

Innovations in food and beverage packaging technology in India

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Nowadays, packaging of a product is rightly considered to be a silent salesman. India's food & beverage packaging industry is blooming and has gained prominence in recent years.

Notably, a major focus of the packaging industry has been the decisive shift towards innovation in order to produce safe, attractive, more informative, sustainable, and environmentally-friendly packaging solutions. As the customer base is increasing globally, food retailing is also transforming. However, due to globalisation and free movement of products, food packaging requires longer shelf life, along with monitoring food safety and quality based upon international standards.

The Government of India is putting all the efforts to spread and invest in science and technology in the packaging industry of India. The packaging industry needs to adapt to all the necessary innovations in terms of technology to fulfil the demand of consumers and meet global standards and the market requirement.

The FSSAI was established with the goal to consolidate all pre-existing laws and food safety standards into a single regulatory body that would be science-based and encompass all of the stages of food processing including its packaging. One of the goals of the FSSAI is to reduce (and gradually phase out) non-recyclable packaging, which is hazardous to the environment and consumers' health. The plan is still in its very first stage, but will have a tremendous impact on the packaging industry and those who depend on it.

FSSAI's focus on packaging is regarding the type of material used as the container. There are strict guidelines about exactly what should not be used to pack food materials as there is concern about the migration of toxic substances from the materials itself or in its barricading properties. Successful international trade is not possible without efficient and tenable packaging.

Packaging has significant importance in the global trade of goods and especially in India, it is essential for the development of the economic growth and GDP. The industry in India is growing at a fast pace and has gained momentum in the e-commerce, processed food, and FMCG industries. Packaging not only protects and maintains the quality of the product but also helps in boosting sales and brand image.

Challenges faced by F&B packaging industry in India

1. Need for longer shelf life for packaged food & beverages; Ease of handling; Ever-growing need/R&D done for packaging materials selection keeping in mind the safety & health of the consumers and the same should also be environment-friendly; Ever-growing demands of consumers; Innovation in terms of design, communication & marketing; Government norms & regulations.

Factors driving demand for innovative and advanced packaging solutions

1. Changing lifestyle leading to increased demand for packaged/convenience food.
2. Government's relaxation in food and beverage import norms.
3. Increasing competition in the market leading to more attractive packaging serving the purpose of brand differentiation.
4. Growing health awareness among consumers.
5. Shrinking family size leading to escalating demand for unit packaging.
6. Exposure to new and improved packaging methods abroad.
7. Rapid urbanisation.
8. Increasing modern retail outlets.
9. Gradual upgradation of rural India to urban lifestyle.
10. Increasing awareness among consumers about recycling & other environmental issues.

Innovation in packaging solutions

The food and beverage packaging industry has come a long way from where it started (basic carton packaging done solely for the purposes of containment and transportation). Apart from its more traditional use, packaging has taken up additional functionality to address rising consumer demands for safety and prolonged shelf life.

While convenience and marketing are important functions of packaging, the industry now looks to packaging to address issues of protection, preservation, and communication. Packaging has become the most important medium of information from food processor to the consumer. Moreover it can easily be observed and monitored as a tracking tool for food safety regulators.

Innovative food packaging is the need of the hour, where information about the current state of the packaged food can be read, felt, seen, or smelt. Innovative food packaging is also done to ensure longer shelf life as new methods continue to emerge in efforts to delay the process of degeneration.

Not only do safe and sustainable methods of packaging solutions provide a reliable method of protection and prevention during various stages like transportation, storage, retail and so on but they also ensure that environmental damage is limited.

Trends that brought innovation in F&B packaging

- Nanotechnology: The use of nanomaterials is widely used in food & beverage packaging industry nowadays. Nanotechnology is being used in plastic food packaging that makes it stronger, lighter and performs better. The antimicrobials such as nanoparticles of silver or titanium dioxide are used in packaging to prevent spoilage of foods.
- Introduction of Tetrapaks: Over the last decade, packaging market in India has evolved

with increasing emphasis on technological innovations including light weight, better barrier properties, and extended shelf life at a reduced cost. Notable shifts in packaging media has also been witnessed with select packaging substrates such as glass and metal giving way to flexibles, liquid packaging cartons, plastics and so on. Introduction of liquid cartons (tetrapak) way back in late 1990s opened up several new markets and a range of products are now being packed in tetrapaks.

- **Robotic Technology:** Few companies have made some strides by using robotic technology in this sector. The use of robotic technology is presently limited in India but will flourish in the coming years.

- **Retort Packaging:** Another technology expected to experience various advancements in near future is Retort Packaging; in which the technological innovation may lead to complete market change in terms of economical and sustainable advantage. For the emerging economies like India and China, retort packaging will create a sturdy demand in the packaging market.

- **PET Packaging:** Poly Ethylene Terephthalate (PET) packaging improves the brand image of the product and is also an economic solution which is well adapted in India.

- **Aseptic Technology:** One more upcoming technology in food & beverage packaging is aseptic technology which is very suitable for India's climate. This technology takes away the need for refrigerated storage of processed food in order to reduce wastage of perishables.

What future holds for us?

In the years ahead, automation and intelligence will be two critical components of the food system, especially in fast-urbanising nations like India. Another major zone of innovation that is likely to open up over the next decade is that of smart packages. Essentially, smart packaging leverages smart materials and programmable nanotechnology to enable a package to sense or measure various attributes of the product and then communicate that information to users by sending, for example, a signal to a smart phone. There are already several local innovations taking this idea forward around the world. In Taiwan, scientists have developed a 3D-printed smart cap with embedded sensors for milk cartons which are capable of detecting spoiled milk. In the US, researchers have developed a low-cost, portable, paper-based label that can detect not only food spoilage but also food contamination.
