UNIT 2   QUALITY CONTROL MANAGEMENT SYSTEM

Structure

2.0 OBJECTIVES

After reading this unit we will be able to:

l   define food hazards;

l   describe the importance of safe food;

l   explain the quality control management system;

l   define quality policy;

l   establish quality objectives; and

l   develop a documented system.

2.1 INTRODUCTION

Quality of milk and milk products is the composite of those characteristics, which differentiate individual units of milk and m ilk products. It include both desirable and undesirable characteristics. It is the responsibility of all those people who are involved in business of milk and milk products such as milk producers, handlers, processors and also those who are involved in food services to ensure safety and quality of milk and milk products. Quality attributes can be divided in two categories. Sensory attributes and hidden attributes. Consumers of milk and milk products are able to asses only the sensory attributes. The hidden good or bad attributes of quality have to be ensured by the suppliers of milk and milk products. To ensure the consumers of good quality product, various national and international agencies have formulated standards and enacted legislations. Over the years several food quality management systems have been evolved. Unlike quality control measures quality control management system or food safety management system have the capability to produce safe and consistently good quality milk and milk products.

The conventional quality control method, in which the quality of the fresh or processed food is tested just before distribution, though it has been very useful in ensuring food safety, is a postmortem exercise. This means that if the food at the distribution stage is found to be defective, there is no way to salvage it. In order to overcome this drawback, new quality control management systems/ safety management systems have been evolved. These systems besides ensuring food safety, also enable production of products with no or minimum defects. We will be learning the basic aspects of some of these systems.

2.2 FOOD HAZARDS

Milk and milk products contain several constituents, namely, proteins, fat, lactose, vitamins, minerals and some other minor constituents. These constituents are required to sustain life. We all expect food to be nutritious, wholesome and safe. Absolutely safe food is that food, which will not cause any damage or harm. However, our food is subject to contamination and therefore, relative food safety can be defined, as the practical certainty that injury or damage will not result from a food used in a reasonable and customary manner and quantity. Food Safety can be understood in a better way if we use two basic concepts toxicity and hazard. Toxicity is the capacity of a substance to produce harm or injury. Harzard is the

relative probability that harm or injury will result when the substance is used in proposed manner and quantity. A hazard may be biological, chemical or physical agent in a food, which has the potential to cause harm or injury to the health.

Biological Hazard: It include pathogenic bacteria, fungus, virus and parasites and toxins synthesized by these organisms.

Chemical Hazards: It include naturally occurring toxicants such as trypsin inhibitors, solanins, haemagylutnins, phytates, cynagonic glycosides and alkaloids, heavy metals (lead, merury, arsine, cadminimum etc), pesticide residues like DDT, malatheion, parathion, endosuffon etc. chemical hazards can be mycotoxins like aflatoxins developed on nuts, corn, veterinary drugs residues and also unapproved additives or additives added in excess.

Physical Harzards:- It include extraruous matter such as glass, stones, wood, metal, bits etc.

2.3 IMPORTANCE OF SAFE FOOD

Safe food in addition to providing nutrition and good health to the consumers promotes international trade and stimulate economic development.

2.4 QUALITY CONTROL MANAGEMENT SYSTEM (QCMS)

Quality does not happen by accident, it must be planned. Quality control management involves planning, quality control and quality improvement. The key elements in implementing company-wide strategic quality planning are in turn seen as identifying customers and their needs; establishing optimal quality goals; creating measurements of quality; planning processes capable of meeting quality goals under operating conditions; producing continuing results in improved market share, premium prices, and a reduction of error rates in the office and factory. Sometimes referred to as the Juran trilogy, each of these three processes has subsets:

l Quality planning process

Determining quality goals

Develop plans to meet these goals

Identify resources to meet goals

Translate goals into quality

Summaries 1 to 4 in quality plan

l Quality control process

Evaluate process

Compare performance with set goals

Take action on the difference

l Quality improvement process

Establish infrastructure for the annual quality improvement

Identify the specific needs for the improvement projects

For each project, establish a project team with clear responsibilities for bringing the project to a successful conclusion

Provide resources, motivation and training needed by the teams to:

    (a) Diagnose the causes

    (b) Stimulate establishment of a remedy

    (c) Establish control hold the gains

The majority of problems are the fault of poor management, rather than poor workmanship. Philip Crosby's Zero defects approach does not help, since it is mistakenly based on the idea that the bulk of quality problems arise because workers are careless and not properly motivated. Long term training to improve quality should start at the top and upper managers already know what needs to be done and that training is for others the workforce, the supervisiors, the engineers.

