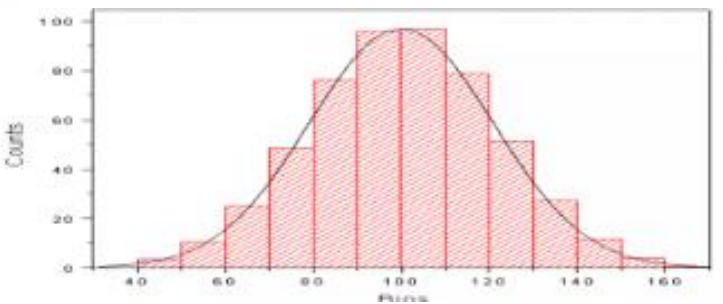


Fig 38. Histogram with normal distribution

IV-5-1-1 Construction of A Histogram

- 1) Count the number of data points in step one.
- 2) Complete a tally sheet summation.
- 3) Figure out the range
- 4) Determine how many intervals there are.
- 5) Use to compute the interval
- 6) Determine the interval's starting positions
- 7) Determine how many points are in each interval
- 8) Make a data plot
- 9) Include a legend and title

- Activity 16 (Chap IV) Applies The Steps On the Example of table 02 & 03 And Create The Histogram

Table 02. Metal Black thickness (m mm)

3.56	3.46	3.48	3.50	3.42	3.43	3.52	3.49	3.44	3.50
3.48	3.56	3.50	3.52	3.47	3.48	3.46	3.50	3.56	3.38
3.41	3.37	3.47	3.49	3.45	3.44	3.50	3.49	3.46	3.46
3.55	3.52	3.44	3.50	3.45	3.44	3.48	3.46	3.52	3.46
3.48	3.48	3.32	3.40	3.52	3.34	3.46	3.43	3.31	3.46
3.59	3.63	3.59	3.47	3.38	3.52	3.45	3.48	3.32	3.46
3.40	3.54	3.46	3.51	3.48	3.50	3.68	3.60	3.46	3.52
3.48	3.50	3.56	3.50	3.52	3.46	3.48	3.46	3.52	3.56
3.52	3.48	3.46	3.45	3.46	3.54	3.54	3.48	3.49	3.41
3.41	3.45	3.34	3.44	3.47	3.47	3.41	3.48	3.54	3.47

Table 03 . Class size

Number of Data	Number of Classes
Under 50	5 - 7
50 - 100	6 - 10
100 - 250	7 - 12
Over 250	10 - 20

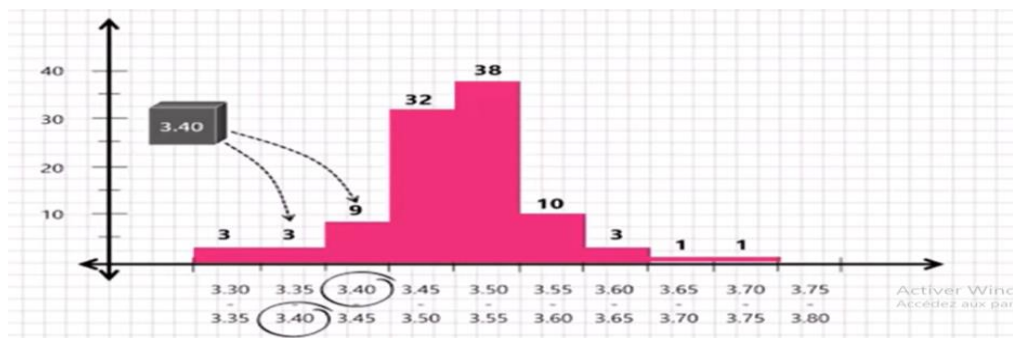


Fig 39 . Histogram

IV-5-2 CHECK SHEET

- A tool to gather and arrange data that has been measured or counted.
- The information gathered can be utilized as input for additional high-quality tools.
- The process of gathering data involves providing answers to a series of questions.

Type of Defect	Count	Score
Dirty		12
Broken stitching		42
Inconsistent margin		15
Wrinkle		30
Long thread		10
Padding shape		8
Off center		18
Stitch per inch		24
Others		22
Total Defects:		181

Fig 40 . Check Sheet

When to Use a Check Sheet?

- To continuously gather data from the same source or at the same place;
- Gathering information from a production process; this can include information on the frequency or patterns of events, issues, defects, locations of faults, causes of defects, etc.

IV-5-2-1 Check Sheet Procedure

- Choose the issue or occurrence that will be watched.
- Choose the period of time and date for data collection
- Produce the form.
- Configure it such that information can be recorded using simply a check mark, X, or comparable symbol and that further data doesn't need to be collected for analysis.
- Indicate each section of the form.
- Make sure the check sheet is easy to use and collects the required data for a short trial period. Record information on the check sheet for every instance of the designated problem or event.

IV-5-2-2 Check Sheet Benefits

- To identify the cause of the issue;
- to gather information in a methodical and organized manner;
- To make data classification (stratification) easier.

