

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 packaging laws and regulations. In the present lecture we will be covering FSSI regulations on packaging and labeling requirements. And the topics we will be covering introduction, purpose of packaging, food labeling, food packaging symbols, FSSI guidelines on packaging and labeling of food products, food safety and standards for packaging and labeling regulations 2011, food safety and standards for packaging regulations 2018, food safety and standards for labeling and display regulations, food safety and standards labeling and display regulations 2020. Introduction, food the most basic necessity of life has also developed into a lucrative business since people no longer have time to cook due to their busy lifestyle packaged food is gaining popularity. Food packaging plays a crucial role in preservation of quality and delivery of safe wholesome food products to the end user.

With the growing concern over the health risk that are involved in the consumption of packaged food, the food safety and standards authority of India that is FSSI is now stringent on the regulatory norms related to FSSI packaging and labeling requirements. In common language packaging means protecting products, it is the process of designing and producing packages, it protects and preserves the food articles. When it comes to labeling the information is vital for the safety of consumers and every food article has to be labeled accurately. Purpose of packaging, packaging is the art and science of encasing food products to safeguard them during distribution, sale and storage.

It is also the process of designing and evaluating packages. Product packaging design not only lends aesthetic appeal, but also helps your products stand out from those of others. Packaging performs five main functions product containment, preservation and quality, presentation and convenience, protection and provide storage history. Product containment, the primary purposes of packaging are containment and protection. Containment refers to holding goods in a form suitable for transport, whereas protection refers to safe keeping goods in a way that prevents significant quality deterioration.

Preservation by maintaining quality, the second function of packaging is to control the local environmental conditions to enhance storage life and safety. Presentation and

convenience, it is important to display the product in an attractive manner to the potential buyer. For a package to be effective, it must present the product well and should do its own publicity. In many cases, packaging provides convenience to the consumers. Eating style such as ready to eat meals, snacks and microwavable ready meals have been changed over the years which need innovation in packaging.

For children, the packaging might represent innovation or fun. Other conveniences could be ease of opening, smaller portions and tamper proof methods. Protection during distribution and processing, the fourth function is to protect the product during transit to the consumer. Packaging can handle better when there are challenges in food distribution chain such as heat, humidity or dew. It is important to be aware of the distribution challenges and designing a package to suit it.

Provide storage history, time temperature indicator that is TTI is effective for predicting microbial concentrations and other parameters of food quality during shipping and storage. It helps in ensuring proper handling and provides a gauge of product quality for sensitive products in which temperature control is imperative to efficacy and safety. TTI's are tags that can be applied to individual packages or shipping cartons to visually indicate whether the product has been exposed to time and temperature conditions that adversely affect the product quality. TTI could be used in chilled foods to identify the temperature abuse during storage and distribution. Food labeling, a label displays information regarding the product which is typically printed on the packaging.

It is a piece of paper, polymer, cloth, metal or other material affixed to a container or article. A label may also be printed directly on the container or article. A label not only describes the product and its use, but also provides instructions and crucial precautionary measures if that need to be taken care of. It essentially informs consumers of the properties of a product. Food labeling hence serves as a primary link of communication between manufacturer and consumer and covers both food safety and information of consumer interest.

Now, the food packaging symbols, this symbol is often used on containers such as Tupperware to show that the product is suitable for food use. This logo is used internationally to show that the product can be recycled. This symbol is registered trademark of European bioplastics and is used to show that the packaging is certified to be compostable. The product in the food packaging is suitable for vegetarians. There is an alternative logo like this that uses a tick rather than leaves although the meaning is stays the same.

This is states that the product does not contain gluten or any other wheat extracts.

Ingredients will typically be very clearly labeled on the products that match this description. Often products that contain ingredients that are common allergies will include this symbol. This is the symbol used to show that the food packaging is suitable for use in a microwave. If this image is seen on food packaging, then one can freeze the entire product without having to remove the wrapping first.

