

# **Modern Food Packaging Technologies: Regulatory Aspects and Global Trends**

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**Week – 01**

**Lecture – 01**

Dear friends, welcome to NPTEL online certification course on Modern Food Packaging Technologies: Regulatory Aspects and Global Trends. I am Professor Prem Prakash Srivastav, Department of Agricultural and Food Engineering, Indian Institute of Technology, Kharagpur. And my team consists of Mr. Soubhagya Tripathy and Miss Srutee Rout, both are research scholars under my supervision. The modern food packaging technologies play an important role in preserving the quality and safety of food products, extending their shelf life and ensuring their reach consumers in optimal conditions. There are two aspects of this, one we will be discussing in this course, one is regulatory aspects and another is global trends.

The regulatory aspects it will contain or deal with the safety and quality, labeling and information, food contact materials, recycling and sustainability, allergens control. In the safety quality, we will be discussing food packaging materials most commonly comply with strict safety and quality standards. Regulatory agencies such as FDA in the United States and the EFSA in the European Union establish guidelines and conduct safety establishments to ensure that packaging material do not transfer harmful substances to the food or comprise its quality. The labeling and information, the food packaging must provide clear and accurate information to consumers including ingredients, nutritional information, allergen declarations and expiration dates.

Packaging regulations often mandate specific level formats and content. In the food contact materials, we will be discussing about the regulations, address materials that come into direct contact with food. These materials must be made from substances recognized as safe and their migration into food should not exceed acceptable limit. Different regions have their own lists of approved substances. Recycling and sustainability will include many countries are implementing regulations to encourage sustainable packaging practices including recycling and reducing single use plastics.

Extended producer responsibility that is EPR programs are becoming more common requiring companies to manage the environmental impact of their packaging. The allergen control will include packaging regulations also deal with allergen across contamination requiring stringent control and labeling for allergenic ingredients. Among the global trends, we will be discussing eco friendly packaging that will include there is

a growing demand for sustainable and eco friendly packaging solutions including biodegradable and compostable materials. This trend is driven by increased environmental awareness and consumer preferences for green packaging. Active and intelligent packaging these technologies incorporate features like oxygen scavengers and time temperature indicators to extend shelf life and improve food safety.

Smart packaging with QR codes for tracking and traceability is also on the rise. Nanotechnology will include the materials explored for their potential in improving packaging properties such as barrier and antimicrobial effects while maintaining regulatory compliances. The digital printing technology is enabling personalized and small based printing which can improve brand engagement and traceability. Safety assurance technologies like modified atmosphere packaging and aseptic packaging continue to evolve to enhance food safety and quality. Food waste reduction the packaging innovations are aimed at reducing food waste by maintaining product freshness and extending shelf life.

This course is of 12 weeks which contains 12 modules and it will also have 12 assignments each at the end of every week there will be online assessment at the end of the course. It will have 4 fold objectives the objective 1 is on functional role this will deal with to describe the functional and safety issues of food packaging and labeling. Whereas, the objective 2 will deal with the quality parameters this to learn quality parameters of packaging materials which come in contact with food products. The objective 3 is global trends this will give information about the detailed idea about global trends in food packaging and disposal methods. Whereas, the objective 4 will deal with the industrial relevance and this will create trend packaging professionals to utilize them as a key differentiator for his relevant industry and businesses.

The week wise topic to be covered is the introduction to food packaging in the first week we will be taking and in that we will be taking historical background of packaging historical background and definition of packaging as an integral part of the production and marketing packaging as a integral part of production and marketing. This will also have packaging function and requirements, printing of packaging and bar codes and labeling laws. Whereas, the 2<sup>nd</sup> week that will discuss about the packaging materials that is glass and paper. Whereas, in the third week we will discuss about the different plastic materials. In the fourth week also that will continue with the plastic materials plastic materials continued.

Then in the fifth week we will deal with the metals and that the most commonly and previous since beginning it is used as a tin plate. Then different types of cans that is 3 piece cans and 2 piece cans, aluminum foil containers and collapsible aluminum tubes.

The sixth week will be devoted for the testing and regulatory aspects of food packaging. In the seventh week the packaging of different food products that will include the packaging of agricultural products. Then packaging of process and dehydrated foods, Packaging of spices.

Then in the eighth week will be devoted to the packaging of milk and milk products. Packaging of meat and poultry products. Packaging of marine products. Then in the ninth week that will be devoted for special packaging methods which will include the form fill sealing machine, form fill sealing machines, controlled atmospheric packaging. Then modified atmospheric packaging. Then aseptic packaging and active and intelligent packaging systems. The tenth week will be devoted to global trends in the food packaging. And that will include overview of modern packaging and challenges and variations in packaging industries. And the same trends in packaging materials. And recycling and disposal of plastic wastes. And eleventh week will be devoted to packaging process and equipment. Then the last that is the twelfth week that will be devoted to packaging laws and regulations and which will include the Food Safety and Standards Act 2006. The legal metrology act 2009 and UN certification code for packaging of dangerous goods UN certification code for packaging of dangerous goods. It is crucial for business and manufacturers to comply with these regulations to avoid legal consequences and ensure consumer safety.

Compliance often involves packaging materials obtaining necessary certification and adhering to labeling and packaging standards. Manufacturers must stay informed about changes in regulations and adopt their packaging processes accordingly to meet legal standards. After completion of this course after the 12 weeks the outcome of the course or the learning process will be fourfold that scientific aspects will include to educate people on all the technical scientific elements of food packaging. The basic about the basic laws to provide an idea about FSSAI packaging regulations for different packaging types and then testing procedure to provide education on packaging materials, their standards and various testing procedures and also packaging and labeling to introduce the laws governing product packaging and labeling. Thank you very much.

These are the few reference books which we have followed and it is suggested for further reading also. Thank you very much.