

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. In the last lecture we have seen the manufacturing of lids and in the present lecture we will be seeing the manufacturing of aluminum containers, the aluminum foils and aluminum tubes. The aluminum foil is a thin rolled sheet of alloyed aluminum varying in thickness from about 4 to 150 micrometer. It was first produced commercially in the United States in 1913 where it was used for wrapping life savers that is a trademark candy bars and chewing gums. In 1921 it was laminated on paper board for folding cartons. Household foil was marketed in the late 1920s and the first heat sealable foil was developed in 1938.

Formed or semi rigid containers appeared on the market in 1949. Why aluminum foils? The food can be kept fresher for a larger period of time when aluminum foil is utilized as a packaging material. Aluminium foils, light barrier, high and low temperature resistance, oil resistance, water resistance, non-toxic and tasteless features keep the food safe and fresh. Aluminium foils are also eco friendly.

These qualities and advantages have made it a popular packaging choice in the food and pharma business. The food packaging business relies heavily on aluminum foil due to its perfect properties and advantages which will be discussed in the subsequent slides. The first is availability. Aluminium is most common metal and third most common material found in the earth square crust. This means that there is an abundant supply of aluminum to be mined for industrial uses including food packaging, confectionary or home care products.

Second is longevity. Even without maintenance, aluminum foil can maintain its integrity for long periods. Aluminium foil will protect products for the duration of their shelf life making it an ideal material for food packaging. It is also corrosion resistant and reacts only to basic substances and highly concentrated acids. Aluminium foil does not absorb liquids which adds to its ability to protect products from outside environmental influences.

It is sterile, tasteless, odorless and dimensionally stable even in a soft state. Aluminium can be endlessly recycled and its recycling process provides a significant amount of

energy savings compared to other materials consuming only 5 percent of its primary production energy. This saves an enormous amount of energy and factory emissions making aluminum a cost effective and environmentally friendly choice for food packaging materials. Versatility. Aluminium is lightweight and has a low melting point while at the same time being very ductile and easy to mold.

This gives aluminum packaging an advantage from a marketing perspective. It can be easily customized due to the flexibility of the material with creative shapes, embossing and printing for brand identification and consumer appeal. This makes it a popular choice for processed food containers, dairy products and even pet food products. High degree of barrier protection. Aluminium provides a complete barrier against moisture, light and oxygen even a very thin foil.

This preserves the quality, safety and aroma of food products that are packaged within it while requiring very little material. Foods packaged with aluminum are safe from bacterial contamination, oxidation as well as moisture and light which can compromise product integrity lightweight. Aluminium is a lightweight material which reduces transportation costs as more products are able to be loaded onto vehicles compared to those packaged with heavier materials. Aluminium can also protect the integrity of food products at very thin gauges which further decreases the weight of the packaging material.

For example, 1. 5 grams of aluminum foil can protect 1 liter of milk for several months providing barrier protection with a minimal increase in the weight of the product. Flexibility. Due to its flexibility, aluminum food packaging is a popular choice for pet food products, dairy products and processed food containers. Aluminium is easily customizable through printing, embossing or creative shapes for consumer appeal and brand identification making it an invaluable food packaging material from a marketing perspective. Aluminium foil is the material of choice for packaging food because it is malleable and has a low melting point.

Thermal conductor. Aluminium transfers heat quickly and homogeneously as a thermal conductor. Aluminium is also incredibly lightweight meaning more products can be loaded onto vehicles thus reducing transportation costs. Colourful packaging. Colourful aluminium packages often sell better as consumers usually choose a specific product because they are attracted to its packaging and design.

Packaging is advertising and product protection in one. In addition to these following advantages are there associated with the aluminium foils. Aluminium foil reacts only to highly concentrated acids and basic substances and is otherwise strongly corrosive resistant. Aluminium foil is sterile and therefore, hygienic. Aluminium foil is tasteless

and

odorless.

Aluminium foil is extremely dimensionally stable even in soft state. Aluminium foil can be recycled several times without loss of quality. Aluminium foil does not absorb liquids. Despite the contrary claims aluminium foil in food packaging is generally harmless to health. Acid or salty foods should not come into direct contact with aluminium, but composite films with aluminium layer can be used.

Suitability of foils. Depending on their thickness aluminium foils and laminates are used for a wide range of food packaging. Films of 10 to 12 micrometre are ideal for chocolates and candies while 30 to 38 micrometre films are used in the dairy industry. For example, for packaging deserts, puddings and yogurt for marmalades and pies.

However, aluminium foil of 50 to 70 micrometre are the right choice. Due to cost reduction the trend is currently going towards increasingly thinner aluminium foils. In the field of chocolate packaging the thickness of the packaging alone decreased by about 30 percent in the last 20 years. Currently the average thickness of chocolate foil is between 7 to 15 micrometre less than the diameter of a human hair. The aluminium foils and laminates are ideally suited for the production of packaging for the tea and coffees, instant beverages, jam and pies, biscuits and cookies, sauces and dried meat, soup concentrates and cooked meats.

Now the aluminium tubes. Use of aluminium tubes as a packaging material has been around for a quite long time. It will remain in reliable packaging material because of its outstanding sealing property which can protect its product contents from exposure to air, light and moisture. Aluminium tubes are also unbreakable and lightweight making it a practical alternative packaging. Aluminium tubes are recyclable making it one the more environmentally friendly packaging material available.

Two types of aluminium tubes are generally manufactured such as collapsible aluminium tubes and rigid aluminium tubes that is aluminium cans. Collapsible aluminium tubes. The collapsible aluminium tube is an unique food package that allows the user to apply the product directly and in precise amounts when required. Collapsible aluminium tubes are used as a primary packaging material for semi liquid products. Typical applications include condiments such as mustards, mayonnaises and saltwater as well as dessert sauces, cheese spreads and pate. As the name suggests collapsible aluminium tubes are soft so that consumer can squeeze the tube to extract the semi solid contents. A rigid aluminium tubes. A rigid aluminium tubes can be used to pack tablets, caplets, aerosol sprays and marker pens. Caplets also use rigid aluminium tubes as a primary packaging material.

The cosmetic industry use aluminium cans for aerosol sprays such as deodorants, perfumed mists, mouth sprays etc. The excellent sealing property of aluminium cans ensure that sprays do not leak. The stationary industry use rigid aluminium tubes for the bodies of felt pen markers. Again the excellent sealing property of aluminium tubes ensure that ink solvents of the markers are contained properly. The advantages are as follows.

The aluminium material does not rust, its oxide is non-toxic, has good shading, excellent moisture and gas barrier, good processing performance, no rebound, thermal conductivity with good ductility, sealing, full protection of the contents. It provides the manufacturing process of the aluminium tube is simple and not easy to be broken. It is easy to use, storage, transportation, environmental protection, durable, beautiful, easy to identify and other functions. Aluminium hose will internal spraying is not easy to react with the contents and does not change the performance of the packaging items. Aluminium tube can really squeeze out the last drop of the contents without waste.

The hard cream, sun screen etcetera packed with aluminium tube is easy to carry not easy to carry. Leaking very convenient. Aluminium collapsible tube compared with the plastic tube with the outstanding feature is more stable. Thank you that is all for today.