GMP TRAINER’S MANUAL

Introduction

The GMP training introduces the participants to the basic principles of food safety, hygiene and sanitation. It discusses the food safety hazards and how to adequately control them. This GMP course lays the foundation where the other food safety management systems build upon.

The training is designed for individuals of all levels within a food manufacturing organization. QA, QC, production as well as Regulatory Affairs and general management positions will be able to better understand the issues at stake as per GMP requirements.

The course materials comprise of this Trainer’s Manual and the Trainees Handouts.

This Trainer’s Manual consists of the following items:

- Presentation slides, trainer’s review notes and suggested readings as needed.
- Worksheets and workshop discussion
- Quiz per session

The objective of the trainer’s manual is to guide the trainers in the preparation, discussion and delivery of each session.

In most sessions, there are trainer’s tips and suggested readings to prepare the trainer on the subject matter.

For the workshops, the specific worksheets consist of instructions and templates, as applicable. Discussion of the workshop outputs are done after every workshop and relate learnings with the objective(s) of the workshop.

The training programmes have been prepared to allow the would-be trainers and would-be food practitioners the knowledge on GMP. However, it is essential that the would-be trainer has sufficient first-hand experience of the food manufacturing to be able to provide examples and case studies, both during the presentations and in the group sessions. It is also important that local issues are considered throughout the course.

To test the understanding on the completed sessions, quiz may be given by the trainer. Suggested quiz questionnaires and answer keys are provided per session.
Learning Objectives

At the end of the training, participants are expected to:

- Have knowledge on the basic principles of food safety, hygiene and sanitation
- Have knowledge on food microbiology
- Know the characteristics and growth requirements of the different types of microorganisms implicated in foodborne illness outbreaks
- Know the requirements of GMP and how to document and how to implement
- Know how to prepare internal GMP audit checklists
- Learn how to conduct GMP training

Target Audience

Food sector
- Food handlers
- Owners
- Managers
- Supervisors
- Trainers
- Students
**ACRONYMS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>A&lt;sub&gt;w&lt;/sub&gt;</td>
<td>Water Activity</td>
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<tr>
<td>BFAD (now FDA)</td>
<td>Bureau of Food and Drug (Food and Drug Administration)</td>
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<tr>
<td>CAC</td>
<td>Codex Alimentarius Commission</td>
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<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<td>cGMP</td>
<td>Current Good Manufacturing Practices</td>
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<td>EPA</td>
<td>Environmental Protection Agency</td>
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<td>EC</td>
<td>European Community</td>
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<td>EU</td>
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<td>Eurep G.A.P</td>
<td>Euro-Retailer Produce Working Group (EUREP) Good Agricultural Practices</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<td>FATTOM</td>
<td>Food, Acidity, Temperature, Time, Oxygen, Moisture</td>
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<td>FDA</td>
<td>Food and Drug Administration</td>
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<td>FDC</td>
<td>Food, Drug and Cosmetic</td>
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<td>FSIS</td>
<td>Food safety and Inspection Service</td>
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<td>FSMS</td>
<td>Food Safety Management System</td>
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<td>GFSI</td>
<td>Global Food Safety Initiative</td>
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<td>Global G.A.P.</td>
<td>Global Good Agricultural Practices</td>
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<td>GLP</td>
<td>Good Laboratory Practices</td>
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<td>GMP</td>
<td>Good Manufacturing Practices</td>
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<td>GRAS</td>
<td>Generally Recognized As Safe</td>
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<td>HACCP</td>
<td>Hazard Analysis Critical Control Point</td>
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<td>ISO</td>
<td>International Organization for Standardization</td>
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<td>PAS</td>
<td>Publicly Available Standard</td>
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<td>PPE</td>
<td>Personnel Protective Equipment</td>
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<td>PRP</td>
<td>Prerequisite Program</td>
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<td>SQF</td>
<td>Safe Quality Food</td>
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<td>SOP</td>
<td>Standard Operating Procedure</td>
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<td>SSOP</td>
<td>Sanitation Standard Operating Procedure</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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Introduction

Globalization brings an array of food selection from the supermarket shelves to our plates. It also raises public concern over food safety scares. Whenever we select and consume food, we expect it to be safe to eat. This expectation and consumer demand place important responsibilities on the people who work with food. It is thus of prime importance for the food workers to know how to protect the food from hazards that might cause injury or illness to the consumers.

This GMP course introduces the participants to the basic principles of food safety, hygiene and sanitation. It discusses the food safety hazards and how to adequately control them. This course lays the foundation where the other food safety management systems build upon.

GMP Course Outline

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Timing and Activities</th>
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<tbody>
<tr>
<td>Session 1</td>
<td>Introduction to Food Safety</td>
<td>Lecture: 15 min</td>
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<tr>
<td></td>
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<td>Workshop 1: 1 hour Presentation and discussion (depends on the number of teams): 1 hr</td>
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<tr>
<td>Session 2</td>
<td>Food Safety Hazards and Control Measures</td>
<td>Lecture:</td>
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<td></td>
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<td>Activity: Workshop 1: Food Safety Hazards</td>
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<td>Time: 30 min</td>
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<tr>
<td>Session 3</td>
<td>Introduction to Food Safety Frameworks Relating to GMP</td>
<td>Lecture: 10 min</td>
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<td></td>
<td>(Prerequisite Program - PRP)</td>
<td>Discussion: 20 min</td>
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<td>Quiz: 10 min</td>
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<td>Session 4</td>
<td>GMP: Introduction</td>
<td>Lecture: 10 min</td>
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<td>Discussion: 20 min</td>
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<td>Quiz: 10 min</td>
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<td>Session 5</td>
<td>Primary Production</td>
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<td>Discussion: 30 min</td>
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<td>Quiz: 10 min</td>
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<tr>
<td>Session 6</td>
<td>Establishment: Design and Facilities</td>
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<td>Activity: Workshop 2</td>
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<td>Control of Operation</td>
<td>Activity: Workshop 3: Flow Diagram and Plant Schematic</td>
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<td>Presentation: 1 hr</td>
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<td>Discussion: 1 hr</td>
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<td>Timing will depend on the number of teams</td>
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<td>Quiz: 10 min</td>
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<tr>
<td>Session 8</td>
<td>Establishment: Maintenance and Sanitation</td>
<td>Time: 30 min</td>
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<td>Workshops 4 and 5 Time: 30 min (simultaneously done by 2 groups)</td>
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<td></td>
<td>Presentation and Discussion: 30 min</td>
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<td>Session 9</td>
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<td>Quiz: 10 min</td>
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<tr>
<td>Session 11</td>
<td>Product Information and Consumer Awareness</td>
<td>Time: 10 min</td>
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<td>Discussion: 30 min</td>
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<td>Training</td>
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<td>Quiz: 10 min</td>
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<td>Session 14</td>
<td>Open Forum</td>
<td>Sharing: 1 hr</td>
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<td>Q &amp; A Portion: 1 hr</td>
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<td>Course Evaluation: 10 min</td>
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Session 1: Introduction to Food Safety

