

Modern Food Packaging Technologies: Regulatory Aspects and Global Trends

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Welcome to the NPTEL online certification course on Modern Food Packaging Technologies Regulatory Aspects and Global Trends. Dear friends in the last lecture we have seen the different packaging machineries for food packaging. In the present lecture we will be seeing the packaging laws and regulations. And the topic we will be covering that will include the food quality, food standards, food standards and regulations in India, food safety and standards act 2006, international organizations and agreements in the area of food standards, quality, research and trade which will include Codex Alimentarius Commission, International Organization for Standardization and World Trade Organization and food safety management systems, package selection criteria and regulatory considerations. Food quality, the term food quality refers to attributes that influence a products value to consumers. This includes both negative attributes such as spoilage, contamination, adulteration, food safety as well as positive attributes such as colour, flavour and texture.

It is therefore, a holistic concept integrating factors such as nutritional traits, sensorial properties which include colour, texture, shape, appearance, taste, flavour, quality colour and order, social considerations and safety. Safety is a preliminary attribute and precursor of quality. In order to ensure that foods are safe and of good quality across the world various governments and international bodies have laid down food standards that manufacturers and suppliers are expected to adhere to. Thus, all food service providers those involved in all stages of pre preparation and preparation or processing, packaging and service should adhere to good manufacturing practices and ensure food safety.

Salient points to be borne in mind are quality of raw materials and water, cleanliness of the premises, personnel, equipment, food preparation and storage and serving areas. Storage of food at appropriate temperature, food hygiene, good service practices, food standards. The effective food standards and control systems are required to integrate quality into every aspect of food production and service to ensure the supply of hygienic wholesome food as well as to facilitate trade within and between nations. The company standards these are prepared by company for its own use. Normally, they are copies of national standards.

The national standards these are issued by national standards body food safety and

standards authority of India that is FSSAI. The regional standards regional groups with similar geographical climatic etcetera have legislation standardization bodies international standards. The international organization for standardization that is ISO and Codex Alimentarius Commission that is CAC publish international standards. Food standards and regulations in India, voluntary product certification. There are voluntary grading and marketing schemes such as ISI mark of BIS and AGMARK.

The bureau of Indian standards that is BIS deals with standardization of various consumer goods including food products and runs a voluntary certification scheme known as ISI mark for processed foods. AGMARK is a voluntary scheme of certification of agricultural products raw as well as processed for safeguarding the health of consumers. Since, the government has several regulations and laws food industry found it cumbersome to adhere to a need was therefore, failed to integrate all such laws for regulating the quality of food. With this in view Indian government has passed food safety and standards act 2006 to bring the different pieces of legislation pertaining to food safety under one umbrella. The food safety and standards act 2006, the objects of the act are to consolidate the laws relating to food.

The food safety and standards authority of India that is FSSAI has been established under food safety and standards 2006, which consolidates various acts and orders that have hitherto handled food related issues in various ministries and departments. The food safety and standards authority of India was established for laying down science based standards for food and to regulate their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption. The act has provisions for maintenance of hygienic conditions in and around manufacturing premises assessment and management of risk factors to human health in a scientific manner which were not specified in the PFA. The FSSAI reflects the international shift in food laws from compositional standards or vertical standards to safety or horizontal standards. Food safety and standards authority of India has been mandated by the food safety standards act 2006 for performing the following functions.

Framing of regulations to lay down the standards and guidelines for articles of food and system of enforcing various standards. Laying down mechanism and guidelines for accreditation of certification bodies for certification of food safety management system for food businesses and accreditation of laboratories and notification of the accredited laboratories. To provide scientific advice and technical support to central government and state governments for framing the policy and rules related to food safety and nutrition. Collect and collect data regarding food consumption, incidence and prevalence of biological risk, contaminants in food, residues of various contaminants in food products, identification of emerging risk and introduction of rapid alert system. Creating

an information network across the country so that the public, consumers, panchayats etcetera receive rapid reliable and objective information about food safety and issues of concern.

Provide training programs for persons who are involved or intend to get involved in food businesses. Contribute to the development of international technical standards for food, sanitary and phytosanitary standards. Promote general awareness about food safety and food standards. The international organizations and agreements in the area of food standards, quality research and trade. Since ancient times governing authorities the world over have made attempts to develop and implement food standards in order to protect health of consumers and prevent dishonest practices in the sale of food.

There have been several international organizations and agreements which have played a role in enhancing food safety quality and security facilitating research and trade. The major organizations which are playing a key role are Codex Alimentarius Commission, International Organization for Standardization, World Trade Organization. The first Codex Alimentarius Commission, the CAC is an intergovernmental body formed with the objective of establishing international standards to protect the health of the consumers and facilitate food and agricultural trade. In 2017 the membership of Codex was 187 members countries and one member organization that is European community respectively. India is a member through the Ministry of Health and Family Welfare.

CAC has become the single most important international reference point for developments associated with food standards. The document published by the CAC is Codex Alimentarius which means food code and CAC is a collection of internationally adopted food standards. The document includes standards codes of practice, guideline and other recommendations in order to protect consumers and ensure fair practices in food trade. Different countries use Codex standards to develop national standards.

