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## Quality Assurance - Why & How ?

- **Definition** - Set of measures to ensure defective products are not generated  
- Ensures process design consistently meets requirements
- **Elements** - buying specification; raw materials control; on-line process control; finished product inspection; sensory testing
- **Strategies-**
  - 1) **Quality Policy** - foundation stone for influencing GMP, staff attitudes, sales and profitability
  - 2) **Management Reviews**
  - 3) **Establish Standards** for sampling and examination
  - 4) **Develop appropriate testing/analysis procedures** e.g. SPC
  - 5) **Establish and adhere to internal quality standards-** AQL
  - 6) **Customer complaints handling**
  - 7) **Recording & Reporting**
  - 8) **Packaging control**
  - 9) **Storage & Distribution Controls**
  - 10) **Continuous Improvement (Six Sigma vs Cost )**
- **Total Quality Management** for  
all-employee involvement  
sustainable improvement
- **Challenges - Examples and Case Studies**



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FOOD QUALITY CONTROL & PLANT  
SANITATION (FST 401) 3Units

Published by [Charla Stafford](#)

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Presentation on theme: "FOOD QUALITY CONTROL & PLANT SANITATION (FST 401) 3Units"— Presentation transcript:

## 1 FOOD QUALITY

### CONTROL & PLANT SANITATION (FST 401) 3Units

Sanni, O. Lateef and Sobukola A. Philip

Department of Food Science and Technology

University of Agriculture

Abeokuta

Course requirements:

CAT: 30%

Exam: 70%

Class attendance compulsory

\*Contact Lecturer ahead of time if any cogent reason will keep you away from lectures.

\*Present medical reports if absence from lectures/CAT was due to ill health.

## 2 Aims of the course

To understand the general concepts that govern quality in terms of:

Historical background and definitions; scope; significance, meaning of quality and control. Quality in relation to reliability, price, delivery, accounting, purchasing.

To present case studies of organization of quality control in typical food companies, setting specifications for microbiology, chemical and entomological standards.

To achieve competence in the skills on statistical quality control – types of errors and decision making; control charts for variables and attributes – construction and uses; sampling plans, sensory quality control – assessment scores and interpretation of data.

To have information on the codex Alimentarius legislation and codes of practice. Biological and aesthetic problems of poor plant sanitation, waste and affluent disposal; plant design, installation and operation for cleaning purposes; disinfection, sterilization and detergency in processing area; cleaning by dismantling; cleaning-in-place technology, personal hygiene in the food factory.

## 3 Quality A DISTINCTIVE ELEMENT

## SANITATION

### THE FOUNDATION OF FOOD SAFETY



Retail Meat & Poultry Processing  
Training Modules



HACCP



### Part III Solid Waste Engineering

#### 12 Evolution of Solid Waste Management

##### 12.1 Solid Waste—a Consequence of Life

Problems with the disposal of wastes can be traced from the time when humans first began to congregate in tribes, villages, and communities and the accumulation of wastes became a consequence of life.

ISO 9001 : 2000

A LEVEL OF SUPERIORITY THAT IS USUALLY HIGH  
DEGREE OF EXCELLENCE  
HIGH STYLE IN QUALITY, MANNER OR DRESS  
PEOPLE OF THE HIGHEST SOCIAL LEVEL

#### **4 Assurance A FIRM BELIEF IN ONE'S OWN POWER**

A STATEMENT THAT EXPRESSES A COMMITMENT ON THE PART OF ITS  
MAKER AS TO ITS TRUTHFULNESS  
THE QUALITY OR STATE OF BEING SAFE

#### **5 Quality Assurance - Why & How ?**

Definition - Set of measures to ensure defective products are not  
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Total Quality Management for  
all-employee involvement  
sustainable improvement  
Challenges – Examples and Case Studies

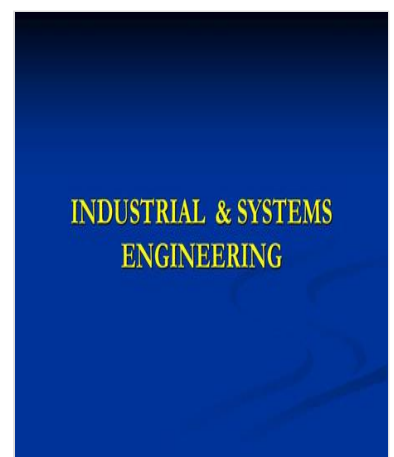
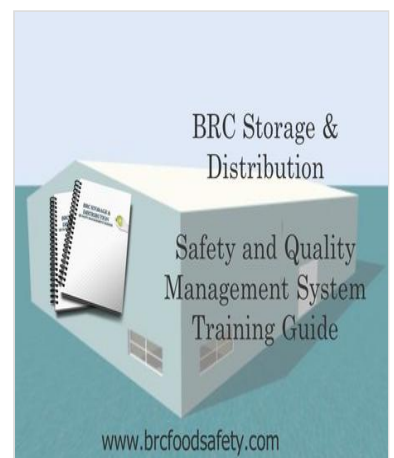
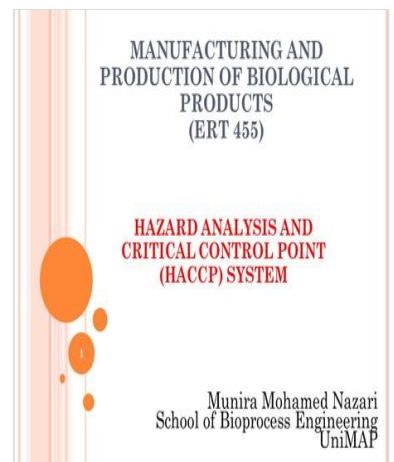
#### **6 Quality Awareness WHO ARE MY CLIENTS WHAT DO THEY**