- The check sheet offers a uniform method of data gathering and is a straightforward and efficient means of displaying data.
- **Activity 17 (Chap IV) Describe the figure below**

Preparation

	Inspected	Status	Comments
Employees wear clean and proper clothing	<input type="checkbox"/>	▼	
Hands are washed properly and frequently	<input type="checkbox"/>	▼	
Equipments and food contact surfaces are rinsed, sanitized, washed before every use	<input type="checkbox"/>	▼	
Food is handled with suitable utensils (gloves and tongs)	<input type="checkbox"/>	▼	
Reusable towels are not used for drying hands or the floor but used only for sanitizing equipments	<input type="checkbox"/>	▼	

Contamination

	Inspected	Status	Comments
Food is covered	<input type="checkbox"/>	▼	
Separate chopping boards, knives and other equipment used for different food	<input type="checkbox"/>	▼	
Cooked/ ready to eat foods are stored in separate fridges	<input type="checkbox"/>	▼	
All open food are covered properly in fridges and dry store	<input type="checkbox"/>	▼	

Chilled/Frozen Food

	Inspected	Status	Comments
Food is restored to its critical temperature and within 2 hours of receipt	<input type="checkbox"/>	▼	
Frozen food is kept at -18°C	<input type="checkbox"/>	▼	
Cooked/ ready to eat foods are stored in separate fridges	<input type="checkbox"/>	▼	
Out of date chilled goods are removed	<input type="checkbox"/>	▼	

This is FOOD SAFETY CHECK SHEET

A food safety checklist is a set of guidelines and procedures that can be followed to guarantee that food is handled, prepared, and served in a way that makes it safe for consumption. Health and safety inspectors and restaurant managers can utilize this list of safety standards to keep an eye on food safety in a variety of establishments, such as restaurants, schools, and other food providers.

IV-5-3 Stratification

A system of creating layers, classes, or groups is called stratification.

- Check sheet data collection requires meaningful classification. This kind of classification aids in obtaining an initial grasp of the relevance and distribution of data, allowing for the planning of additional analysis to get a relevant result. Stratification is the meaningful classification of data.

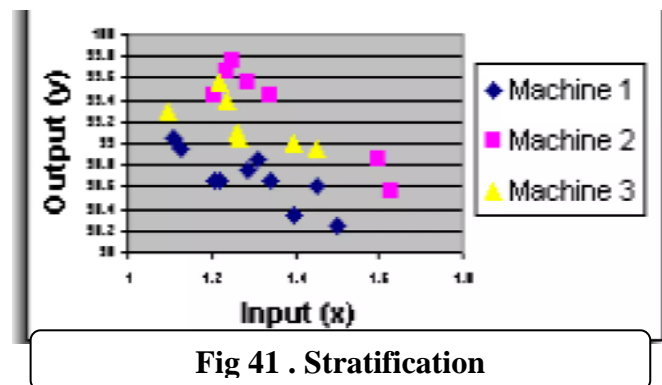


Fig 41 . Stratification

- We employ stratification in the following situations: (1) when data analysis requires separating multiple sources or circumstances; for example, shifts, days of the week, suppliers, or demographic groups.

IV-5-4 Pareto chart

Vilfredo Pareto (1848-1923) Italian economist developed this tool .

Eighty percent of the population is poor.

To discern between a problem's vital and inconsequential components, utilize a Pareto diagram.

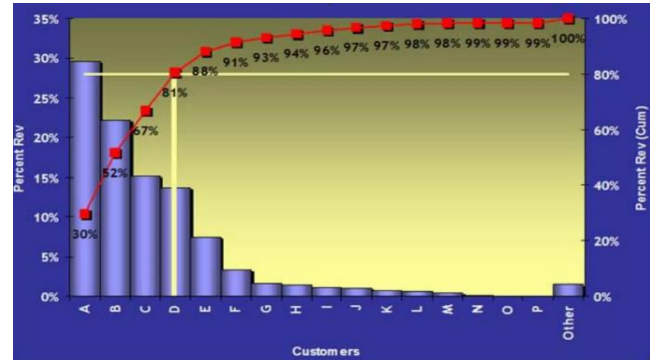


Fig 42 . Revenue by Costumer

IV-4-4-1 Pareto Chart Procedure

- **Develop a list** of issues, objects, or reasons that need to be contrasted;
- **Gather the information** at the designated time interval;
- **Calculate the frequency** of each item. Determine the sum of all the things in total;
- **Determine** each item's percentage;
- **Arrange** the objects under comparison in descending order of comparison measure;
- **Arrange** the items on a graph's horizontal axis, highest to lowest. First, write the values on the left vertical axis, and then the cumulative percentage on the right vertical axis.
- **Create** a line graph showing the total percentage. The initial point on the line graph and the top of the first bar should line up.
 - Examine the diagram and note which elements are most important.