Time: 15 minutes

Learning objectives:

By the end of the session participants should be able to:

- State the benefits of associated with effective food safety management
- Cite some cases of foodborne illness and their causes
- State the types of foodborne illness
- State the contributors to foodborne illness

Refer to Slides # 8 to 20.

Review Notes:

Foodborne illness is the sickness that some people experience when they eat contaminated food. It impairs performance, causes discomfort and sometimes, results to death. Estimates of the number of cases of foodborne illnesses vary. Reported figures may be less than the actual due to several unreported cases.

Outbreaks of foodborne illness had been in the headlines in recent years. Cases of foodborne illness have increased dramatically. Reasons that have been suggested include:

- increased consumption of ready-to-eat foods;
- identification of new foodborne diseases;
- more people eating outside the home;
- changes in menu trends and choices such as exotic foods e.g. sushi, rare or raw meats;
- seasonal variation such as after typhoons or during summer months

In the U.S., the Centers for Disease Control and Prevention (CDC) is the federal agency that is responsible for protecting public health through the prevention and control of diseases. The CDC supports foodborne disease investigation and prepares annual summaries and statistics on outbreaks of foodborne diseases including all those transmitted through food and water.
Quiz 1.

1. Which of the following can be considered as benefit of food safety?
   a. Happy customers
   b. Good reputation
   c. Profit
   d. All of the above
   e. None of the above

2. Cost impact of lack of food safety
   a. Happy customers
   b. Legal fees
   c. Business closure
   d. All of the above
   e. b & c

3. Foodborne illness is
   a. Not important
   b. Caused by microorganisms only
   c. Food infection and food intoxication
   d. All of the above
   e. None of the above

4. Food intoxication is caused by:
   a. Ingesting microorganisms
   b. Ingesting toxins produced by microorganisms
   c. Salmonella and Clostridium toxins
   d. None of the above
   e. a, b & c

5. Food infection is caused by:
   a. Ingesting disease-causing microorganisms
   b. Handwashing
   c. Microbial toxins
   d. All of the above
   e. None of the above
Discussion Points:

1. Ask the students to share knowledge on foodborne illnesses and share the foodborne illness outbreaks that they know or have experienced

2. How can we control foodborne illness as producer, as teacher, as consumer?

Emphasize that foodborne illnesses are preventable and that every stakeholder has a significant role in preventing foodborne illnesses.

Suggested Readings:

- ISO 22000: 2005 Food safety management system
- www.fda.gov/fsma
- Drexler, J. M. 2011. Schuster Institute for Investigative Journalism at Brandeis University, Watthan, MA.
- http://spatterson3.blogs.plymouth.edu/2012/11/26/how-safe-is-your-food..
- www.foodsafetynews.com
Session 2: Food Safety Hazards and Control Measures

Learning objectives:

By the end of the session, the participants should be able to:

- Know the definition of food safety hazards
- Cite examples of biological food safety hazards, their sources and their control
- Explain FATTOM.
- Cite examples of chemical food safety hazards, their sources and their control
- Know the examples of food allergens
- Cite examples of physical food safety hazards, their sources and their control

Refer to Slides # 21 to 74

Review Notes:

Biological hazards represent 93% of the incidences of foodborne illness.

Food Safety Hazards

Food safety hazard is a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect. Among the food safety hazards, biological hazards are by far the most important foodborne hazard in any type of food establishment. They cause most foodborne illnesses and are the primary target of a food safety program.

Foodborne illness

Microorganisms can cause a variety of effects in food products including spoilage, which primarily affects product quality, and food poisoning, which is generally caused by pathogens.

Foodborne infection - an illness caused by eating food contaminated by living organisms that multiply in the body.

Foodborne intoxication – an illness caused by eating contaminated with toxins produced by microorganisms, plants fish or chemicals.

Toxin-mediated infection – an illness caused by eating food contaminated by living microorganisms that produce toxins, including endotoxins, when they are inside the human body.

Different diseases have many different symptoms. However, the microbe or toxin enters the body through the gastrointestinal tract, and often causes the first clinical signs such as nausea, vomiting, abdominal cramps and diarrhea which are common symptoms in many foodborne diseases.