##### **WANT FROM ME**

WHAT IS THE BEST POSSIBLE WAYS TO FULFIL THEIR WANTS  
DO I HAVE THE MWANS TO SATISFY THEM  
HOW CAN I OBTAIN THE MEANS TO SATISFY THEM  
WHO ARE SUPPLIERS  
DO I MAKE THE RIGHT AGREEMENT WITH MY SUPPLIERS ABOUT WHAT  
THEY DELIVER

#### **7 Quality System System in Operation**

QUALITY MANUAL, PROCEDURES, WORK INSTRUCTIONS ,  
DOCUMENTATION  
STANDARDS  
RECORDS  
COMMITTED PEOPLE  
OPERATIONS



## 8 Quality Beliefs DO IT RIGHT THE FRIST TIME, EVERY TIME

QUALITY COST MONEY, NON-QUALITY IS MUCH EXPENSIVE

IF YOU CANNOT SMILE, DO NOT OPEN A SHOP

QUALITY MANAGEMENT AIMS AT SATISFYING MORE EXTERNAL CUSTOMERS WHILE LOWERING THE INTERNAL COSTS

QUALITY IS WHAT CUSTOMERS GET OUT OF THE PRODUCT ANDNOT WHAT SUPPLIER PUT IN THE PRODUCT

## 9 Quality Requirements for Sustainable Improvement

Good Quality Staff : Analytical; of High integrity; trainable; team-oriented

Statistical Tools : sampling plans; process optimization; AQL

Environmental Hygiene & Food Safety : Self-enforcement; HACCP as vital management tool

Building Design & Equipment Layout : location; access; good ventilation; no cluttering; fly-proof meshes; conveniences; water, waste, dust controls; aesthetics

Operator Hygiene & Cleaning Schedule: PPE; training 7 use of posters; cleaning schedule; risk assessment

Regulatory Control : national food standards; standard operating procedures for all areas; internal specifications; etc

## 10 Total Quality Management

TQM system are :

Commitment to TQM by all staff including owners/Directors.

The prevention of problems.

To develop a written system that can be followed easily and modified when found necessary.

To train all staff for their role in the system.

To ensure full compliance with the system.

## 11 Requirements of TQM

For successful implementation of TQM there are four essential requirements:

Management Commitment

Employee Commitment and Teamwork

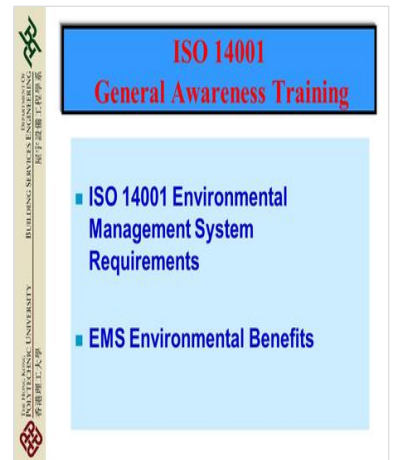
Customer Orientation

Quality System.

## 12 Examples of Poor TQM Compliance in Manufacturing

### Operations/Processes

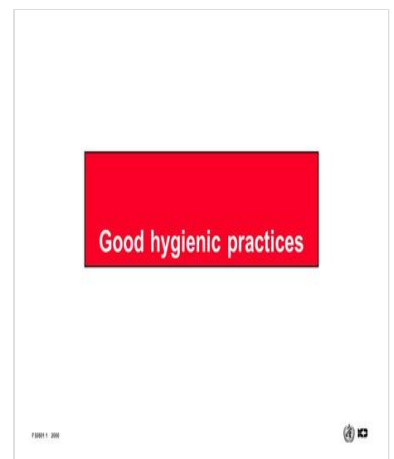
Technical: Poor documentation or absence of records; delays in inspection time or missed audit schedules; high level of defectives; customer complaints; inadequate process/product specifications; product recall



ISO 14001  
General Awareness Training

- ISO 14001 Environmental Management System Requirements
- EMS Environmental Benefits

BUCHING SERVICE & MANAGEMENT CONSULTING ENGINEERING  
BUCHING SERVICE & MANAGEMENT CONSULTING ENGINEERING  
BUCHING SERVICE & MANAGEMENT CONSULTING ENGINEERING  
BUCHING SERVICE & MANAGEMENT CONSULTING ENGINEERING




Good hygienic practices

FABRI 2011

### Quality Control Procedures & Raw Materials

- Raw materials are the tools, equipment, supplies, goods and services that a company requires to do business on a daily basis.
- What are some raw materials you use in your trade?
- Is it important for you to have quality raw materials? Why?

### Good Hygiene Practices along the coffee chain



Module 2.3

### The Codex General Principles of Food Hygiene

Sales and Marketing: Lost opportunities due to poor forecasts or lack of initiatives; Blocked pipelines due to wrong forecasts; Excess or Obsolete Stocks returned from trade; fall in market share; Unambitious Targets; Low profitability

Engineering: High Operational Down-times and Production losses; Breakdown maintenance; Poor/Inadequate knowledge and/or training leading to wastage of spares; use of wrong spares; avoidable injuries due to cutting corners

### **13** Examples of Poor TQM Compliance in Manufacturing

#### **Operations/Processes**

Personnel: Non-implementation of appraisal returns/recommendations; delays in filling vacancies; High staff turnover; Industrial disputes; unwarranted injuries

Logistics: Materials Stock-Out; Poor Quality Deliveries; High prices; untimely deliveries; poor documentation and/or record-keeping

Finance: High receivables; payment delays; irregular/inaccurate stock counts; poor budget forecasting

### **14** SPECIFICATIONS

The cornerstone of quality assurance and quality control system is the specification.

It embodies the control limits – the minimum or maximum values of the various chemical, physical, physico-chemical properties of raw and packaging materials and manufactured products.

It is aimed at: minimum rejects, maintenance of uniformity, increase consumer's satisfaction and minimized cost of production.