The QMS approach encourages organization to analyse customer requirements and define the processes that produce products acceptable to him. This approach emphasizes that organization should:

ı   Establish quality policy and quality objectives and identify processes critical to attaining quality objectives.

ı   Establish measures for the effectiveness of identified processes towards attaining quality objectives.

ı   Establish means of preventing defects, reducing variability and minimizing rework, waste and set opportunities to reduce risks and improve the effectiveness and efficiency of process.

ı   Determine avenues for improvement to provide optimum results with acceptable risks and plan strategies, processes and resources to deliver identified improvements and asses the results against the expected outcome.

Some of the quality systems important for survival and growth of dairy industry and increasingly relevant to face the challenges of the new millennium are:

ISO 9000

ISO: 9000-1994 is an international standard directed at the quality management process of an organization, it include the group of standards ISO-9001, ISO-9003 and ISO-9004. ISO-9001 standard is a management tool that focus on meeting the customers needs and expectations, every step in achieving the quality is documented the documented system defines policies, objectives and expected performance.

Quality management refers to all activities of the overall management function that determines the quality policy, objectives and responsibilities of the quality systems. Quality system is the organizational structure, procedures, processes and resources needed to implement the quality management. ISO-9001:2000 is the latest quality management system. ISO certificate is provided to the organization that has a quality management system to meet the scope of the stated standards. The important factors for the rapid success of ISO 9000 are that it:

ı   Meets international trade requirements and brings a degree of order in the market place.

ı   Addresses the customer needs and provides assurance.

ı   Includes comparative quality management concepts and provides framework for continual quality improvement.

ı   Creates confidence among business partners within and across the nations.

ı   Provides a common denominator for measuring efficiency of operation and quality of goods and services.

ı   Introduces control mechanisms for an organization's own operations to achieve, sustain and improve quality of product/services.

With the changed focus on quality issues worldwide, the ISO 9000 standards would serve as a basis for ensuring consistent quality of goods and services. The new standards will necessitate organizations to reorient to address process-centered approach to quality management system to meet consumer requirements and gauge their satisfaction and place the system on a continual improvement mode.

FOOD SAFETY STANDARDS

The potential for food to be involved in the outbreaks of health threat is great. Outbreaks of food borne illness remind us that there are compelling reasons for proactive control of food safety at all stages of food production - from production to consumption.

For a food processing company, a pure, safe and wholesome food must be the minimum standard for consumer acceptance. Food quality, which includes not only highly acceptable organoleptic characteristics but also nutritional value and safety, has become an intense concern of the consumer.

The HACCP (Harzard Analysis Critical Control Points) is a scientifically designed food safety management system, which systematically identifies specific hazards and provides measures for their control to ensure safety of food. The salient points of this system are:

ı   Addresses all types of hazards- Microbiological, Physical and Chemical.

ı   Requires use of risk-based decision making in identifying significant hazards & establishing critical limits for monitoring & ensuring safety.

ı   Proactive system for assuring safe production and deli\very of foods.

ı   Emphasises prevention rather than inspection

ı   International acceptance.

ENVIRONMENTAL MANAGEMENT SYSTEM (ISO:14000)

Environment is defined as surroundings in which an organization operates, includes air, water, land, natural resources, flora, fauna, humans and their interrelations The environment management system encompasses the following:

- Structured, systematic, documented and voluntary approach.

- Proactive identification & control of environmental aspects.

- Ensures compliance with legislations.

- Continual improvement in environmental performance

- Sustainable dialogue with interested parties.

FOOD SAFETY MANAGEMENT SYSTEM (ISO 22000)

Specifies requirements for a food safety management system where an organization in the food chain needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the time of human consumption. It is integration of Quality Management System, Food Safety and Environment Management System.