Now, FSSI guidelines on packaging and labeling of food products. Food Safety and Standards Authority of India is an autonomous body established by government of India under the Ministry of Health and Family Welfare. It usually sets standards for food so that there is no chaos in minds of consumers, traders, manufacturers and investors. Since the FSSI is the authority on all food related things India, FSSI registration and observance of FSSI rules is must. Food safety and standards regulations for packaging and labeling 2011.

Packaging general requirements and utensil or container made of the following materials or metals when used in the preparation, packaging and storage of food shall be deemed to render it unfit for human consumption. The containers which are rusty, enameled containers which has become chipped and rusty, copper or brass containers which are not properly tinned, containers made of aluminium not conforming the chemical composition to IS 20. Specifications for cast aluminium and aluminium alloys for utensils for IS 21 specification for wrought aluminium and aluminium alloys for utensil. These are not allowed for preparation of food materials. Containers made of plastic materials should confirm to the following Indian standards specification used as appliances or receptacles for packaging or storing whether partly or wholly food articles namely IS 10146.

This is specification for polyethylene in contact with food stuffs. IS 10142 this is specification for styrene polymers which is in contact with food stuffs. IS 10151 has the specification for polyvinyl chloride in contact with food stuffs. IS 10910 shows the specification for polypropylene which is in contact with the food stuffs. IS 11434 gives the specification for inomers resins in contact with the food stuffs.

IS 11704 gives the specification for ethylene acrylic acid copolymer. IS 12252 has got the specification for polyalkylene terephthalates. IS 12247 for nylon 6 polymers. IS 13601 for ethylene vinyl acetate. IS 13576 for ethylene methacrylic acid.

Tin and plastic containers once used shall not be reused for packaging of edible oils and fats provided that utensils are containers made of copper though not properly tinned may be used for preparation of sugar confectionery or essential oil and mere use of such utensils or containers shall not be deemed to render sugar confectionery or essential oils

unfit for human consumption. The general packaging requirements for can products all containers shall be securely packed and sealed. The exterior of the cans shall be free from major dents, rust, perforation and seam distortions. Cans shall be free from leaks. Now, the labeling general requirements every prepackaged food shall carry a label containing information as required here under unless otherwise provided namely the particulars of declaration required under these regulations to be specified on the label shall be in English or in Hindi Devnagri script provided that nothing here in content shall prevent the use of any other language in addition to the language required under this regulation.

Prepackaged food shall not be described or presented on any label or in any labeling manner that is false, misleading or deceptive or is likely to create an enormous impression regarding its character in any respect. The label in prepackaged foods shall be applied in such a manner that they will not become separated from the container. Contents on the label shall be clear, prominent, indelible and readily legible by the consumer under normal conditions of purchase and use. Where the container is covered by a wrapper, the wrapper shall carry the necessary information or the label on the container shall be readily legible through the outer wrapper and not obscured by it. License number shall be displayed on the principle display panel in the following format namely, this format, provided that the existing products of a unit shall comply with the requirements of this clause on and after the 6 months of commencement of the food safety standards for packaging and labeling the amendment regulation 2013.

The labeling of prepackaged foods In addition to general labeling requirements every package of food shall carry the following information on the label namely the name of the food. The name of the food shall include trade name or description of food contained in the package. List of ingredients except for single ingredient food a list of ingredients shall be declared on the label in the following manner. The list of ingredients shall contain an appropriate title such as the term ingredients. The name of ingredients used in the product shall be listed in descending order of their composition by weight or volume.

A specific name shall be used for ingredients in the list of ingredients. Now, the nutritional information nutritional information or nutritional facts per 100 gram or per 100 ml or per serving of this product shall be given on the label containing the following. Energy value in kilo calorie the amounts of protein carbohydrates is specified quantity of sugar and fat in grams. The amount of any other nutrient for which a nutrition or health claim is made. Whether numerical information on vitamins and minerals is declared it shall be expressed in metric units.