### **15** Quality attributes for tomatoes

Accept

Reject

Colour

Orange/red

More than 10% green

Size

Any

-

Shape

Damage

Splitting

Insect

-mould

<5%

< 5%

None

>5%

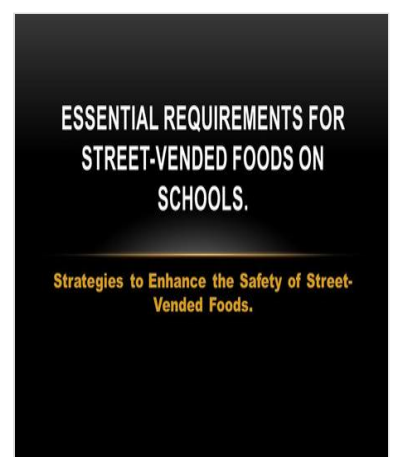
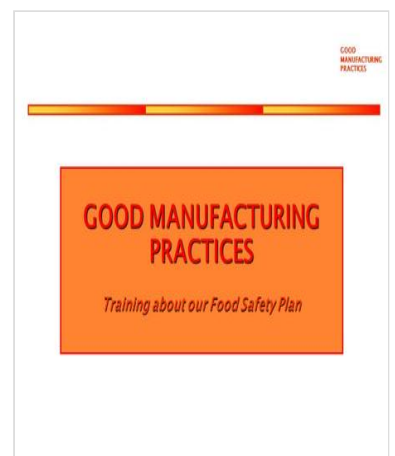
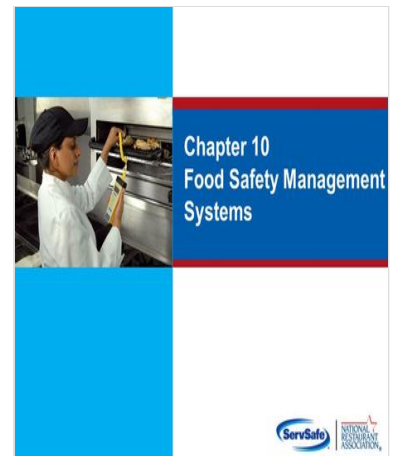
Any evidence of mould

Hardness

Soft to over soft

More than 10% hard

## HAZARD ANALYSIS CRITICAL CONTROL POINTS(HACCP)



## 16 Type of Specification

**Raw Material Specification:** Here the choice of raw materials is determined in the early stages of research and product development e.g. cocoa powder for chocolate drink. At such stage, the important properties of the raw material like geometric (shape, size, surface area), physical, color, appearance, aerodynamics and hydrodynamics and functional properties are determined and designated based on existing standards.

**Finished Product Specification:** Like the raw material specification, the finished product specification is a direct consequence of manufacturing formula/recipe and originates from the research and development work on the product. It describes the chemical, physical, physico-chemical and bacteriological properties of the final product.

## 17 FOOD STANDARDS

They could be defined as a body or rules that concerns foods right from ingredient assembly to finished products or retail presentation.

It is an integral components of food laws.

Standards are varied in character, subject and medium.

For the economic players, the standard is:

A factor for rationalization of production

A factor for clarification of transactions

A factor for transferal of new technologies

A factor for strategic choice for companies

## 18 Classification of Standards

Standards have been classified as follows:

In respect of the object standardized as definition, designation, composition, additives, quality level of products, hygiene, pesticide residue, packaging, marking/labeling, sampling analysis and testing.

In respect of means by which standardization is achieved: Permissive, Mandatory, Prohibitory, Presumptive, Recipe

In respect of degree of standardization required: Complete, partial, minimum, platform, trading, commercial.

In respect of the binding force of the standard: Legal, voluntary, draft, temporary, target.

In respect to the field of application of the standard: Factory or contractual

**Levels of Standards:** Standards are drawn up at international, regional and national level. The coordination of the work at these three levels is ensured by common structures and cooperation agreements.

## 19 What is HACCP?

HACCP stands for Hazard Analysis Critical Control Point.

HACCP is a internationally recognized, systematic and preventive approach to food safety that addresses biological, chemical and physical hazards through anticipatory and preventive action rather than by finished product inspection.



## Hazard Analysis Critical Control Point (HACCP)

## Hazard Analysis Critical Control Point

A Food Safety Approach



## Food Safety Plan

## 20 What does HACCP do?

Ensures that preventive food safety controls, based on science, will be applied in a systematic and consistent manner

## 21 The Seven Principles of HACCP

- Principle 1. Conduct a hazard analysis.
- Principle 2. Determine the Critical Control Points (CCPs).
- Principle 3. Establish target levels/critical limits.
- Principle 4. Establish monitoring procedures.
- Principle 5. Establish corrective action.
- Principle 6. Establish verification methods.
- Principle 7. Establish documentation systems.

## 22 LOGICAL SEQUENCE OF 12 STEPS

1. Assemble HACCP team
  2. Describe product
  3. Identify intended use
  4. Construct process flow and plant schematic
  5. On site verification of flow and schematic
  6. List hazards associated with each process step (principle #1)
- Read Slide

## 23 LOGICAL SEQUENCE OF 12 STEPS

7. Apply HACCP decision tree to determine CCP's (Principle #2)
  8. Establish critical limits (Principle #3)
  9. Establish monitoring procedures (Principle #4)
  10. Establish deviation procedures (Principle #5)
  11. Establish verification procedures (Principle #6)
  12. Establish record keeping/documentation for principle one through six (Principle #7)
- Read Slide

## 24 Hazard Identification

List all hazards related to ingredients, incoming materials, processing, product flow, etc., creating separate lists for biological, chemical and physical hazards.

Identify each hazard and where or by what pre-requisite program it is to be controlled.

Situate each hazard according to both incoming material and to process steps.

## 25 Biological Hazard Identification

Identified Biological Hazards

## GOOD MANUFACTURING PRACTICE FOR BIOPROCESS ENGINEERING (ERT 421)

Huzairy Hassan  
School of Bioprocess Engineering  
UniMAP

### Good Hygiene Practices along the coffee chain



Module 4.2

### Codex Guidelines for the Application of HACCP

## WHO FOOD COURSE SAFE FOOD PRODUCTION: HACCP

HACCP and food regulators

The logo for GMP Programs for Food Safety Management Systems Certification. It features a blue background with the text 'GMP Programs for Food Safety Management Systems Certification' and a circular seal on the right containing the text 'SQF ISO FSSC' and '2010-2011'.