More than 250 different foodborne diseases have been described. Most of these diseases are infections, caused by a variety of bacteria, viruses, and parasites. Other diseases are poisonings, caused by harmful toxins or chemicals that have contaminated the food, for example, poisonous mushrooms or heavy metal contamination.
FATTOM - Parameters affecting the growth of microorganisms

Nutrient content (Food)

In order to grow and function normally, the microorganisms of concern in the food industry require water, source of energy, source of nitrogen, vitamins and related growth factors, and minerals. High protein foods, such as meat, meat products, poultry, eggs, milk and milk products and seafood, provide nourishment to microorganisms. Growth is repressed by high concentration of salt, sugar, acid or fat.

pH (Acidity/Alkalinity)

It has been well established that most microorganisms grow best at pH values around 7.0 (6.6 – 7.5), whereas few grow below a pH of 4.0. Bacteria tend to be more fastidious (complex nutritional or cultural requirements for growth) in their relationships to pH than molds and yeasts, with the pathogenic bacteria being the most fastidious. Meats and milk have a final pH of about 5.6 and above; this makes these products susceptible to bacteria as well as to mold and yeast spoilage.

Time

Bacteria need time and the right conditions to be able to multiply. Under optimal conditions, bacteria can divide in every 10 to 20 minutes by the process of binary fission.

Temperature

Bacteria multiply rapidly at temperatures between 41°F (5°C) and about 140°F (60°C), the range known as the danger zone. Bacteria multiply more slowly if it is cold and they become dormant in very cold conditions. At temperatures above 145°F (62.3°C) most pathogenic bacteria die, or create spores if they are spore-forming types.

Oxidation-reduction potential (Oxygen)

Microorganisms display varying degrees of sensitivity to the oxidation-reduction potential (O/R) of their growth medium for environment. Aerobic microorganisms require more oxidized environments (more oxygen) versus anaerobic organisms which require more reduced environments (lacking oxygen).

Most bacteria require oxygen to grow but some can multiply in low levels of oxygen or do not need oxygen at all. According to oxygen requirements, bacteria can be classified as:

- obligate aerobes need oxygen e.g. Bacillus cereus
- obligate anaerobes grow without oxygen and tend to cause problems in canning e.g. Clostridium botulinum
- facultative anaerobes grow with or without oxygen e.g. Salmonella spp and Staphylococcus aureus

Moisture content (water activity, Aw)

One of the oldest methods of preserving foods is drying or desiccation. The preservation of foods by drying is a direct consequence of removal or binding of moisture, without which microorganisms do not grow. It is now generally accepted that the water requirements of microorganisms should be described in terms of water activity (aw) in the environment. Basically, the water molecules are loosely oriented in pure liquid water and can easily rearrange. When a solute is added (like salt) to water, the water molecules orient themselves on the surface of the solute, in this case the Na+ and Cl- ions, and the properties of the solution change dramatically. Therefore, the microbial cell must compete with solute molecules for free water molecules. The water activity of pure water is 1.00; the addition of solute decreases aw to less than 1.00. Most foodborne pathogenic bacteria require aw greater than 0.9, however, Staphylococcus aureus may grow in Aw as low as 0.86.
Activity: Workshop 1: Food Safety Hazards

Time: 30 min. Resources Needed: Flip Charts/manila paper/A0 paper, markers, masking tape

Workshop 1.

Workshop objectives:

1. To train participants how to evaluate their operations and be able to identify possible food safety hazards

2. For the participants to suggest ways of controlling the identified food safety hazards in their operations

Workshop procedure:

Assign different products per team according to the products that are important to them such as their own products or any major product of interest in the area.

Trainer needs to review and comment on the workshop outputs per group. Emphasize that knowledge of the raw materials, process and finished product specifications relating to food safety is very important during hazard analysis. If they know the hazards, they can establish control measures to address the hazards.

1. Group the participants into 3 groups and have each group prepare a list of chemical, physical and microbiological hazards that may be associated with identified products.

2. Identify source and control measures that may reduce or eliminate these hazard

3. Use the template for Workshop 1

Time limit: 30 minutes

Each group will report its findings using flipcharts.

Workshop 1: Food Safety Hazards

<table>
<thead>
<tr>
<th>Biological/Chemical/Physical Hazards</th>
<th>Source(s)</th>
<th>Control Measure (s)</th>
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</table>
Quiz 2.

1. Bacteria need this to grow and multiply:
   a. Food or nutrients, acidity, temperature, time, oxygen, moisture
   b. Food, amino acids, and vitamins only
   c. Host
   d. Proper temperature only
   e. None of the above

2. Food safety hazards:
   a. Biochemical, chemical, physical hazards
   b. Biological, chemical, physical
   c. Allergens only
   d. Wood and glass only
   e. None of the above

3. Examples of food allergens
   a. Fruits
   b. Eggs and egg products
   c. Wheat and wheat products
   d. Vegetables
   e. b & c

4. Sources of physical hazards
   a. Containers
   b. Pallets
   c. Equipment
   d. Workers
   e. All of the above

5. Examples of biological hazards
   a. Salmonella
   b. Parasites
   c. Viruses
   d. All of the above
   e. Aflatoxin
Suggested Readings:


- Codex General Standards for the labelling of Prepackaged Foods, Section 4.2.1.4 Codex Stan – I 1985 as amended


- Food Standards Agency. 2005. Draft Guidance on all allergen control and consumer information

Session 3: Introduction to food safety frameworks relating to GMP (PRP)

Time: 10 min

Learning objectives:

By the end of this session, the participants should be able to:

- Know the objectives and functions of prerequisite programs (PRP)
- State the various food safety standards available
- State the main purpose of food safety regulation
- Give examples of food safety regulations
- Cite applicable Cambodian food safety regulations

Refer to Slides #75 to 98

Review Notes:

Difference between Statutory and Regulatory Requirements

Statutory Requirements are the body of laws created by legislative statutes. Statutory refers to laws passed by national government, e.g. Regulation (EC) 178/2002, PD 856, Republic Act No. 9003. The national and local regulatory agencies that are responsible for enforcing food and safety requirements are usually under the departments of health, environment, and agriculture. Statutory requirements are legally mandated requirements that must be compiled with by the organization to which it applies.