The prevention of food adulteration act 1954, the PFA 1954 was enacted by the government of India to prevent adulteration of food. The act has been amended over 200 times as per need. In addition to PFA there are other orders or acts that help to ensure the quality of specific foods such as fruit and vegetable product order. A specifications for fruit and vegetable products are laid down. Meat food products order, processing of meat products is licensed under this order.

Vegetable oil products ordered. A specifications for Banaspati, margarine and shortening are laid down. All such acts have been consolidated under the Food Safety and Standards Act. All food products manufactured in India are imported and sold in India have to meet the requirements prescribed under the Food Safety and Standards Act. The International

Organization for Standardization that is ISO, the ISO is a worldwide non-governmental federation of national standards bodies.

The mission of ISO is to promote the development of standardization and related activities in the world with a view to facilitate the international exchange of goods and services and to develop cooperation in the spheres of intellectual, scientific, technological and economic activity. The work done by ISO results in international agreements which are published as international standards. ISO 9000 is an international reference for quality requirements. It is concerned with quality management of an organization, adoption of these standards is voluntary. World Trade Organization that is WTO, WTO was established in 1995.

The main objective of WTO is to help trade flow smoothly, freely and fairly and predictably by administering trade agreements, settling trade disputes, assisting countries in trade policy issues. The WTO agreement covers goods, services and intellectual property in order to enforce adoption and to ensure that trade flow is complete. In implementation of the standards, there is a need for a strong food control system. An effective food control system must consist of food inspection and analytical capability. Food inspection, conformity of products to standards is verified through inspection.

This will ensure that all foods are produced, handled, processed, stored and distributed in compliance with the regulations and legislation. Government municipal authorities appoint food inspectors to investigate the status of quality conformity of standards in their laboratories. Analytical capability, there is need for well equipped state of the art accredited laboratories to carry out analysis of food. Further, well trained personnel having knowledge of principles of laboratory management and physical, chemical and microbiological analysis of food, taste foods and food products are also required. A broad range of analytical capabilities is required for detecting and detecting food contaminants, environmental chemicals, biotoxins, pathogenic bacteria, food borne viruses and parasites.

Now, the food safety management systems over the years issues related to food safety and quality have gone beyond just the average avoidance of food borne pathogens, chemical toxicants and other hazards. A food hazard can enter into the food at any stage of food chain. Therefore, adequate control throughout the food chain is essential. Food safety and quality can be ensured through good manufacturing practices or GMP, good handling practices or GHP and hazard analysis critical control point that is HACCP. The good manufacturing practices are a part of quality assurance to ensure that manufacturers or processors take proactive steps to ensure that their products are safe.

It enables to minimize or eliminate contamination and false labeling thereby protecting the consumer from being misled and helping in purchasing products that are not harmful. GMP is a good business tool that helps to refine compliance and performance by the manufacturers or producers. Now, good handling practices indicate a comprehensive approach from the firm to the store or consumer in order to identify potential sources of risk and indicates what steps and procedures are taken to minimize the risk of contamination. It ensures that all persons who handle food have good hygiene practices. The hazard analysis critical control point is a means of providing assurance about safety of food.

HACCP is an approach to food manufacture and storage in which raw materials and each individual step in a specific process are considered in detail and evaluated for its potential to contribute to the development of pathogenic microorganisms or other food hazards. It involves identification of hazards, assessment of chances of occurrence of hazards during each step or stage in the food chain, raw material procurement, manufacturing, distribution, usage of food products and defining measures for hazards control. The package selection criteria, a number of criteria must be considered when selecting a packaging system for a food. These include the following. The stability of the food with respect to the deteriorative chemical, biochemical and microbiological reactions that can occur.

The rates of these reactions depend on both intrinsic that is the compositional and extrinsic that is environmental factors. The environmental conditions to which the food will be exposed during distribution and storage. The ambient temperature and humidity are the two most important environmental factors and they dictate the barrier properties required of the package. The compatibility of the package with the method of preservation selected for example, if the food is being thermally processed after packaging then the packaging must obviously be able to withstand the thermal process. Likewise if the food is to be stored at freezer temperatures after packaging then the packaging must be able to perform at these temperatures.

The nature and composition of the specific packaging material and its potential effect on the intrinsic quality and safety of the packaged food as a consequence of the migration of components from the packaging material into the food. The regulatory considerations Concerned about the wholesomeness and safety of foods has increased dramatically over the last century particularly in those countries where food security is not a problem. An increasing understanding of and interest in technological matters on the part of consumers and organized consumers group coupled with a recognition that neither government nor industry can guarantee the safety of food has lent support to the concern. Because food safety is a subject of intense study by a large group of highly sophisticated

scientists many consumers think that food safety determination can be solely a scientific process. Several authors stated that there is a no known way to demonstrate absence of risk.

Controlled experiments the most reliable means for assessing risk levels cannot ethically be applied to humans. Retrospective studies are unreliable. Reliance must therefore be placed principally on animal studies. Unfortunately the mechanisms for extrapolating from risk of animals at high concentrations to risk to humans at low concentrations are unreliable. Thank you very much for today.