All Process Steps

Step 1 - Receiving - Microbial growth due to time/temperature abuse during transport

Step 1 - Receiving - Microbial growth due to time/temperature abuse at receiving

Controlled at

## 26 CCP Determination

For each identified hazard, first determine if it can be fully controlled by a pre-requisite program(s).

If YES, then indicate these programs and proceed to the next identified hazard.

If NO, then proceed to Question 1.

## 27 CCP Determination (cont.)

Q1. Could a control measure(s) be used by the operator?

If NO, then it is not a CCP.

If YES, describe and continue to Question 2.

## 28 CCP Determination (cont.)

Q2. Is it likely that contamination with the identified hazard could exceed acceptable levels or could increase to an unacceptable level?

If NO, then it is not a CCP.

If YES, continue to Question 3.

## 29 CCP Determination (cont.)

Q3. Is this process step specifically designed to eliminate/reduce the likely occurrence of the identified hazard to an acceptable level?

If NO, continue to Question 4.

If YES, then the step is a CCP.

## 30 CCP Determination (cont.)

Q4. Will a subsequent step eliminate the identified hazard or reduce the likely occurrence to an acceptable level?

If NO, then step is a CCP.

If YES, then step is not a CCP, identify subsequent step and proceed to next identified hazard.

## 31 Biological Hazard Identification

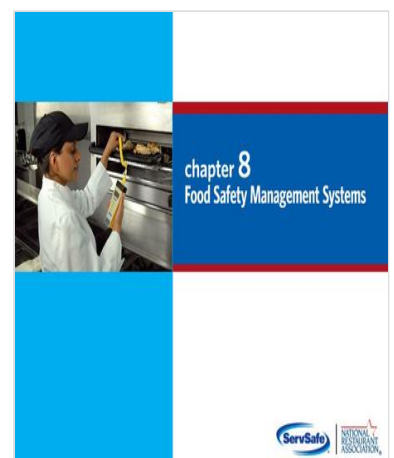
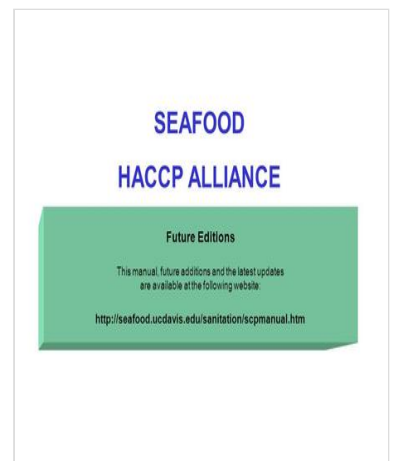
Identified Biological Hazards

All Process Steps

Step 1 - Receiving - Microbial growth due to time/temperature abuse during transport

Step 1 - Receiving - Microbial growth due to time/temperature abuse at receiving

Controlled at





## CCP

### Personnel, Transportation & Storage Pre-requisite Programs

#### **32** Hazards Not Addressed

List any biological, chemical and physical hazards which are not addressed at the establishment:

hazards not addressed by the HACCP plan

indicate the way the hazard could be addressed (cooking instructions, public education, use before date, ...)

#### **33** HACCP Plan

Steps 8 to 12 are incorporated into a HACCP Plan which summarises:

All CCPs and situates each in the appropriate process step

Hazard Description and Critical Limits

Monitoring Procedures

Deviation Procedures

Verification Procedures

HACCP Records/Documentation to be used

#### **34** PREREQUISITE PROGRAMS

1. Premises
2. Transportation & storage
3. Equipment
4. Personnel training
5. Sanitation & pest control
6. Recall program

#### **35** SANITATION IN THE FOOD INDUSTRY

For effective critical control point programme it is recommended that the sanitation of the processing plant should be adequately controlled.

Sanitation in the food industry could be defined as the planned maintenance of the work and product environment and conditions aesthetically offensive to the consumer, and to provide clean, healthful and safe working conditions.

In sanitary environment, physical facilities, equipment and handling predispose foods to microbial contamination, deterioration and spoilage with such possible consequences as the reduction in aesthetic appeal, loss of organoleptic and nutritive qualities, a total waste or food poisoning.

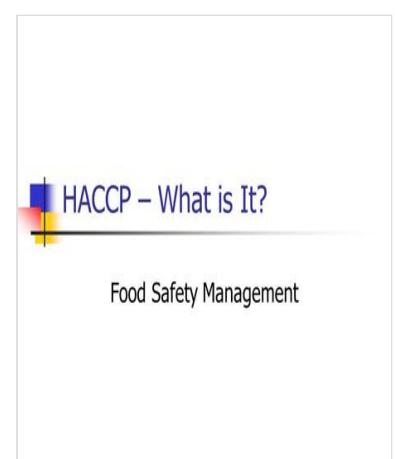
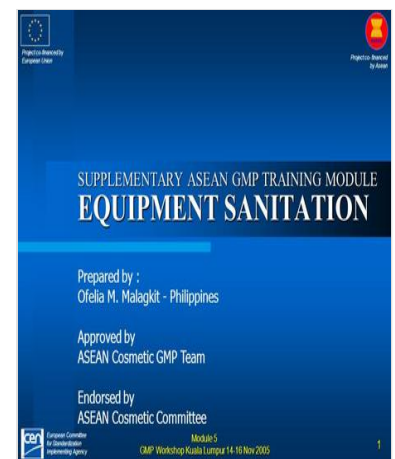
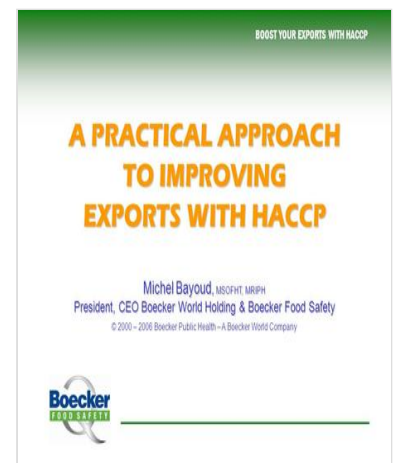
#### **36** Vehicles for contamination in the food industry

Inability to separate food materials from each other

Poor ventilation including inadequate air filtration

Workers harbouring contaminating microorganisms or used to dirty habits.