Regulatory means a rule issued by an agency that the government has given authority to regulate an industry. Examples: A.O.153 issued by Philippine FDA, Discharge Permit issued by LLDA. “Regulatory" is limited by an authoritative group e.g. the EPA saying you can only allow a certain amount of emissions to escape the workplace.
US Food Laws

Federal Food, Drug and Cosmetic (FD & C) Act
The FDA administers the federal Food, Drug and Cosmetic Act\textsuperscript{22} which was originally passed by Congress in 1938 to ensure that foods are safe, pure, wholesome, and produced under sanitary conditions. Several amendments have been added to the law since then. Among them are Miler Pesticide Amendment of 1954, the Food Additives Amendment of 1958 and the Color Additives Amendment of 1960.

The Miller Pesticide Amendment \textsuperscript{23} establishes a procedure for the setting of safe amounts (tolerances) for residues of pesticides which may remain on fresh fruits, vegetables, and other raw agricultural commodities when shipped in interstate commerce.

The 1958 Food Additives Amendment has a 2-fold purpose: (1). To protect the public health by requiring proof of safety before substance may be added to food; and (2) to advance food technology and improve the food supply by permitting the use of substances which are safe at the levels of intended use. Currently there’s a list of over 3,000 approved food additives. Excluded are those food additives which have been designated as GRAS, generally recognized as safe substances.

Federal Meat Inspection Act
The Federal Meat Inspection Act provides for the mandatory inspection of animals, slaughtering conditions, and meat processing facilities. Such products are stamped “U.S. inspected and passed by Department of Agriculture.” The stamp is necessary for interstate and imported goods. This law is enforced by Food safety Inspection Service (FSIS) of the Department of Agriculture.

Federal Poultry Products Inspection Act
This law provides for the mandatory inspection of poultry, slaughtering conditions, and poultry processing facilities.

Egg Products Inspection Act
FSIS inspects facilities that process egg products. These are facilities that break, pasteurize, freeze dry, and package egg products. The Egg Products Inspection Act also authorizes FSIS to provide a surveillance program to help ensure that eggs still in the shell and that are fit for human consumption.

Nutrition Labelling and Education Act
The USDA and FDA share responsibility by enforcing the Nutrition and Education Labelling Act. This law provides information on specific nutritional guidelines and defines what needs to be on the nutrition label. This helps consumers make informed choices when selecting foods.
Primary Food Safety Legislation in Europe

Regulation (EC) 178/2002

Regulation (EC) 178/2002 of the European Parliament sets out the basic framework for food and feed law within the European Community. The following sets out the general food and feed law requirements, as outlined by this regulation:

- Article 14 sets out “food safety requirements”
- Article 15 sets out “feed safety requirements “
- Article 16 makes general provision in respect to presentation of food and feed, which should not mislead consumers
- Article 17 imposes general responsibilities. Food and feed business, operators must ensure that foods and feeds satisfy food law and check that all legal requirements are met. Member States must maintain s system of official controls and ensure that the requirements of food law are being fulfilled.
- Article 18 makes provisions for the traceability of food, feed and food-producing animals
- Article 19 sets out further responsibilities of food business operators regarding withdrawal of food which does not comply with food safety requirements or which is believed to be injurious to human health.
- Article 20 sets out similar responsibilities of feed business operators.

In Europe the three basic food hygiene regulations are:

- Regulation (EC) 852/2004 on the hygiene of foodstuffs
- Regulation (EC) 853/2004 laying down specific hygiene rules for food and animal origin

Discussion Points:

1. Ask the participants especially the manufacturers the permits and licenses required in their operation and their products.

2. What are their regulated raw materials and products?

Emphasize the need for compliance to legal and regulatory requirements locally and those of the export customers. There should be a system to monitor compliance.
Quiz 3.

1. Example of regulatory standards
   a. Permit to Operate or License to Operate
   b. Workers Health Certificate
   c. Product Registration
   d. All of the above
   e. None of the above

2. Government agencies involve in food safety regulation in Cambodia
   a. Ministry of Health
   b. Ministry of Commerce
   c. Ministry of Industry and Handicraft
   d. All of the above
   e. None of the above

3. When exporting,
   a. The exporting company should know the food safety regulations and requirements of the exporting country
   b. The exporting company should know the food safety regulations and statutory requirements of the importing and exporting country
   c. The exporting company should know the food safety regulations and requirements of the importing country
   d. Only a is correct
   e. None of the above

4. What are the food safety frameworks that are applicable to food manufacturers?
   a. HACCP
   b. ISO 22000
   c. FSSC 22000
   d. GMP
   e. All of the above

5. Who in the organization should know the food safety regulations and statutory requirements?
   a. HACCP team only
   b. HACCP Team, Top Management and key employees
   c. Employees only
   d. Consultant
   e. c and d

Suggested Readings:

Session 4: GMP: Introduction

Time: 10 min

Learning objectives:

By the end of this session, the participants should:

- Know what GMP is
- Know the functions of prerequisite programs (PRP)
- Be clear on food safety terms and definitions

Refer to Slides # 99 to 110

Review Notes:

Good Manufacturing Practices (GMP) is a collection of generally recognized rules, procedures and practices that provide a code stating what is acceptable and what is not acceptable in the food industry to ensure production of quality and safe foods.

Companies usually develop procedures and are usually termed SOP or Standard Operating Procedures.

Per Codex Alimentarius, the following are the scope of GMP/GHP:

- Primary Production
- Design and Facilities
- Control of Operation
- Maintenance and Sanitation
- Personal Hygiene
- Transportation
- Product Information and Consumer Awareness
- Training

In food safety management systems such as HACCP and ISO 22000, GMP is one of the prerequisite programs. PRP are food safety basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end products and safe food for human consumption.

The PRPs depend on the segment of the food chain in which the organization operates and the type of organization.