ISO 22000 specifies requirements to enable an organisation:

- To plan, implement, operate, maintain and update a food safety management system aimed at providing products that, according to their intended use, are safe for the consumer,

- To demonstrate compliance with applicable statutory and regulatory food safety requirements.

- To evaluate and asses customer requirements and demonstrate conformity with those mutually agreed customer requirements that relate to food safety, in order to enhance customer satisfaction,

- To effectively communicate food safety issues to their suppliers, customers and relevant interested parties in the food chain,

- To ensure that the organization conforms to its stated food safety policy.

TOTAL QUALITY MANAGEMENT (TQM)

TQM is an integrated organizational approach in delighting customers (both internal and external) by meeting their expectations on a continuous basis through everyone involved with the organization working on continuous improvement in all spheres, namely, products, services and processes along with proper problem solving methodology. If implemented properly, TQM can bring the following benefits to the organization.

- For Customers

- Value for money

- Greater customer care

- No complaints

- Better availability

All these will result in better customer loyalty.

ı For Company

ı Continuous improvement in quality

ı Reduction in size

ı Increase in productivity

ı People are better motivated

ı Defects are reduced

ı Problems are solved faster

All the above will result in increased ROI, net profits and cash flow.

ı For Employees

ı Empowerment

ı More training skill

ı Appreciation and recognition

ı More respect

Some of the main activities available under TQM are:

ı House Keeping

ı Kaizen

ı Small Group Activity (SGA)

ı Policy Deployment (Hoshin Kanri)

ONLINE QUALITY CONTROL MANAGEMENT IN DAIRY INDUSTRY

Total quality assurance management system in dairy industry involves assuring that raw material meeting the standards, hygienic and plant parameters are maintained during processing, filling and packing, desirable storage conditions in dairy, transportation and trade, so that the product reaching to customers meets his/her needs with respect to quality, safety and nutrition. The stepwise details of online total quality assurance management system in dairy are:

Raw Material: Assuring that good quality raw material is used for manufacturing the product. Visual and olfactory analysis of material to assure that raw material is free from any foreign matter, abnormal flavours etc.

Processing: Monitoring the various parameters like temperature, steam pressure, vaccum, Baume reading, pH, hygrometer etc. and maintaining the records of parameters monitored for particular process/ product. It also involves parameters

of cleaning and sanitation, monitoring of plant and personal hygiene as well as proper house keeping in production and packing area. Some of the examples are moisture control in milk powder, granulation control in ghee etc.

Filling and Packaging: It also involves monitoring of various parameters like cleanliness of filling lines, packing machine, printing and coding, control over weight and length variation, sealing integrity, hygienic condition of packing area etc.

Storage: Fulfillment of various storage norms such as cleanliness, insect and pest free area, temperature, humidity, ventilation, lighting facilities, proper stacking and stack height and maintenance of First Manufactured First Out (FMFO).

Transportation: Regular checking of transport vehicle, temperature monitoring, cleanliness of vehicle, absenceof undesirable odour, dairy products should not be transported with odour imparting materials.

Sales of Distribution: Storage of dairy products as per norms such as clean, insect and pest free area, lighting facilities, proper stacking and stack height and maintenance of First In First Out (FIFO). It also involve maintenance of storage environment such as temperature, humidity, dampness, proper ventilation etc.

Product Indentification and Traceabililty: Product identification at all stages of processing from receipt of raw material to finished product. Product identification helps in:

ı   The segregation of product;

ı   Isolating the non-conforming product,

ı   Future prevention of non-conforming product

Traceability is a legislative requirement. It plays an important role to investigate the problem. A system for product tracebililty helps what was produced, when, how much and its destination.

Check Your Progress – 1

1. Define food quality.

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2. What are sensory attributes of milk and milk products?

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3. What are hidden attributes of milk and milk products?

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4. What do your understand by hazards?

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5. Why food quality is important?

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2.5 WHAT IS QUALITY CONTROL MANAGEMENT SYSTEM

Quality Management refers to all activities of the overall management function that determines, the quality policy, objectives and responsibilities of the quality systems. Quality system is the organizational structure, procedures, processes and resources needed to implement the quality management. ISO-9001:2000 is the latest quality management system. ISO certificate is provided to the organization that has a quality management system to meet the scope of the stated standards.