Equipments designed wrongly or faulty ones with cracks or crevices where soil or foods per boiled can be lodged.



Dirty or contaminated water used for processing

Presence of varnish or pests

## 37 Sources and Control of Food Poisoning Bacteria

Public Health control

Laboratory control

animal stool, coats, hooves

Food stuff (animal origin)

Environment of food preparation

Water for drinking and preparation of food, human-stool, hand

Human, nose throat, hand, skin and lesions animal cow, goat

Food stuffs (diary) milk, cheese, cream

Foodstuff

Food preparation (food and dust), human-stool, animal-stools and dust

Soil and mud

Fish, foodstuff, fish, meat and vegetables

Food stuff (cereals), dust and soil

Salmonella

Rearing methods, Feeding stuffs, Farm hygiene, Slaughter house hygiene

Hygiene of production, Treatment to render safe storage, cleanliness of equipment.

Utensils and surfaces

Treatment by filtration and chlorination, care in handling foods, avoidance of cross-contamination from raw to cooked food, personal hygiene.

Staphylococcus

Care in handling foods, storage of cooked foods, personal hygiene and habits.

Care of mastitis

Hygiene of milk production. Heat treatment of milk intended for drinking and for cream and cheese.

Clostridium welchii

Cooking and cooling, meat and poultry techniques, dehydrated foods.

Storage of cooked food

Environment for cleanliness of equipment and surfaces

Clostridium botulinum

Processing and cooking

Bacillus cereus

Storage after cooking, cleanliness of environment

Diagnostic media for stool samples, swabs, and food.

Bacteriological counts of foods, Biochemical tests, serological and bacteriophage typing.

Diagnostic media for swabs and food, Bacteriological counts on food.

Coagulate test, bacteriological and serological typing.

Enterotoxin production by gel diffusion techniques

Diagnostic media for stool samples and food. Bacteriological counts on food

Cl welchi counts on stools. Serological typing.

Toxin identification

Diagnostic media

Diagnostic media, bacteriological counts on food, serological typing.

## ISO 9000 & TOTAL QUALITY

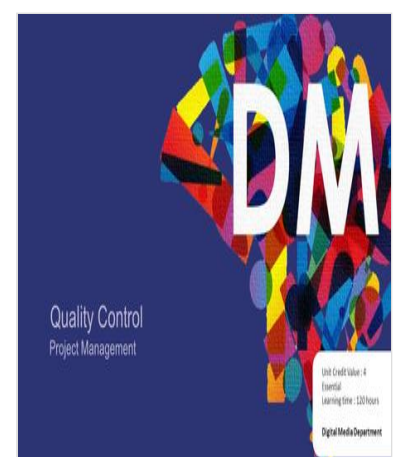
ISO 9000 refers to a group of quality assurance standards established by the International Organization for Standardization. This group, which is made up of representatives from 91 countries, adopted the standards in 1987.

ISO 9000 standards are aimed at quality systems, not at the quality of goods and services. ISO certification means that a company has a detailed, documented approach to achieving consistency of output. It doesn't mean that they can be made as durable as specified, and that the level of defects will be controlled.

1

## Lecture #9 Project Quality Management Quality Processes- Quality Assurance and Quality Control

Ghazala Amin



### 38 The hygienic design of food plant

Basic principles for hygienic design are:

All surfaces in contact with food must be inert to the food under the conditions of use and must not migrate or be absorbed by the food.

All surfaces in contact with food must be smooth and non-porous so that tiny particles of food, bacteria or insect eggs are not caught in microscopic surface crevices and become difficult to dislodge, thus becoming a potential source of contamination.

All surfaces in contact with food must be visible for inspection or the equipment must be readily disassembled for inspection or it must be demonstrated that routine cleaning procedures eliminate the possibility of contamination from microorganisms or insects.

All interior surfaces in contact with food must be so arranged that the equipment is self-emptying or self-draining.

Equipment must be so arranged as to protect the contents from external contamination

The exterior-non-product contact surfaces should be so arranged to prevent harbouring of soils, bacteria or pests in and on the equipment floors, walls or hanging supports.

### 39 Factors of importance in the hygienic design of plant

Materials of Construction: Inert material i.e. Aluminium is the best. Do not use lead, zinc, cadmium because of their contaminating effect on the food stuff.

Surface finish: Smooth and non-porous surface should be used. Do not use wooden surface, porous plastic surface.

Internal Geometry: The equipment/machine should be free from crevices, dead pockets, sharp internal corners, etc. It should be self emptying or draining as stated above.

Flow conditions: Good internal geometry will contribute to good flow conditions. The geometry should be simple and free from any mechanical obstructions. Pumps are the means by which motion or flow is imparted to liquids.

Plant Layout: A flow through principle should be adopted where there is a simple flow of materials from raw materials through preparation and processing to storage, but with the restricted movement of waste and personnel to reduce the risk of gross contamination.

### 40 Cleaning-in-place

Cleaning-in-place (CIP) is regarded as a particular solution to a specific hygiene problem by process design. It is cleaning without dismantling.