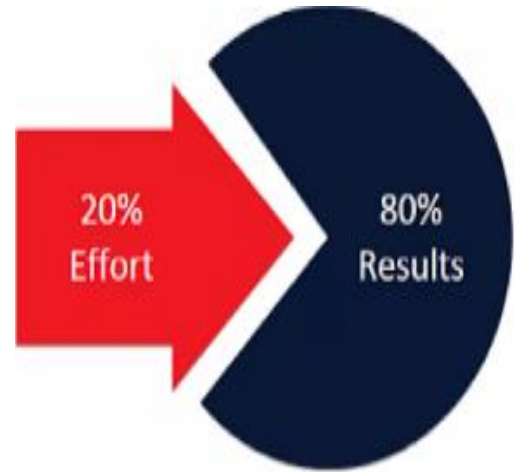
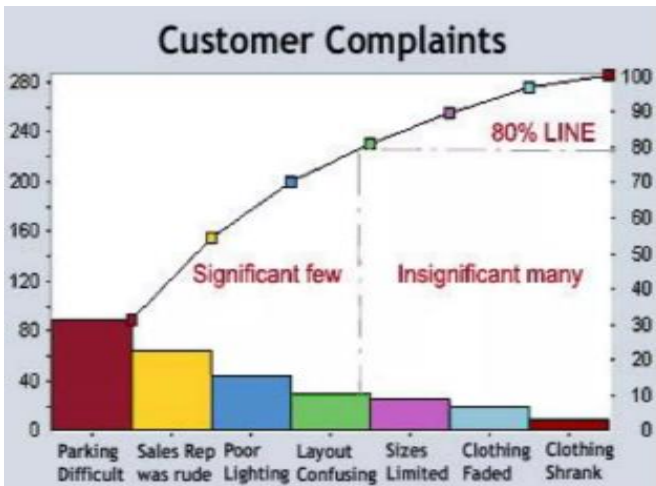


Fig 43 . Costumer Complaints

IV-5-5 CONTROL CHART

A control chart is a graph that is used to analyze how a process evolves over time.

A control chart has three lines: an average line in the middle, a lower line for the lower control limit, and an upper line for the higher control limit. These lines are constructed based on historical data. By comparing the current data to these lines, you can ascertain whether process

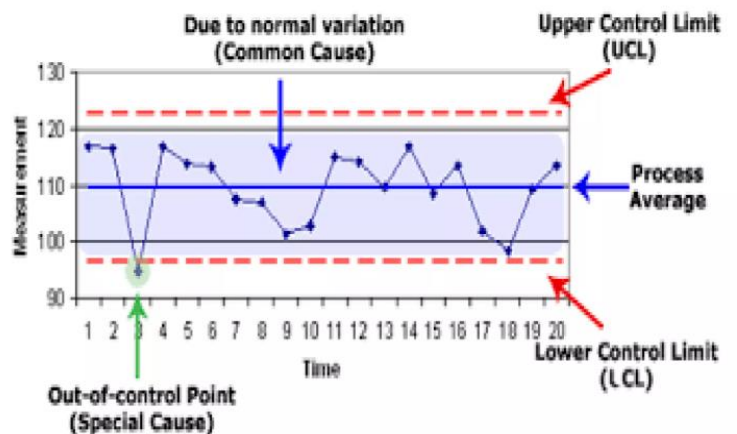


Fig44 . Control Chart

variation is unexpected (out of control, impacted by specific causes of variation) or consistent (under control).

IV-5-6 SCATTER DIAGRAM

Purpose: To determine any potential correlations between a quality characteristic and a potential contributing component. The correlation between two process variables is displayed in a scatter diagram. These elements may be a Critical To Quality (CTQ) feature.

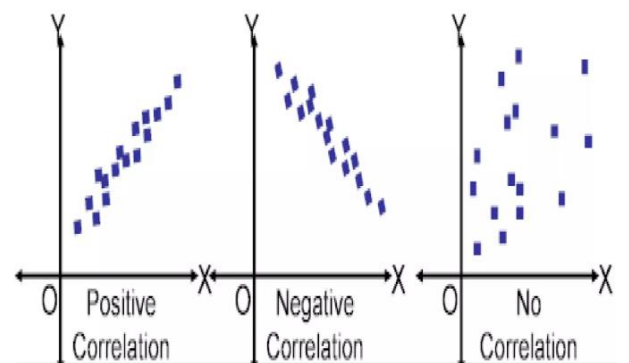


Fig45 . Scatter Diagram

-: Scatter Diagram :- Dots representing data points are scattered on the diagram.