PAS (Publicly Available Specification) focuses on the prerequisite program (PRP) elements & sets out detailed requirements similar to GMP. The organization is required to pass each element within an FSSC 22000:2010 audit. There are specific PAS standards that are applicable to specific sectors of the food chain:

ISO/TS 22002-1 (formerly Pas 220) - Applicable to food manufacturers

PAS 223:2011 - Applicable to food packaging manufacturers

PAS 221:2013 - Applicable to food retailers
Discussion Points:

1. What are the important and basic food safety standards?
2. Why are these standards important?
3. What are their existing procedures, guidelines and policies in connection with GMP requirements? Give examples.
4. Do you know of companies that are implementing GMP?

Emphasize the importance of establishing GMP procedures in a food establishment in maintaining hygiene and sanitation. These are basic requirements to ensure hygienic operations in the manufacture, handling and storage of food products.

Emphasize globalization and the need to comply to compete.
Quiz 4.

1. Coverage of GMP
   a. Pest Control
   b. Hygiene and sanitation
   c. Training
   d. Cleaning and Sanitation
   e. All of the above

2. Standard applicable to food packaging operations
   a. ISO 22000
   b. ISO/TS 22002-1
   c. PAS 223
   d. All of the above
   e. a & c

3. Which of the following standard is a prerequisite program of HACCP and ISO 22000?
   a. 5S
   b. Lean manufacturing
   c. GMP
   d. ISO 9001
   e. None of the above

4. Which of the following standard is applicable to the members of the food chain?
   a. ISO 22000
   b. FSSC 22000
   c. GMP
   d. HACCP
   e. All of the above

5. Who should know about the food safety standards’ requirements in varying extent?
   a. Employees only
   b. Top management only
   c. HACCP Team only
   d. HACCP Team leader only
   e. All of the above
Suggested Readings:

- www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodCode/FoodCode2005/index.htm
- Food Development Center. 2009. Requirements for Good Manufacturing Practice in the Handling and Processing of Foods.
- Chartered Institute of Environmental Health. 2000. Food safety management
- Codex Alimentarius 2003. Recommended International code of practice- General principles of food hygiene
- www.fda.gov.ph
Session 5: Primary Production

Time: 10 min

Learning objectives:

By the end of this session, the participants should be able to:

- State the requirements for environmental hygiene in primary production
- State the requirements for hygienic production of food sources
- State the requirements for handling, storage and transport
- State the cleaning, maintenance and personal hygiene requirements in primary production

Refer to Slides # 111 to 117

Primary Production objectives:

- Avoid the use of areas where the environment poses a threat to the safety of food;
- Control contaminants, pests and diseases of animals and plants in such a way as not to pose a threat to food safety
- Adopt practices and measures to ensure food is produced under appropriately hygienic conditions

Discussion Points:

1. Give examples of primary producers
2. What is the importance of GMP in primary production?
3. Give examples of hazards associated with primary products?

Emphasize that there are food safety hazards that can originate from primary products. In vegetable and fruit production – e.g. GMO issue, pesticide residue, aflatoxin, biological hazards coming from soil. In animal production – dioxin, antibiotic residues, GMO issue, Salmonella, etc… In marine sector- virus, histamine, inherent toxins in seafoods, among others.

Emphasize that if there are no tests results or COA coming from primary producers, it is the responsibility of the next user such as the feed producers, chicken dressing plants, food manufacturers to have the raw materials coming from primary producers to have them tested for contents of the identified hazards.
Quiz 5.

1. Examples of food safety hazards for fruits and vegetables:
   a. Salmonella
   b. Pesticide residue
   c. Aflatoxin
   d. Antibiotic residues
   e. a, b and c

2. Examples of food safety hazards in fresh marine products
   a. Dioxine
   b. Aflatoxin
   c. Molds
   d. Viruses and bacteria
   e. A and d

3. Examples of food safety hazards in animal products
   a. Bacteria and viruses
   b. Antibiotic residues
   c. Pesticide residues
   d. Growth hormone residues
   e. a, b & d

4. Not a requirements for primary production
   a. Hygiene and sanitation
   b. Site selection
   c. Laboratory gown for field workers
   d. Training
   e. Proper Waste disposal

5. Primary producers are considered _____ to food manufacturers
   a. Third party
   b. Suppliers
   c. No relationship
   d. Customers
   e. None of the above
Session 6: Establishment: Design and Facilities

Time: 15 min

Learning objectives:

By the end of this session, the participants should be able to:

- Know the requirements of location
- State the requirements of premises and rooms
- State the requirements of equipment
- State the requirements of facilities

Refer to Slides # 118 to 150

Workshop 2. Preventive Maintenance (PM) and Calibration of Equipment

Activity: Workshop 2

Time: 20 min

Resources Needed: Flip Charts/manila paper/A0 paper, markers, masking tape

Objective of the workshop:

- To give an idea to the participants to think of the process environment and equipment and how this can be maintained
- To let the participants understand the need for calibrated equipment and instruments in monitoring quality and food safety parameters

Trainer needs to review and comment on the workshop outputs per group.
Workshop procedure

1. Group the participants into 2 teams
   Group 1 – PM Program of Equipment and Food Manufacturing Facility
   Group 2 – Master Calibration Program of Equipment

2. List all the items in the food manufacturing operations that require PM and Calibration

   Time: 15 min
   Resources Needed: Flip Charts/manila paper/A0 paper, markers, masking tape

Preventive Maintenance Program

<table>
<thead>
<tr>
<th>Area/Location</th>
<th>Item/Equipment</th>
<th>Frequency and Schedule</th>
<th>Internal Responsibility</th>
<th>External Responsibility</th>
<th>Records</th>
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Calibration Program

<table>
<thead>
<tr>
<th>Area/Location</th>
<th>Item/Equipment to be Maintained</th>
<th>Frequency and Schedule</th>
<th>Internal</th>
<th>External</th>
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Quiz 6.