Advantages of CIP

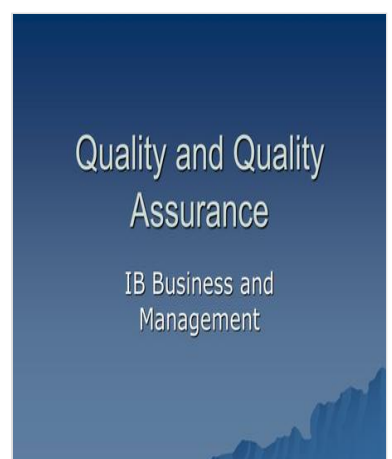
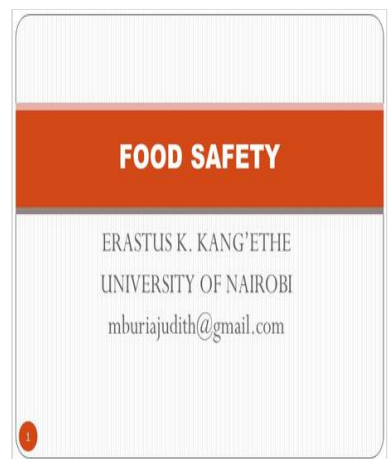
Cost savings – better use of water, detergent

Better plant use – less downtime

Less manual work required – no need to dismantle the plant before cleaning

Greater comfort and safety for operators – no need to crawl into tanks or come into contact with detergents/sterilants

Better hygiene – cleaning schedules followed exactly and consistently.



Less risk of contamination

Disadvantages of CIP

Not suitable for all applications

High capital cost required.

#### **41** CIP Techniques

CIP techniques are capable of achieving the highest standards of hygiene in process plant, equivalent to that obtained by dismantling and cleaning all the pipe work and plant by hand.

Two basic techniques are single-use and re-use systems, which have evolved with time. Latest is multi-use systems.

#### **42** Detergents

Detergents are composed of surface active agents, which are often added to detergent formulations to enhance wetting and penetrating properties.

Surface active agents can be classified as either: (a) Anionic, (b) Cationic or (c) Non-ionic

#### **43** Sterilization

The methods selected for plant sterilizing operations must be kept under rigid bacteriological control. Either heat or chemical sterilants are used.

For heat sterilization, either steam or hot water is used.

The use of saturated steam under pressure is a most effective means of controlling micro-organisms, being excellent for the sterilization of storage tanks, process vessels, pipelines etc. Moisture plays a part in the destruction of micro-organisms by thermal treatment, dry heat being less effective than the heat in steam or hot water.

The most popular groups of chemical sterilants used in the food industry are chlorine compounds and quaternary ammonium compounds.

#### **44** Chemical Sterilizing Agents

Active Agent

Chlorinated trisodium orthophosphate

Dichloridimethyl hydantoin

Sodium dichloro-isocyanate

Sodium hypochlorite

Cetyl trimethyl ammonium bromide

Benzalkonium Chloride

Iodophor

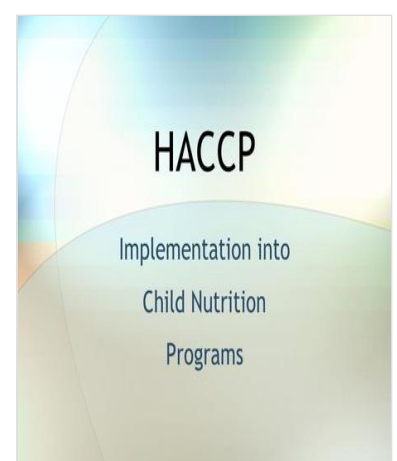
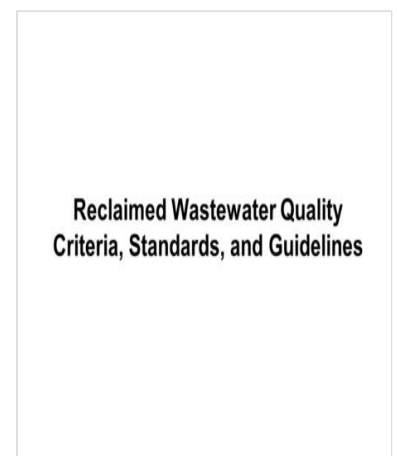
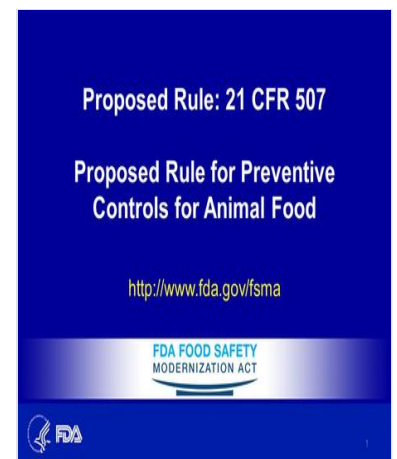
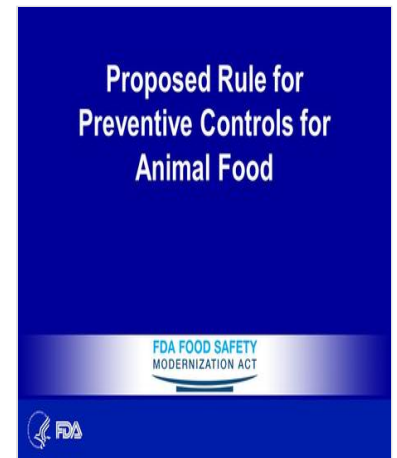
Chlorine

Quaternary ammonium compound

Iodine

#### **45** Principles of Chlorination

The efficiency with which chlorine can attack and destroy organisms is dependent on:



the amount of organic and inorganic pollutants present in the water

the pH, i.e. measure of alkalinity or acidity of the water

temperature of the water

the contact residual time

When chlorine is added to the water it will react with the organic and inorganic pollutants and will be gradually used up. During these reactions organisms are also destroyed. The destroying action however takes time and there is a possibility that before the organisms can be destroyed the pollutants may use up the available chlorine. It is therefore important to ensure that the concentration of free chlorine in the water is sufficient to meet the demands of the pollutants and ensure destruction of the organisms.