2.6 REQUIREMENTS OF QUALITY CONTROL MANAGEMENT SYSTEM

There are 3 general requirements and five specific requirements and they are numbered as such.

i. **Scope:** This specifies requirements for a quality management system where an organization has to demonstrate its ability to consistently provide product that meet customer and applicable regulatory requirements, and aims to enhance customer satisfaction through the effective application of the system.

ii. **Normative Reference:** The reference in the standard to the latest versions of the documents ISO 9000:2001, Quality Management System, Fundamentals and Vocabulary.

iii. **Terms and Definitions:** Terms and definitions related to quality and quality management system are given.

Quality is the degree to which a set of inherent characteristics fulfils requirements.

Quality management system - is the management system that direct and control an organization with regard to quality.

iv. **Documentation requirements:** The requirement is identified for establishing, documenting, implementing, maintaining and continuously improving. The quality management system documentation shall at least include quality policy quality objectives quality manual documented procedure and the documents necessary to ensure the effective operation and control of its process.

Quality Policy- Top management shall ensure that there is a quality policy, which is appropriate to the organization and provide a framework for setting, reviewing and meeting requirements.

The policy should reflect the following that it:-

ı Is appropriate to the purpose of the organization.

ı Include a commitment to comply with requirements and to continually improve the effectiveness.

ı Provides a framework for establishing and reviewing quality objectives.

ı Is communicated and understood within the organization.

ı Is reviewed for continuing suitability.

Example:-

Quality Policy

We are committed to fulfill the needs and expectations of our esteemed customers and delight them with quality of products as well as prompt and efficient services.

We shall do this through complying with customers as well as statutory objectives establishing and reviewing quality policy and quality objectives.

Quality manual – The organization will require a quality manual, which will include, scope of the quality system.

Control of records - As in the case of documents a documented producer is required to prepare, maintain and dispose of records.

v. **Management Responsibility:** Top management shall provide its commitment to the development and improvement of its quality management system. Communicate within the organization the importance of meeting customer and regulatory requirements, set policies and objectives and lead the organization by providing necessary resources and conduct the management reviews.

vi. **Resource Management:** Personal responsible for implementing quality management system shall be competent to carryout the assigned tasks. This can be achieved through education training, skills or experience.

vii. Production Realization: Organizational processes must be planned and developed and these must be consistent with other requirements.

viii. Measurement Analysis and Improvement: The organization shall plan and implement the use of monitoring measurement analysis and improvement process to ensure conformity of the product and the quality management system.

2.7 IMPLEMENTATION OF QUALITY CONTROL MANAGEMENT SYSTEM

After understanding the requirements of quality management system we will now discuss the implementation of the quality management system. Different steps in the implementation of quality management system are described below in brief.

i. Decision by the management

Depending upon various considerations such as market forces, economics, acceptance by the work force, competitors in the field etc management has to take the decision wheather to go for the implementation of the system.

ii. Formation of steering committee/Project Group/Task Force

Depending on the nature and size of the organization 2 or 3 tier structure has to be set up to look after the entire project.

iii. Awareness and training

From the initial stage of implementation of the system awareness and training of various levels is necessary.

iv. Defining Quality Policy

Once the decision is taken to implement the system, the first step is to define organizations commitment to quality by establishing quality policy of the organization and made known to all in the organization.

v. Initial assessment and diagnostic

The second stage involves carrying out a review of the practices being followed within the organization before stalling the system.

vi. Preparation of action plan

After carrying out the initial assessment and analysis an action plan is to be drawn listing various tasks to be carried out and the persons responsible for these tasks.

vii. Establishment of quality objectives

Quality objectives are established at relevant functions and levels in the organizations.

viii. Development of Documented system

Documentation includes any written or pictorial information's describing

defining, specifying, reporting or certifying activities requirements, procedures or results. Such documents include quality manual procedures, customers, contracts, product standards, statutory documents, regulatory documents, customers specifications and service level agreements.

ix. Implementation of Documented Systems

It can be done either in phases in different areas or all the areas can be covered at same time if the organization is small.

x. Appraisal and review of the implemented system

It is divided into 2 sub phases internal auditing and management review.

xi. Pre-assessment or trial assessment

When system deficiencies are no longer visible from an effective internal audit and management review, company/ organization can put an application for certification. However it is advisable for the organization to organize pre-assessment before final audit by a certified body.

xii. Quality management system certification

In this case the audit is done by a third party/ agency and it gives a certificate or conformity that a product system or service confirms to specified requirements.