1. Coving is:
   a. Curved sealed edge between the floor and the wall that eliminates sharp corners to make cleaning easier
   b. Anti-slip floor covering used to protect workers from slips and falls
   c. Plastic material used to seal cracks and crevices under and around equipment in a food establishment
   d. Device used to prevent back siphonage
   e. None of the above

2. Zoning can be done by the following:
   a. Color coding of uniform
   b. Washing hands
   c. Using rodenticide
   d. Putting plastic curtain
   e. None of the above

3. Water is potable when:
   a. it is supplied by municipal waters
   b. when it is filtered
   c. when its test results are in accordance to WHO standards for Drinking Water
   d. when it is clear
   e. all of the above

4. This is not required in design and layout of the food establishment:
   a. choice of proper materials for walls, floors and ceilings
   b. utilities
   c. equipment location
   d. chandeliers as lighting fixtures
   e. cleanable and maintainable

5. Food establishment should be located in
   a. Environmentally polluted areas;
   b. Areas subject to flooding unless sufficient safeguards are provided;
   c. Areas prone to infestations of pests;
   d. Areas where wastes, either solid or liquid, cannot be removed
   e. Clean and secure area
Session 7: Control of Operation
Time: 30 min

Learning objectives:
By the end of this session, the participants should be able to:
- State the control of food hazards
- Know the key aspects of hygiene control systems
- State Incoming material requirements
- Know the requirements on packaging
- Know the requirements for water
- Define the requirements on management and supervision

Refer to Slides # 151 to 170
Activity: Workshop 3: Flow Diagram and Plant Schematic
Time: 30 min
Discussion: 30 min
Resources Needed: Flip Charts/manila paper/A0 paper, markers, masking tape
Objectives of the Workshop:
- To check the process flow diagram of identified products
- To check the plant schematic diagram per identified product

Trainer needs to review and comment on the workshop outputs per group

It is very important that the participants know the processes involved in the manufacture of their products.

In plant schematic, emphasize that prevention of cross-contamination is very important.
Workshop Procedure:

Flow Diagram/Plant Schematic

A. Flow Diagram
1. Each company/group will prepare a flow diagram for their specific product.
2. The process flow diagram will identify the important process steps (from receiving to shipping)
3. Each process step should be considered in detail and the information expanded to include all relevant process data:
   - all ingredients and packaging used
   - sequence of all process operations (including raw material addition)
   - number the steps/inputs
   - time/temperature history of all raw materials and intermediate and final products including the potential for delay
   - flow conditions of liquids, solids and air
   - equipment design features

B. Plant Schematic
A plant schematic must be developed to show product flow and employee traffic patterns within the plant for the specific product.
- the diagram should include the flow of all ingredients and packaging materials from the moment they are received at the plant, through storage, preparation, processing, packaging, finished product holding and shipping.
- The personnel flow should indicate employee movement through the plant, including changing room, toilets and lunchroom. The location of handwashing facilities and food baths (if applicable) should be noted.

Time: 30 minutes
Team Presentation and discussion: 30 min
Suggested Readings:


- Codex General Standards for the labelling of Prepackaged Foods, Section 4.2.1.4 Codex Stan – 1– 1985 as amended


Quiz 7.

1. Physical contamination can be controlled by the following except:
   a. Swab test
   b. Magnet
   c. Metal detector
   d. Screen and sieves
   e. Visual Inspection

2. Chemical contaminants can best be detected through:
   a. Microbiological test
   b. Chemical tests
   c. Screens and sieves
   d. X-ray
   e. Sensory evaluation (by tasting, smelling, touching, visual inspection)

3. Biological contaminants can best be detected by:
   a. Microbiological tests
   b. Chemical tests
   c. Screens and sieves
   d. X-ray
   e. Sensory evaluation (by tasting, smelling, touching, visual inspection)

4. Biological contaminants can be controlled by:
   a. Time and temperature management
   b. Metal detector
   c. Visual inspection
   d. Smelling
   e. Chemical testing

5. Management of incoming materials
   a. Inspection
   b. Verify accompanying COA
   c. Storage in required warehouse
   d. All of the above
   e. None of the above
Session 8: Establishment: Maintenance and Sanitation

Time: 30 min

Learning objectives:

By the end of this session, the participants should be able to learn about:

- Maintenance and sanitation
- Pest control systems
- Waste management
- Monitoring effectiveness

Refer to Slides # 171 to 187
Workshop 4: Writing SSOPS

Time: 30 min

Resources Needed: Flip Charts/manila paper/A0 paper, markers, masking tape

Objective of the Workshop:

• To let the participants know the procedures that need to be written and implemented so that sanitation and prevention of cross-contamination be assured for critical areas in the food manufacturing plant.

• To let the participants realize the resources that are needed in order to implement the procedures effectively

Trainer needs to review and comment on the workshop outputs per group. Emphasize the need to monitor compliance to procedures through verification, inspection and testing.