#### 46 Waste Disposal

Ideally, the requirements for waste treatment should be fully considered while the factory is at the design stage. The treatment plant becomes an integral part of the overall factory design embracing:

Avoidance of waste as far as possible

Maximum utilization of waste products

Prevention of pollution at the effluent loading expected under maximum production conditions.

#### 47 Need for pretreatment of food waste

Food wastes having high Biological Oxygen demand (B.O.D.) values when discharged to rivers and streams, give rise to pollution.

The high organic content can lead to rapid putrefaction and odour problems, the growth of pathogenic organisms and a diminution in the oxygen content in the water, resulting in damage to aquatic flora and fauna.

Waste materials must be pretreated before being discharge so that organic material undergoes decomposition to a more stable form harmless to subsequent users of the water.

Food waste may be subjected to physical, chemical and biological treatment.

#### 48 Disposal of Waste Solids

Solid waste products also occur in food processing.

These and the sludge resulting from effluent treatment may have commercial value as by-products.

If they have no commercial value their disposal can present considerable problems.

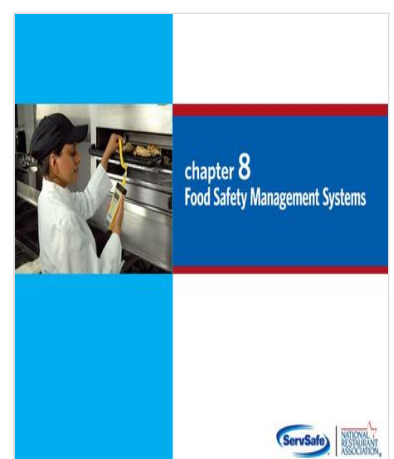
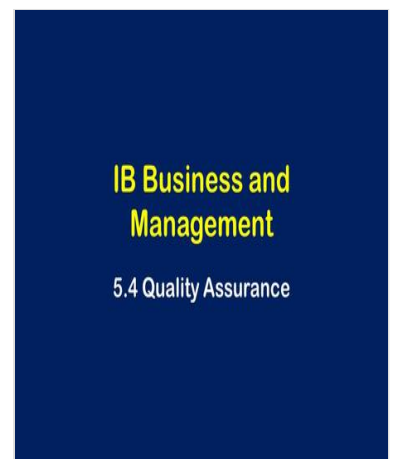
Methods for the ultimate disposal of solid food wastes include dumping in a safe far place, incineration with adequate control of the generated smoke and odours, and composting under controlled conditions.

#### 49 Types of quality cost

Failure cost

Internal failure cost

External failure cost



Prevention cost  
Appraisal cost

## 50 The P-A-F model for quality costing

## 51 Statistical Quality Control

It involves the collection, presentation, analysis and interpretation of data which are generated in the course of quality control activities.

## 52 Importance of Statistical Quality Control in the Food

### Industry

Enable substantial savings of costs due to less scrap, add value to defective products, rescheduling, rework or inspection in ensuring high quality of products.

Enable a good understanding between producers and consumers by establishing common measures of judging product quality.

Enable tighter specification limits and hence improved product claims.

Enable a scientific comparison of products with the competitors.

Enable the adequacy of a machine to be compared with another through statistical quality control i.e. Have evidence of what a process is doing and what is likely to do. Provide an assessment of the quality levels your process is currently capable of meeting, Tell when to look for trouble and when not to, provide clues as to where trouble is likely to occur, Help towards an understanding of the operation of the system and so help in making improvements to the process or product.

The hall mark of statistical quality control is that it optimizes the amount of inspection needed for decision making.

It increases yield (or maintain yield at reduced cost).

Finally, it ensures uniform quality of the product, and helps to insure acceptance of product.

## 53 Fundamental Concept in SQC

Data: There are three main types of data: attributes; countable and continuous data. In Attribute data, each item of data is classified as belonging to one of a number of categories

Countable data arises when each data item is the count of the number of faults, accidents etc., which are two in number.

In continuous data, many variables are measured on a continuous scale such as the hardness of a metal, or of a plastic; the tensile strength of a piece of plastic; the water content in parts per million of a sample of antifreeze; and the weight of a powder packed in a container.

## 54 Control plan


It is a centralized document to keep track of the status of all significant process characteristics.

Variables

Attributes

Provide more information about a product.

United States Department of Agriculture  
Food Safety and Inspection Service



## Overview of Trim Sampling Compliance Guidelines and Discussion

Daniel Engeljohn, PhD  
Office of Policy and Program Development

## PLANT LAYOUT

## Awareness Training: 'HARPC' for Food Safety

Complimentary Presentation by  
Quality Systems Enhancement  
1790 Wood Stock Road  
Roswell GA-30075  
E. mail: [info@enhancequality.com](mailto:info@enhancequality.com)  
[www.enhancequality.com](http://www.enhancequality.com)  
Phone: 770-518-9967  
Fax: 770-518-9968



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## SYSTEMS CONCEPT

- Adopting a materials handling systems from overall optimization point of view.
- It means that it is not necessary to buy the latest materials handling equipment.
- Materials handling engineer must put all the elements of the system together to see whether it is profitable for the enterprise.
- Must analyze to ensure the objective of least total cost of handling.
- Must have basic criteria for selecting a handling system of adequate monetary pay back, if all other things are equal.

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Results are more reliable since they are measured objectively by equipment

Provide less information.

Results are less reliable because of subjective method of measurement e.g. human judgement.

## 56 SAMPLING AND INSPECTION

Acceptance sampling and inspection

Inspect a smaller no. of items in the lot which will form the basis for acceptance or rejection.

Advantages of sampling

lower costs

fewer inspection staff needed

less risk of handling damage

less time

less monitoring and hence less risk of errors

Disadvantage of sampling

- risk of wrong decision about the lot

## 57 Types of Sampling

Sampling by Attributes Items are classified as defectives or non-defectives according to one or more characteristics. Based on the no. of defectives found in the sample (or samples), the decision to accept or reject the lot is made. Degree of defectiveness is not taken into account. Therefore sampling by attributes can be applied to measurable and non-measurable characteristics.