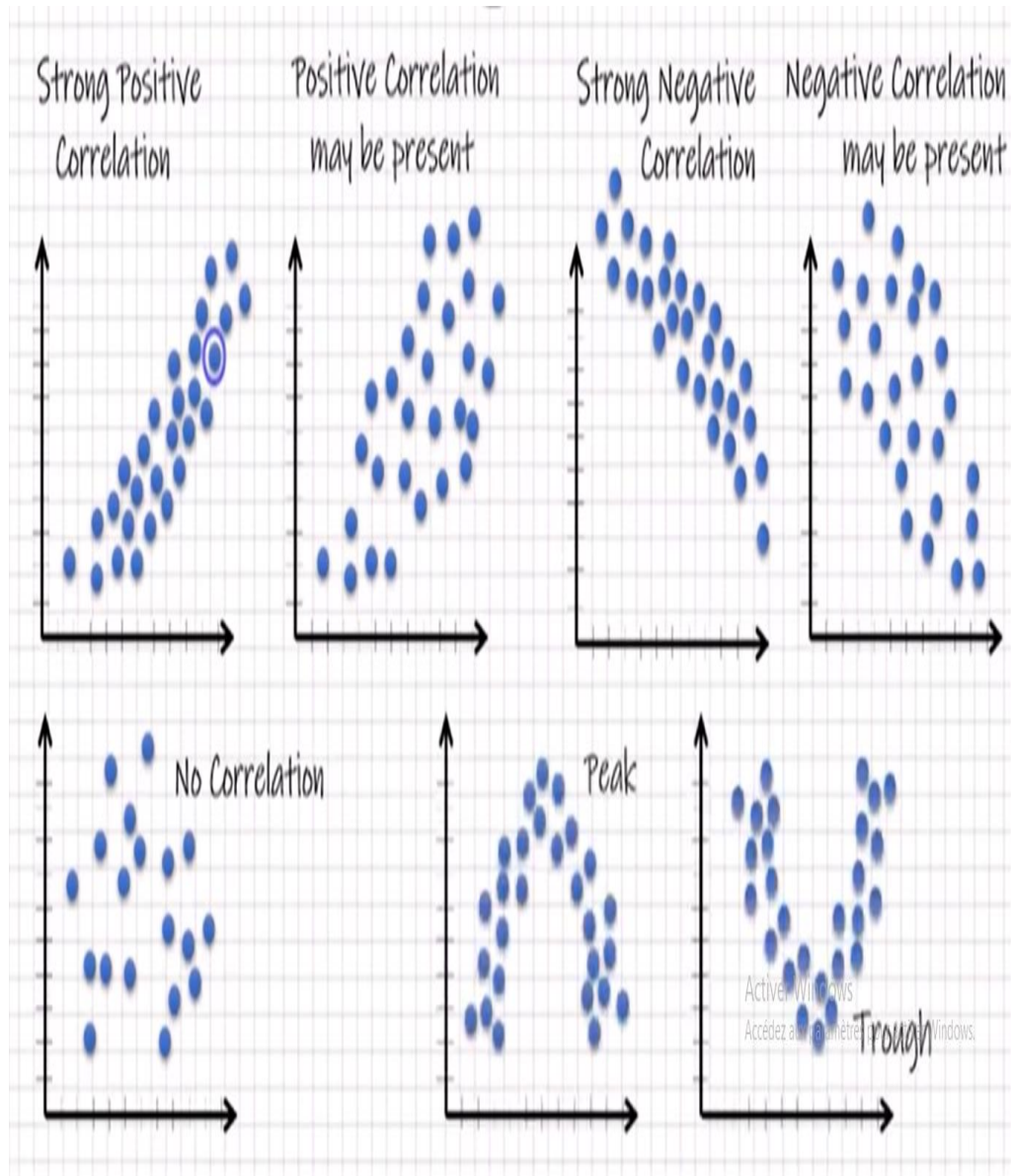
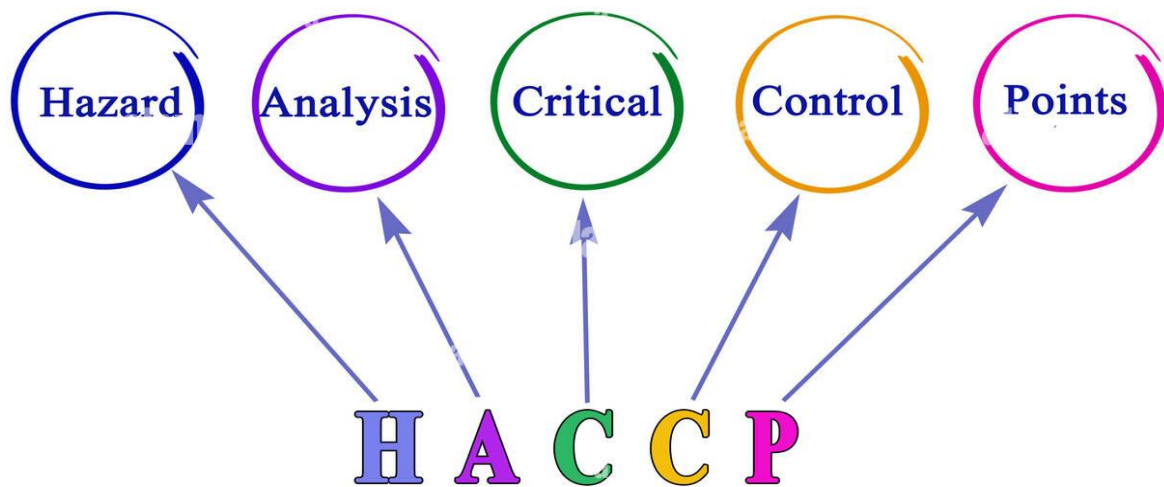


Fig 46 . Types of Scatter Diagram

CHAPTER V

HACCP



- *Chapter V Objectives*
- *Generality*
- *Qualities of HACCP System*
- *Hazards*
- *Critical Control Points*
- *Principles of HACCP*
- *Steps of HACCP Implementation*
- *Advantages of HACCP*
- *Activities*

V-1 Chapter V objectives

At the end of the Chapter V , in relation to the subjects covered, the student must be able to:

- **Understand** the basic principles of HACCP;
- **Learn** the Critical Control Point;
- **Learn** the notion of Hazards;
- **Learn** the Types of Hazards;

V-2 Generality

- Hazard Analysis Critical Control Point, or HACCP, is a system that seeks out and averts possible issues before they arise;
- Food firms can employ HACCP to ensure that, during the food production process, they do not violate any laws by putting consumers at danger;
- It is a methodical approach to risk assessment and one way to meet UK hygiene legislation's requirement for risk assessment;
- The safety and quality of all items are now managed using the whole HACCP system;

It's regarded as one of the best instruments for managing the risks connected to the food and beverage processing, distribution, sales, and catering industries at a time when it's essential to give customers unquestionable products and prevent any detrimental effects on their health.