SSOP Procedure Writing - 2 persons working per item

• Write a procedure for each of the eight (8) key areas for SSOP

1. Safety of Water - Team 1
2. Condition/Cleanliness of Food Contact Surfaces - Team 2
3. Prevention of Cross-Contamination - Team 3
4. Handwashing, Sanitizing Facilities Team 4
5. Protection from food adulteration – Team 5
6. Proper labeling and Storage – Team 6
7. Control of Employee Health Conditions - Team 7
8. Exclusion of Pests - Team 8

The Procedure needs to give reference to the following:

➤ Purpose /scope of the procedure
➤ Who (responsibility)
➤ Where (Area/location)
➤ When (frequency)
➤ Activity/Action
➤ Reference
➤ Records
➤ Time allotted: 30 min with sample presentation from 2 teams.
Workshop 5: Master Cleaning Program

Objective of the Workshop:

- To let the participants realize the need for time for cleaning the establishment

Time: 30 min

Resources Needed: Flip Charts/manila paper/A0 paper, markers, masking tape

Workshop Procedure:

1. Group the participants into 2 persons per team

2. Develop a Master Cleaning Program for the following areas:
   - Outside Premises and Toilets – Team 1
   - Warehouse/Storage Area (RM, Packaging and FG) – Team 2
   - Staging Area - Team 3
   - Processing area - Team 4
   - Packing Area –Team 5
   - Change Room and Locker rooms – Team 6
   - Eating Area - Team 7
   - Cleaning equipment - Team 7

3. Areas, items of equipment and utensils to be cleaned

4. Responsibilities for particular tasks

5. Method and frequency of cleaning, and

6. Monitoring arrangements

Presentation by 2 teams

Master Cleaning Program

<table>
<thead>
<tr>
<th>Areas</th>
<th>Items of equipment and utensils to be cleaned</th>
<th>Responsibilities for a particular task</th>
<th>Method of cleaning</th>
<th>Frequency of Cleaning</th>
<th>Verification</th>
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Quiz 8.

1. Effective pest control depends on:
   a. Hygiene and sanitation
   b. Waste management
   c. Inspection of incoming materials
   d. Pest proofing of the establishment
   e. All of the above

2. Considered as pests in food establishments:
   a. Rats and mice
   b. Flies and ants
   c. Cockroaches
   d. Birds
   e. All of the above

3. Waste management requirements
   a. Use of food containers as waste containers
   b. Should be removed from the production area at least once a day
   c. Use of open waste containers
   d. Use of closed, foot-operated waste bins
   e. b & d

4. SSOP focus on:
   a. Safety of Water, Condition/Cleanliness of Food Contact Surfaces
   b. Protection from food adulteration and Proper labeling and Storage
   c. Prevention of Cross-Contamination and Handwashing, Sanitizing Facilities
   d. Control of Employee Health Conditions and Exclusion of Pests
   e. All of the above

5. In developing a cleaning program, the following should be considered:
   a. Items to be cleaned
   b. Areas to be cleaned
   c. Responsibility for cleaning
   d. Method and frequency of cleaning
   e. All of the above
Session 9: Establishment: Personal Hygiene

Time: 10 min

Learning objectives:

By the end of this session, the participants should be able to:

- Know the requirements for personal hygiene
- Know the GMP requirements for visitors
- Know the importance of proper handwashing

Refer to Slides #188 to 199

Discussion Points

1. Ask the participants to enumerate the different procedures on personal hygiene such as in hiring workers, production, visitors

2. What are the resource requirements for personal hygiene?

Emphasize the importance of proper handwashing. Also discuss on management’s provision of proper facilities, training to use the facilities, use of facilities by the employees.

Emphasize on consistency of employees – Personal hygiene required for managers, employees, visitors and contractors who are entering the critical areas in the food establishment.
Quiz 9.

1. The most effective method of preventing cross contamination
   a. Taking a bath
   b. Proper Handwashing
   c. Drying
   d. All of the above
   e. None of the above

2. Food handlers infected with the following illness should not be permitted to work in the food processing area:
   a. Jaundice, Diarrhoea
   b. Vomiting, Discharges from ear, eye or nose
   c. Fever, Sore throat with fever
   d. Visibly infected skin lesions (boils, cuts,
   e. All of the above

3. Handwashing should be done
   a. Anytime
   b. 3 times a day
   c. Whenever you feel like washing
   d. None of the above
   e. Whenever your hands get dirty

4. Personal hygiene includes good behavior appropriate inside the food processing area such as:
   a. No spitting
   b. No eating
   c. No smoking
   d. All of the above
   e. None of the above

5. Visitors should also:
   a. Follow GMP procedures
   b. Wear appropriate PPEs
   c. Be excused from following GMP procedures
   d. Observe appropriate behavior inside the establishment
   e. a,b & d
Session 10: Transportation

Time:  10 min

Learning objective:

By the end of this session, the participants should be able to:

- Know the hygiene requirements for transporting food products

Refer to Slides # 200 to 204

Discussion Points:

1. Ask the participants to state the requirements for transporting food products.

Emphasize that the same hygienic handling and conditions must be provided to the products when they are produced, stored, and transported.

Emphasize on the training of the truckers and delivery crew on food safety.

Emphasize that transport or delivery is the extension of the manufacturing facility and that the same care on handling should be given to the products being delivered.
Quiz 10.

1. In transporting food products, observe:
   a. Cleanliness of the truck
   b. Temperature requirement
   c. Stacking height
   d. Allowed product mix
   e. All of the above

2. Requirements for bulk containers and conveyances:
   a. Do not contaminate foods or packaging
   b. Can be effectively cleaned and disinfected, if necessary
   c. Permit effective separation of different foods or foods from non-food items (where necessary) during transport;
   d. Effective protection from contamination, including dust and fumes;
   e. All of the above

3. Containers used for transporting should:
   a. Be used for whatever types of chemicals
   b. Be used for toxic chemicals and just washed before loading
   c. Be cleaned and inspected prior to loading
   d. All of the above
   e. None of the above

4. In transporting rice for export, the following are required:
   a. Refrigerated
   b. Freezer temperature can be attained
   c. Fumigation can be done, if needed
   d. Relative humidity should be observed
   e. All of the above

5. In transporting our produce, we need to train the following:
   a. Loading crew
   b. Truckers
   c. Warehousemen
   d. QC inspectors
   e. All of the above
Session 11: Product Information and Consumer Awareness

Time: 10 min

Learning objectives:

By the end of this session, the participants should be able to:

- Know the information about food safety features of the products, handling, preparation and storage requirements to be followed by the consumers or the users.