Sampling by variables

Necessary to have measurements on the characteristics measured. A statistical treatment will show whether the lot should be accepted.

Terms associated with sampling

## 58 Inspections inspection by attributes:

classification of a unit of product either as acceptable or unacceptable inspection by variables.

Actual values obtained in terms of some scale used to establish a level of quality. Only one characteristic can be evaluated at a time. A separate plan is needed for each quality characteristic.

## 59 Types of inspection

Types of inspection based on degree of risk that buyer is willing to assume in sampling inspection

Normal

Tightened – use when buyer wants to minimize his risk.

Tightened inspection – larger sample, hence a reduction in sample error

Disadvantage – higher costs are involved

Reduced inspection – use when there is a lot of confidence in the supplier (based on past experience), a smaller sample size would be used.

Character of the lot

WORKSHOP ON ACCREDITATION OF BODIES CERTIFYING MEDICAL DEVICES

INT MARKET 56458

TOPIC 9 CH 8 ISO 13485

MEASUREMENT, ANALYSIS AND IMPROVEMENT  
INTERNAL AUDITS

Philippe Bauwin  
Medical devices expert  
Belgium



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Bulk lot – units of the product are not packaged in any way  
Sub-lots – subdivisions of the lot in pallets, crates, cartons, etc.

## **60** Types of sampling plans

Single

One sample is taken from the lot. The decision to reject or accept the lot is made based on the inspection results of that sample.

$N$  – lot,  $n$  – sample size,  $C$  – acceptance number

## **61** Double Sampling

On the initial sample, a decision based on inspection results is made whether to (1) accept (2) reject or (3) take another sample

If 2nd sample is required, the result of inspections of the 1st and 2nd samples are used to reject or accept the lot.

$N$  = lot size

$n_1$  = sample size of 1st sample

$C_1$  acceptance no. of first sample

$r_1$  rejection no of the 1st sample

$n_2$  sample size of the second

$C_2$  acceptance no of 2nd

$r_2$  rejection no. of 2nd

Values are not given for  $r_1$  and  $r_2$  they are taken as  $C_2 + 1$

## **62** Factors influencing choice of sampling procedure

purpose of the inspection

nature of raw material to be tested

nature of testing methods

nature of the lots being sampled

## **63** Advantages of Sampling

economical, due to fewer inspections (inspectors) and less handling damage

good for use with destructive tests

provides for the rejection of entire lots rather than returning non-conforming units. This gives a motivation for improvement

upgrades the inspection job from monotonous piece by piece decisions to lot by lot decisions

## **64** Disadvantages of Sampling

risks of rejecting conforming lots and accepting non-conforming lots

more time and effort is required for planning and documentation

may not provide enough information about the product

no assurance that the entire lot conforms to specifications

## **65** Control Charts



Is a statistical device primarily used to study and control repetitive processes such as specification, production and inspection in the food industry.

#### Advantages of Control Charts

It helps managers to ask useful questions that lead to better process control.

It discourages useless questions that often lead to wasted effort and increased cost.

It is used to distinguish between common causes of variation and real change.

It helps in advising people to accept common/random cause variation in their processes and act on assignable causes.

#### **66 UCLX = X + A2R (Upper control limit for X)**

LCLX = X - A2R (Lower control limit for X)

UCLR = D4R (Upper control limit for R)

LCLR = D3R (Lower control limit for R)

#### **68 Recommended reading**

Kress-Rogers, E, Instrumentation and Sensors for the Food Industry.

Butterworth-Heinemann Ltd., Linacre-House, Jordan Hill, Oxford, London

Juran, J. M. Quality Control Handbook. Mc Graw-Hill Inc. New York, 1988.

Herschdoerfer, S. M. (3d.) Quality Control in the Food Industry. Vol. 1.

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Sanni, L. O. (2006) Quality Assurance System in the Food Industry.

Jedidiah Publishers, Abeokuta. ISBN , 188 pp. 2nd edition.

...and lots of others in the University Library and Internet.

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#### Similar presentations

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## Hazard Analysis Critical Control Point (HACCP)



HACCP is a system which looks for and prevents potential problems before they happen.

HACCP may be used by food companies to make sure they do not break the law by putting consumers at risk when producing food. It is a structured approach to risk assessment and is one means of satisfying the risk assessment requirement of UK hygiene legislation. It enables manufacturers to prove 'due diligence' if taken to court on food safety matters.

HACCP is a system designed to break a process down in order to identify any possible hazards (physical, chemical or micro-biological). The potential hazards are then rated according to whether they are low, medium or high risk and controls are put in place to prevent the hazard occurring.

The whole system is monitored. Critical Control Points (CCP's) are identified. At these points, some preventative action must be taken, e.g. a temperature check, and details of monitoring and corrective action stated.

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## BSB3503 - Biomanufacturing CHAPTER 8 Hazard Analysis Critical Control Point (HACCP)

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## Hazard Analysis Critical Control Point (HACCP)

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## Quality Control Procedures & Raw Materials

- Raw materials are the tools, equipment, supplies, goods and services that a company requires to do business on a daily basis.
- What are some raw materials you use in your trade?
- Is it important for you to have quality raw materials? Why?

## Hazard Analysis Critical Control Point (HACCP)

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## Food Production Systems

ERT 426 Food Engineering  
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A Road Map to Food Safety

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2018

## Chapter 4: Food Hazard Analysis

By:  
Pn Siti Hajar binti Zakariah

## GMP Programs

for Food Safety Management Systems  
Certification

SQF  
ISO  
FSSC

## Chapter 2

### Prerequisite Programs

Seafood HACCP Alliance for Training and Education

## HACCP

- HAZARD
- ANALYSIS
- CRITICAL
- CONTROL
- POINTS

1 December 2018

## HACCP HAZARD ANALYSIS CRITICAL CONTROL POINTS

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