This system entails :

- Determining the stages in a product's manufacture where possible risks could arise;
- Evaluating the likelihood that the risk points will materialize, as well as the severity of the consequences if they do;
- Selecting the elements that are most important for consumer safety;
- Putting controls in place, keeping an eye on output, and acting when needed;
- Regularly reviewing the HACCP plan even in the absence of any changes to the food operation. This should be done anytime there are changes to the operation.

V-3 Features of the HACCP protocol

HACCP is methodical in that possible risks are found before an issue arises; Effective because it concentrates control efforts at the potential hotspots for risk; On the spot: The food sector can have instantaneous control over its processes.

Food businesses can use HACCP to ensure that consumers are not put in risk by their products. Although no two businesses are exactly same, a HACCP system's specifics will change over time, but its principles will never change.

- **Activity 18 (Chap V) What is Hazard ?**

A substance present in food—whether it biological, chemical, or physical—that could be harmful to the consumer.

V-4 Hazards

A hazard is any physical, chemical, or biological agent that, in the absence of regulation, has a plausible risk of spreading disease or inflicting injury.

Hazards in HACCP refer to situations or substances in food that have the potential to inflict disease or harm.

V-3-1 Categories of Hazards

The following categories of hazards can be the focus of a HACCP plan:

- **Physical risks** (such as glass, stones, or metal);
- **Chemical hazards** (such as those that are either naturally occurring, purposefully added, or accidentally contributed);
- **Biological hazards** (such as hazardous bacteria);
- Packaging;
- Equipment.

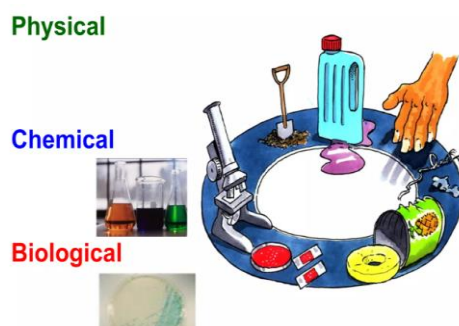


Fig 47 . Food Hazards

➤ **Activity 19 (Chap V) State five sources of microbiological hazards?**

(**Raw food. People. Animals. Insects. Rodents. Farm animals. Sewage**).

V-5 Critical Control Point (CCP)

An identifiable location where a risk may arise in the production chain is known as a Critical Control Point (CCP). The risk is addressed in order to keep it from happening. This can be a technique, a point, or an action that must be taken in order to apply control and prevent, eliminate, or lower a risk to a level that is acceptable. Multiple hazards can be controlled with a CCP (e.g. refrigeration storage). On the other hand, multiple CCPs can be required to manage a single danger.

□ When risks may be avoided, points like these can be designated as CCP.

- Controlling the reception stage can prevent the introduction of chemical residue;
- Controlling the formulation or component addition stage can prevent a chemical hazard;
- Controlling the growth of pathogenic bacteria can be achieved by chilling or refrigerated storage.

□ CCP can be found in areas where risks can be removed, like:

- Cooking is one way to destroy pathogenic (harmful) bacteria;
- Using a metal detector to find and remove contaminated products from the processing line is another way to eliminate metal particles;
- Freezing is one way to destroy parasites.

□ Points that have their dangers lowered to tolerable levels are considered CCPs. Examples of such points include:

- The presence of foreign objects can be reduced by the use of automatic collectors and hand sorting;
- shellfish from authorized waters can reduce some biological and chemical dangers.

V-6 Principles of HACCP implémentation

The system has three main phases:

1-Perfect knowledge of the food product

2- Hazard analysis, defining critical points and permissible limits, in the context of the study of a given hazard;

3- Verification, documentation and ongoing adaptation of the system, enabling the method to be used as a tool for improving quality.

HACCP is a preventive control system designed to guarantee food safety.

- 1- Hazard Analysis
- 2- Determine The Critical Control Point
- 3- Establish Critical Limits
- 4- Critical Control Points Monitoring
- 5- Corrective Actions
- 6- Establish Verification Procedures
- 7- Record Keeping Procedures

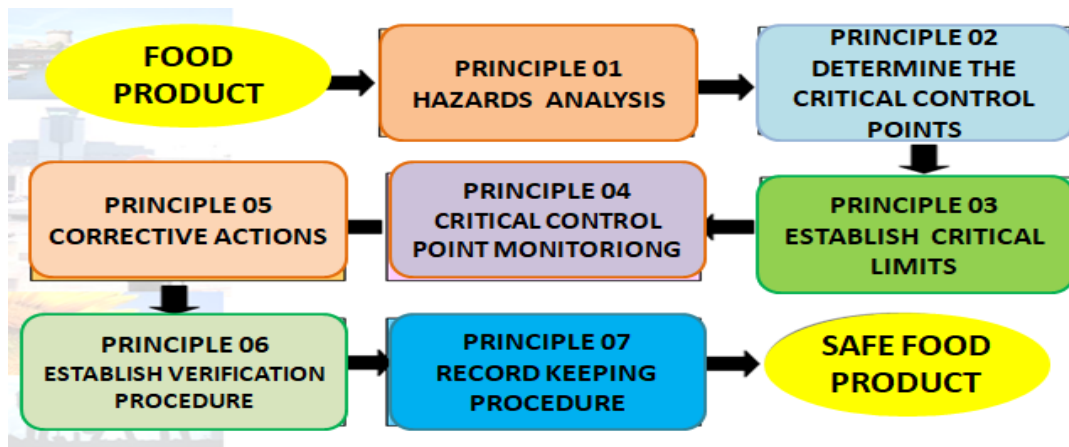


Fig 48. HACCP PRINCIPLES

1. Hazard analysis

Finding any dangers that need to be stopped, removed, or brought down to a manageable level is the first step.