Refer to Slides # 205 to 212

Discussion Points:

1. Ask the participants to look at a sample label of a product and enumerate the information about the product that is given to the consumers/users.

2. Why is labelling important?

Emphasize on the responsibility of the users/consumers to read and follow food safety instructions.
Quiz 11.

1. Important contents of a food label:
   a. Product name
   b. Manufacturer’s name
   c. Lot number; manufacturing date
   d. All of the above
   e. None of the above

2. Product information required for traceability
   a. Product name
   b. Manufacturer’s name
   c. Lot number; manufacturing date
   d. All of the above
   e. None of the above

3. Product information may be provided through;
   a. Labels
   b. Websites
   c. Menu for restaurants
   d. All of the above
   e. None of the above

4. Label should also contain clear information such as:
   a. Storage requirement and shelf life
   b. Manner of preparation
   c. Cooking instructions
   d. All of the above
   e. None of the above

5. Consumer education includes product information on:
   a. Temperature control
   b. Time control
   c. Possible foodborne illness and allergen contents
   d. All of the above
   e. None of the above
Session 12: Training

Time: 10 min

Learning objectives:

By the end of this session, the participants should be able to:

- Define training and the important role it has in food establishment safety and sanitation
- Have an idea of the training needed by the food handlers

Refer to Slides # 213 to 221

Discussion Points:

1. Ask the participants what training should be given to food handlers
2. Why is there a need for refresher training?

Emphasize that the food handlers assigned to specific tasks should be trained on how to perform that particular task especially if the task needs monitoring and measuring.

Refresher training is needed to review and to update on new information such as new regulations, new procedures, new products, etc…
Quiz 12.

1. Training should be given to:
   a. All personnel should be aware of role and responsibility in protecting food from contamination or deterioration
   b. Food handlers should have the necessary knowledge and skills to handle food hygienically
   c. Who handle strong cleaning/hazardous chemicals should be instructed in safe handling techniques
   d. All of the above
   e. None of the above

2. Factors that are considered in the training:
   a. Nature of food;
   b. Manner in which food is handled and packed;
   c. Extent and nature of processing or further preparation before consumption;
   d. Condition under which the food will be stored;
   e. all of the above

3. Refresher training should
   a. Be given at least twice year
   b. Contents should be the same every training
   c. Contents of training module should be reviewed for continued suitability
   d. All of the above
   e. None of the above

4. Today’s food industry leaders understand that training is:
   a. A cost without benefit
   b. Not necessary
   c. An investment
   d. A one-time event

5. Training needs analysis need to be done for:
   a. Suitability of training
   b. Identify the correct training
   c. Food handlers
   d. All of the above
   e. None of the above
Suggested Readings:

• www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodLabelingNutrition/FoodLabeling.

• http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Food%20and%20Agricultural%20Import%20Regulations%20and%20Standards%20-


• Holden, Tom. 2002. Training needs analysis in a week. London: Hodder & Stoughton,
Session 13: Specifications

Time: 15 min

Learning objective:

By the end of this session, the participants should be able to:

- Understand the importance of documenting specifications for raw materials, packaging materials and finished goods

Refer to Slides #222 to 233

Discussion Points:

1. Review participants on the contents of specifications
2. What is the importance of specifications?

Stress the point that the food safety information on the raw materials, equipment, finished goods, process and regulatory requirements need to be available during hazard analysis.

Communication lines with the sources of information should be in place.

Workshop 5- Developing GMP Checklist

Time: 45 min
Discussion: 15 min

Resources Needed: Flip Charts/manila paper/A0 paper, markers

Objective of Workshop 5

- To give an idea to the participants to develop a GMP Checklist that they can use in internal auditing.

1. Group the participants into 6 groups
2. Make a GMP Checklist for the different areas and suggest a rating system:
   - ✔ Receiving/Testing of Raw Materials - Team 1
   - ✔ Warehouse for RM, Packaging Materials and Finished Goods - Team 2
   - ✔ Processing Area – Team 3
   - ✔ Packing Area – Team 4
   - ✔ Outside Premises – Team 5
   - ✔ Lockers/Changing Room and Toilets – Team 6

Time Limit: 30 min. Presentation of Results: 30 min
Quiz 13.

1. Specifications contains:
   a. General product information- name of product, size of product
   b. General supplier information- name of company, production site details, date of specification issue and other information
   c. Food safety legal requirements for country of production - compositional, process, microbiological and quantity
   d. Food safety legal requirements for the country of sale - compositional, process, microbiological and quantity
   e. Quality standards/attributes; shelf life
   f. All of the above

2. Specifications is needed for
   a. Finished goods
   b. Raw materials
   c. Process
   d. Raw materials
   e. All of the above

3. Good sources of specifications:
   a. Suppliers, customers, industry, government
   b. Buyers
   c. Consultants
   d. Certifying body
   e. A and b

4. Specifications:
   a. Are documents that need to be updated
   b. Are considered records
   c. Are not necessary
   d. Need not be filed
   e. All of the above

5. Which of the following statement is not true.
   a. Specifications are important records that should be filed by the company
   b. Specifications are important documents that should be filed by the company
   c. Specifications should be agreed with the suppliers as well as with customers
   d. Specifications may contain legal requirements
   e. None of the above
Session 14: Open Forum
Time: 1 hr
Resources Needed: Invited Consultants

Learning objectives:

By the end of this session, the participants should be able to:

- Appreciate consultancy and training
- Have capacity to do consultancy and training
- Consider going into consultancy and training

Refer to Slides # 234 to 238
Trainees should be encouraged to ask questions and insights from invited speakers/consultancies.
Sharing should be encouraged.
Course Evaluation: 10 min

ANNEXES:

1. GMP Training the Trainers Handouts
2. GMP Worksheets
4. ISO 22000: 2005 Food safety management system