Wherever numerical information on vitamins and minerals is declared it shall be

expressed in metric units. Where the nutritional declaration is made per serving the amount in gram or milliliter shall be included for reference. Beside the serving measures provided that the food claimed to be enriched with nutrients such as minerals, proteins, vitamins, metals or their compounds amino acids or enzymes shall give the quantities of such added nutrient on the label. Declaration regarding veg or non veg every package of non vegetarian food shall bear a declaration of this effect made by a symbol and color code as stipulated here to indicate that the product is non vegetarian food. This symbol shall consist of a brown color filled circle having a diameter not less than the minimum size specified in the regulation inside a square with brown outline having sides double the diameter of the circle.

Where any article of food contains egg only as non vegetarian ingredients the manufacturer or packer or seller may give declaration to this effect in addition to this symbol. Every package of vegetarian food shall bear a declaration to this effect by a symbol and color code as stipulated here in this figure for this purpose to indicate that the product is vegetarian food. The symbol shall consist of a green color filled circle having a diameter not less than the minimum size specified inside the square with green outline having size double the diameter of the circle. Declaration regarding the food additives for food additives falling in the respective classes and appearing in lists of food additives permitted for use in foods. The following class titles shall be used together with the specific names or recognize international numerical identifications.

Acidity regulators, acids, anti caking agent, anti foaming agent, antioxidant, bulking agent, color, color retention agent, emulsifier, emulsifying salt, forming agent, flow treatment agent, flavor enhancer, foaming agent, gelling agent, glazing agent, humectant, preservative, propellant, raising agent, stabilizer, sweetener, thickener, addition of colors and/or flavors. The food safety and standards regulations 2018 for packaging, food safety and standards authority of India made the food safety and standards for packaging and labeling regulations 2011, but later to make the national labeling regulations more robust and effective, FSSI was in the process of comprehensive revision of the food safety and standards (Packaging and labeling) regulations 2011 for packaging and labeling with the objective of having three different regulations dealing separately to packaging labeling and advertisement and claims requirements. Food authority has thus divided the packaging labeling regulations into two regulations the food safety and standards packaging regulations 2018 and the food safety and standards labeling and display regulations 2020. The food safety and standards labeling and display regulations 2018 general requirements every food business operator shall ensure that the packaging material used shall be in accordance with these regulations provided where Indian standards are not available then relevant international standards may be complied with.

Any material which comes in direct contact with food are likely to come in contact with food used for packaging preparation storing wrapping transportation and sale or service of food sale be of food grade quality. Packaging materials shall be suitable for the type of product the conditions provided for a storage and the equipment of filling, sealing and packaging of food as well as transportation conditions. The packaging materials shall be able to withstand mechanical chemical or thermal stresses encountered during normal transportation in case of flexible or semi rigid containers and over wrap packaging may be necessary. Food products shall be packed in clean hygienic and tamper proof package or container. The sealing material shall be compatible with the product and the containers as well as the closure systems used for the containers.

Tin containers once used shall not be reused for packaging of food. Plastic containers of capacity 5 litre and above and glass bottles which are reused for packaging of food shall be suitably durable easy to clean or disinfect. Printing inks for use on food packages shall conform to IS 15495 specification. Printed surface of packaging material shall not come in direct contact with the food products. Newspaper or any such materials shall not be used for storing or wrapping food.

In case of multi layer packaging the layer which comes in direct contact with food or layers likely to come in contact with food shall meet the requirements of packaging materials is specified in schedule 1, 2 and 3 of these regulations. The materials listed in schedule 1, 2 and 3 of these regulations shall be compatible with their intended use as a packaging material so as not to alter the quality and safety of the food product. Every food business operator shall obtain the certificate of conformity issued by NABL accredited laboratory against these regulations for the packaging material which in comes in direct contact with food or layers likely to come in contact with food to be used. Specific requirements for primary food packaging paper and board materials intended to come in contact with food products, glass containers intended to come in contact with food products, metal and metal alloys intended to come in contact with food products, plastic materials intended to come in contact with food products. Migration plastic materials intended to come in contact with food products all packaging materials of plastic origin shall pass the prescribed overall migration limit of 60 milligrams per kg or 10 milligrams per dm square when tested as per IS 9845 with no visible color migration.