From the time raw materials are received until the completed product is released, all possible risks must be taken into account.

If a hazard is likely to happen or is likely to put consumers at intolerable risk, it needs to be controlled.

2. Determination of the (CCP)

Finding the CCP at the stages where control is necessary to stop a hazard from happening, get rid of it, or bring it down to a manageable level.

3. Establish critical limits

A biological, chemical, or physical limit that needs to be regulated at a CCP is linked to a critical limit, which can be either a maximum or minimum value.

This is adjusted to stop, get rid of, or lessen a risk to a manageable level.

4. Monitoring of Critical Control Points (CCPs)

If a CCP is not within critical boundaries, it must be determined by a scheduled series of measurements or observations.

This helps to produce an accurate record that may be referred to later for confirmation.

5. Remedial measures

Corrective actions are the steps taken after a risk in food production is identified.

The goal is to address and eradicate the risk factor and restore control of the CCP.

To stop an issue from happening again in the future, the reason must be found.

Corrective measures can take the following forms:

- Moving the impacted product or materials to a different line where the deviation wouldn't be deemed important;
- Isolating and holding the product for safety assessment;
- Reprocessing;
- Product destruction.

6. Procedures of Verification

Verification procedures, in addition to CCP monitoring, validate the HACCP plan and show that the system is operating as planned.

This is typically completed in the event of a system failure or a significant alteration to the procedure or final product. Even when there are no signs of these two events, annual inspections are routinely carried out.

7. Record keeping procedures

Maintaining records and providing documentation aid in proving that the earlier HACCP concepts have been used successfully.

These records could be of the development of the HACCP plan, CCP monitoring, corrective actions or verification activities.

The following four categories of HACCP records exist:

- HACCP plan and supporting paperwork utilized during plan development;
- CCP monitoring records;
- Documentation of remedial measures;
- Documentation of verification procedures;

V-7 Steps of HACCP implementation

STEP 1: Define the field of study An HACCP study applies to

- A single product or a family of similar products from the same Factory
- A single manufacturing process
- In relation to a group of identified hazards

STEP 2: Setting up the HACCP Team

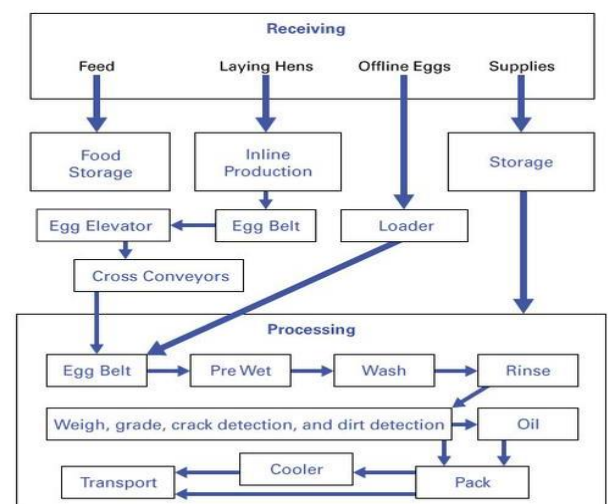
Even though HACCP procedures are multivalent, they are implemented by a multidisciplinary team rather than by a single person. The coordinator, who oversees communication and the team as a whole, makes up the group.

STEP 3: Describe The Product

- Input Formulation
- Intermediate products
- Finished Product Formulation

STEP 4: Identify The Product's Intended Use

- Certain types of use reduce the risks
- Consider normal conditions of use



STEP 5: Draw Up A Fabrication Diagram

To draw up the diagram, we break down the process each stage

Fig 49. Shell Egg Flowchart

- Precise technical information
- Duration, premises, equipment, sequences
- Interfaces are described

STEP 6: Check The Fabrication Diagram On Site**STEP 7: Analysing Hazards**

- Danger
- Risk
- Causes
- Preventive measures

STEP 8: Establish Critical Limits And Target Levels For Each Ccp Identified**STEP 9: Setting Up A Ccp Monitoring System****STEP 10: Draw Up A Corrective Action Plan: Process And Product****STEP 11: Draw Up Documentation: Plan, Procedures And Records****STEP 12: Check The Compliance And Efficiency System****STEP 13: Plan To Update The System****V-7 Advantages of HACCP**

The HACCP system has a lot of advantages:

- Comply with regulations.
- Meet customer requirements.
- Strengthen the Quality Assurance system.
- Help design new food products or processes.
- Respond to a specific problem.

➤ **Activity 20 (Chap V) What does the phrase "food safety management" mean to you?**

Procedures and guidelines that guarantee the food a food business sells is safe to consume and uncontaminated

➤ **Activity 21 (Chap V) What is the acronym for 'HACCP'?**

Risk analysis, critical control point.

- **Activity 22 (Chap V) State three possible consequences of consuming food containing a physical hazard.**

Choking. Cuts. Internal injury. Burns. Broken teeth.