Check Your Progress – 2

1. What is quality management?

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2. What do your understand by quality system?

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3. what are biological hazards?

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4. What is the importance of pre-assessment of food quality control management system?

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2.8 LET US SUM UP

Quality of milk and milk products is very important from consumers, health point of view as well as from the market point of view of these products. Quality of any food including milk and milk products is composite of those attributes, which differentiate individual units of the product. It comparises both the desirable and undesirable characteristics. It is the responsibility of the food suppliers to ensure the supply of safe and good quality milk and milk products. To ensure the quality and safeguard the consumers against food borne hazards number of national and international agencies have formulated standards and enacted legislations. Over the years several management systems have been evolved which have the capability to produce safe and good quality milk and milk products these are much superior than conventional quality control methods in which the quality of the fresh or processed product is tested just before distribution. Any defect or hazard in the product at this stage cannot be salvaged. To over cum this defect quality management system/ safety management system have been evolved to produce a product with no or minimum defects. Food may contain biological, chemical or physical hazards, which may cause harm or injury to human health. Food safety is important for the promotion of international trade in addition to providing nutrition. Quality management refers to all activities of the overall management function that determines, the quality policy, objectives and responsibilities of the quality systems. Quality system is the organizational structure, procedures, processes and resources needed to implement the quality management. ISO-2001 is the latest quality management system and its Indian equivalent is IS 1400. In implementation of quality management system, quality policy provide a framework for setting, reviewing and meeting requirements and quality manual include the scope of quality system.

2.9 KEY WORDS

Food quality : Composite of desirable and undesirable attributes and judged by sensory and hidden characteristics of food.

Quality management : Overall management functions that determines the quality policy, objectives and responsibility of quality system.

Quality system : Organization structure, procedures, processes and resources needed to implement the quality management.

Quality Policy	:	Framework for setting, reviewing and meeting quality management system's requirements and commitment of organization to continual improvement.
Quality manual	:	It is a controlled document, which include scope of quality system, procedures, description of the sequence and interaction of the processes.
ISO	:	International organization for standardization.
Assessment	:	Third party evaluation of the facilities, capabilities and commitment of organization for implementing the quality management system.
Certification	:	confirmation by third party about the facilities, capabilities and commitment of the organization to implement the quality management system.

2.10 SOME USEFUL BOOKS

Ralhp Early (1995) guide to quality management systems for food industry, St. Edition, Blakie Academic Professional, London.

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MC Swane, D.Rue, N and Linten, R.(1995). Food Safety and Sanitation, Prentice Hall New Jersey, USA.

Arora K.C. (1998) TQM and ISO 1400 S.K. Kataria & Sons, Publishers. Delhi.

Bolton, A.(1996) Quality management systems for the food industry. A Guide to ISO 19001/2 Aspen Publishers, USA.

2.11 ANSWER TO CHECK YOUR PROGRESS

Your answer should include the following point:

Check Your progress- 1

1. Desirable and undesirable attributes

2. Organoleptic test, assessment by human senses

3. Characteristics which can not be evaluated by the consumers such as nutritive value and presence of absence of adulterants and toxicants.

4. Substances or agents which can cause harm or injury.

5. Important from nutritional, health and international trade point of view.

Check Your Progress – 2

1. Overall management function, which determine the quality policy objectives and responsibility of the quality system.

2. Organizational structure, procedures, processes and resources needed to implement the quality management.

3. Biological hazards include microorganisms, enzymes or toxins secreted by the microorganism.

4. Pre-assessment is self-assessment prior to third party assessment to make sure that every thing in the organization is up to the make.