Plastic materials and articles shall not release the substances in quantities exceeding the specific migration limits in milligrams per kg as given below. The barium 1 milligram per kg, cobalt 0.05 milligram per kg, copper 5 milligram per kg, iron 48 milligram per kg, lithium 0.6 milligram per kg, manganese 0.6 milligram per kg and zinc 25 milligrams per kg.

Food safety and standards regulations 2020 for labeling and display, these regulations prescribe the labeling requirements of prepackaged foods and display of essential information on premises where food is manufactured, processed, served and stored. Labeling of prepackaged foods general requirements, every prepackaged food shall be labeled with information as required under these regulations unless otherwise provided. When a food product is sold through e-commerce or any other direct selling means, the mandatory requirements of the label is given in these regulations shall be provided to the consumer through appropriate means before sale. Prepackaged food shall not be described or presented on any label or in any labeling in a manner that is false, misleading or deceptive or is likely to create an enormous impression regarding its character in any respect. Any information or pictorial device written, printed or graphic matter may be displayed on the label provided that it is not in conflict with the requirements of these regulations.

The particulars of declaration required under these regulations printed on the label shall be in English or in Hindi. Label on prepackaged foods shall be applied in such a manner that it will not become separated from the container. Contents on the label shall be clear, unambiguous, prominent, conspicuous, indelible and readily legible by the consumer under normal conditions of purchase and use. Where a package is provided with an outside container or wrapper and such container or wrapper is displayed for a retail sale, it shall also contain all the declarations which are required to appear on the package except where such containers or wrapper itself is transparent and that declarations on the packages are easily readable through such outside container or wrapper. Labeling requirements every package shall carry the following information on the label namely the name of the food.

Every package of food shall carry name of the food which indicate the true nature of the food contained in the package on the front of pack. Whereas, food is specified by certain essential composition under the food safety and standards regulations made under the act that establishes its identity the name provided there in shall be used. In the absence of such name either a common or usual name or an accompanying description of true nature of food shall be used. It may additionally have a coined fanciful brand or trade name subject to compliance of food safety and standards advertising and claims regulations 2018. List of ingredients except for single ingredient food a list of ingredients shall be declared on the label.

Nutritional information nutritional information per 100 gram or per 100 ml or per single consumption pack of the product as per percentage contribution to recommended dietary allowance calculated on the basis of 2000 kilo calorie energy, 67 gram total fat, 22 gram saturated fat, 2 gram trans fat, 50 grams added sugar and 2000 milligram of sodium

which is equivalent to 5 grams of table salt requirement for average adult per day shall be given on the label. Declaration regarding veg or non veg or non vegetarian food the symbol shall consist of a brown color filled triangle inside a square with brown outline and vegetarian food the symbol shall consist of a green color filled circle having a diameter not less than the minimum size is specified inside the square with green outline having the size double the diameter of the circle. The declaration regarding food additives declaration of name and complete address, FSSI logo and license number under the act shall be displayed on the label of the package in contrast colors the background as given in this figure. Fortified food and organic food shall be marked with the logo as specified in the schedule of these regulations FSSI may specify logo for any other food as decided from time to time. Every package of fortified food shall carry the word fortified with name of the fortificant like if it is fortified with iron then here it should be iron and the logo as specified here in this figure on that label it may also carry a tag line Sampoorna poshan Swasth jeevan one under the logo.

Every package of certified organic food as per food safety and standards organic foods regulations 2017 shall carry the logo as specified in this figure. Food labeling and food packaging help the consumers in differentiating between various foods and finding out the best product matching their requirement. There is a significant demand for getting FSSI license or registration in India in order to run a food business. It is crucial for all the food business operators carrying out their business in India to abide by the FSSI's food packaging and labeling regulations. Thank you very much that is all for today.