- **Activity 23 (Chap V) List the three advantages of HACCP**

Adherence to the law. defense of careful consideration. both resourceful and proactive. Every worker that is engaged. Safety was introduced during the product development process. fosters a mindset of food safety. reduces the risk. defending a brand. recognized on a global scale.

- **Activity 24 (Chap V) Which organisation defined the seven principles of HACCP?**

Codex Alimentarius

CHAPTER VI

ISO 22000



**International Organization
for Standardization**

- *Chapter VI Objectives*
- *Generality*
- *Various ISO Standards*
- *ISO 22000*
- *Activities*

VI-1 Chapter VI objectives

At the end of the Chapter VI , in relation to the subjects covered, the student must be able to:

- **Understand** the basic of concept ISO ;
- **Learn** the ISO 22000;

VI-2 Generality

An independent private non-governmental organization that creates international standards.

"Equal" is the meaning of the Greek word "isos," from whence the term ISO comes.

- Global Standards Provide World-Class Requirements ;
- Regarding Goods, Services, and Systems ;
- To guarantee effectiveness, safety, and quality ;

"No matter the nation or language, we are always ISO," it states.

Almost every industry is covered by ISO:

- Food Protection;
- Agriculture, healthcare, biotechnology, medicine, the environment, etc;

To ensure that goods, materials, procedures, and services are appropriate for the purposes for which they are designed, ISO produces papers with standards, specifications, advice, or features.

Members of ISO come from 162 different nations. The members are essential to the way ISO runs. Under the direction of the Secretary General, the Central Secretariat in Geneva, Switzerland, manages daily operations and organizes the system.

General Assembly :

- It is the main organ and supreme authority of the organization;
- The organization's members and important officers attend the annual conference;

Technical Management Board (TMB)

- TMB, which answers to Council, is in charge of managing the technical work;

- It oversees the technical committees that direct the development of standards pertaining to technical issues;
ISO standards are created through a multi-stakeholder process, in response to market needs, and they are founded on expert opinion from throughout the world.

VI-3 Numerous ISO Standards:

- ✓ ISO 14000: Environmental Management;
 - ✓ ISO 9000: Quality Management
 - ✓ The ISO 50001 Energy Management,
 - ✓ ISO 31000 Risk Management,
 - ✓ ISO 22000 Food Safety Management,
 - ✓ ISO 27001 Information Security Management,
 - ✓ ISO 45001 Occupational Health & Safety
 - ✓ Medical devices (ISO 13485)
 - ✓ Anti-bribery management systems (ISO 37001)
- and ISO 3166 Country Codes are among the standards that need to be met.

VI-4 ISO 22000 : 2005

The International Association for Normalization developed the international safety standard known as ISO 22000 certification.

It essentially serves as the framework for the following:

- ✓ Good Manufacturing Practices (GMP) and the Food Safety Management System (Fsms);
- ✓ Critical Control Point for Hazard Analysis
- ✓ ISO 9001: 2000

A management system developed to help businesses manage risks to food safety across the food chain so that food is safe to eat when it's ready.

Any association can install an ISO 22000 food safety management system in the following order: homestead to fork. Once an organization has finished ISO 22000 internal auditor training, it may show its clients that it has an operational safety management system. Your clients' confidence in the product is bolstered by the ISO 22000 Certification. This is becoming more and more crucial since food processors want safe ingredients from suppliers and customers demand safe meals.

Any organization involved in the efficient handling of food, from the field to the store, such as cultivators, carriers, packagers, processors, retailers, and bottlers, usually finds it beneficial.

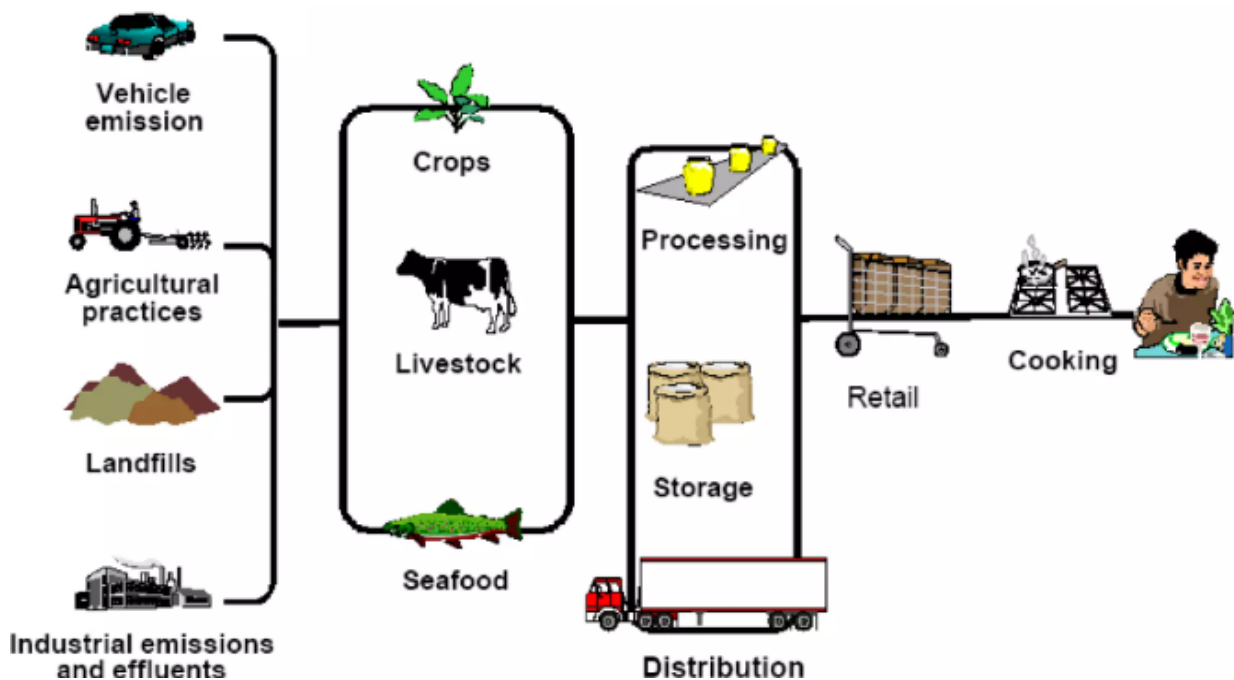


Fig 50. Entry of Hazards in Food Chain

- **Activity 26 (Chap VI) Why It Is Required???**
 - Intense Farming And Processing Of Food
 - Increase In Meals Consumed Outside Home
 - Increase In Ready To Eat Foods
 - More Traveling Across The World
 - Increased Amount Of Exotic Imported Foods
 - Increase In Number Of Susceptible People

VI-4-1 Features

- Harmonizes the voluntary international standards;
- Establishes the first global standard for food safety;
- Makes Use of Proven Management System Elements;
- Facilitates Mutual Understanding Of What A Food Safety Management System Is;
- Demands Legal Compliance Verification;
- Combines Current Best Practices;
- Provides Both Internal And External Monitoring

VI-3-2 Requirements

ISO 22000 specifies requirements for 5 essential elements of food safety:

- ✓ The systemic approach;
- ✓ Interactive communication;
- ✓ Traceability;
- ✓ Prerequisites or prerequisite programs (PRP) ;
- ✓ HACCP plan;

VI-3-3 Content Of The Standard

A food chain cannot create a food safety management system in accordance with the following protocols unless these requirements are satisfied:

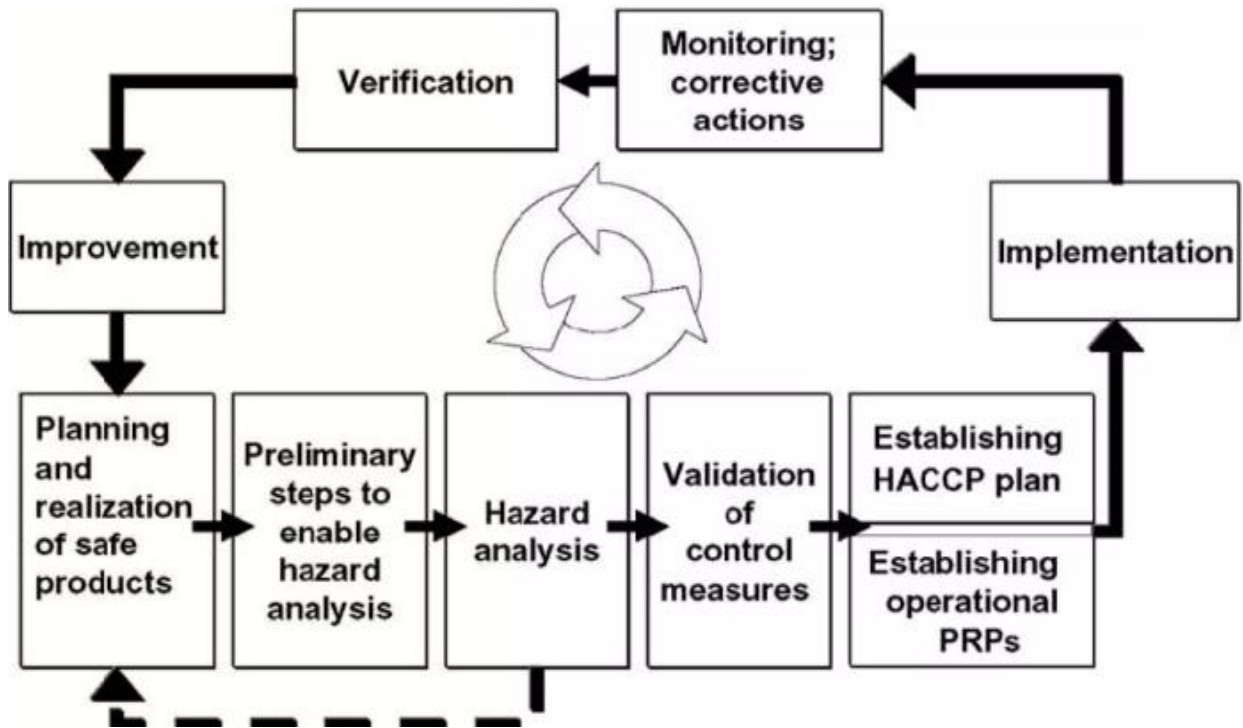


Fig 52. Food Safety Management Standards (FSMS)

- Activity 27 (Chap VI) What Is The Difference Between Haccp And Iso 22000?

Table 04 . Differences between HAACCP and ISO 22000

	HACCP	ISO 22000
Range		
Methods		
Accreditation		
Combination		
Relevance		

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