# Food Packaging:

# Technology and Market Trends in 2018

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# Presentation Layout

❑ *Overview*

❑ *Technology Trends*

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    ❑ *Active, and Intelligent Packaging*

    ❑ *IoT will Drive the Smart Food Packaging*

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# *Overview*

❖ *The requirements towards packaging is growing owing to the growing consumer interest in consumption of fresh products with extended shelf life and controlled quality, manufacturers have to provide modern and safe packaging*

❖ *According to a recent report it has been found that every year over 30% of the food produced globally is wasted due to lack of proper storage and packaging facilities.*

❖ *Parallelly, the world population is growing and is expected to be over 9.7 billion by year 2050, which means more pressure on food production with limited space, therefore the current approach towards enhancing global food security is to reduce the food damage and wastage during storage by investing into development of novel technologies for food packaging.*

❖ *The recent trends shows that plastic is dominant among food packaging materials, which is gradually being replaced by biobased polymers for packaging of various food products such as bread, beverages, eggs, juices, meat, cola drinks etc.*

❖ *Food packaging based on biopolymers is rational approach especially in developing countries like China, India, Brazil etc. due to availability of low cost raw material from wood waste, molasses etc.*

❖ *Majority of R&D activity is focused on improving the mechanical and barrier properties of various biopolymers by addition of certain additives and plasticizers.*

❖ *In the market context the customers are demanding more transparent packaging to enable visual validation and intelligent packaging that indicates about the condition of the food; both these trends are towards reducing the food wastage.*

❖ *Additionally, the consumers are also demanding ecofriendly and sustainable packaging, a large portion of the consumers are well aware of the adverse impact of plastic packaging and are willing to pay more for the sustainable packaging.*

❖ *Food packaging can be grouped into following major categories; Flexible packaging, Active packaging, Modified atmospheric packaging (MAP), Smart packaging and Others.*

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# Technology Trends

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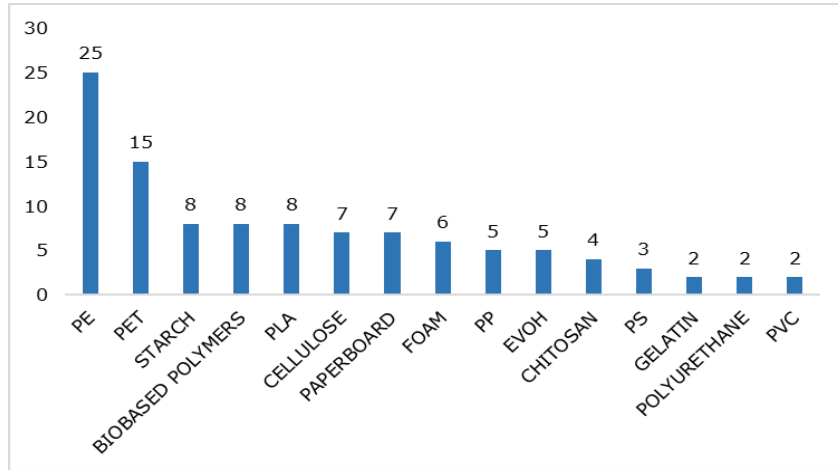
# R&D activity



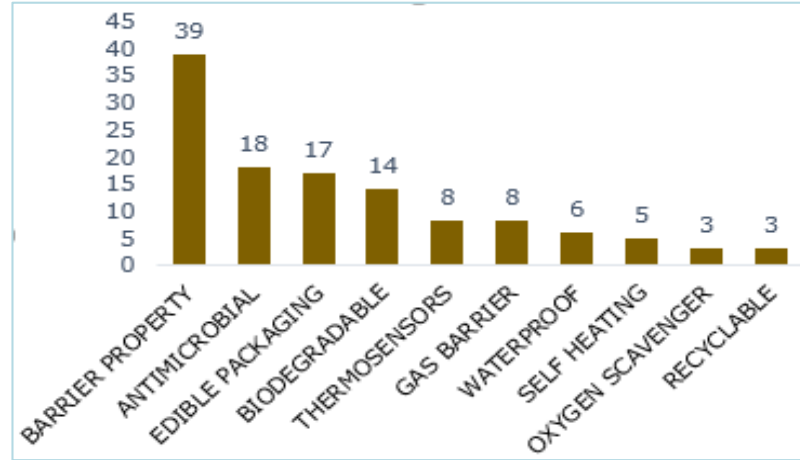Fig. 1 Key polymers/base materials food packaging



Fig. 2 Key features improved for food packaging

➢ Although the **current focus of food packaging industry is towards R&D in biobased polymers** production but still the use of plastic including PE, PET and PP dominated the industry in 2018 due to its better mechanical properties and easy availability **(Fig 1)**.

➢ **Starch, PLA, Cellulose and Chitosan are among the major biopolymers which is under R&D activity in year 2018** for food packaging.

➢ In terms of improvement of various **properties of food packaging materials, properties such as improved barrier properties, antimicrobial properties, oxygen scavenging, biodegradability and improving recyclability** were main focus (**Fig. 2**).

➢ The industry has seen development of smart technologies including thermosensors, pH indicators etc., which help in monitoring the food condition during long term storage and transportation.

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# *Market Trends*

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# Key Trends : Active, and Intelligent Packaging

The growing inclination towards packaged and ready to eat foodstuffs has propelled the active and intelligent packaging market and this trend is likely to continue in 2019. Chopped and packaged fruits and vegetables employ active and intelligent packaging to a large extent. These food release gases within the packaging and it becomes difficult to control the quality and reduce food wastage.

- **Active packaging** is an extension of the protection function of a package and is commonly used to protect against oxygen and moisture. Oxygen scavenging, ethylene scavenging, ethanol release, carbon dioxide release and water vapor removal are some of the methods of active packaging.
- The **Department of Food Science at Cornell University** is undertaking work on using bioactive materials and enzymes on polyethylene films for applications in food packaging.
- **University of Massachusetts** team developed an additive derived from a mix of oregano and cranberry that is capable of inhibiting the growth of listeria in processed meat.
- **Oregon State University** has developed an **edible antimicrobial film** that uses a fiber from shellfish (chitosan) and a protein from egg white (lysozyme).

- **Intelligent packaging** is an extension of the communication function of traditional packaging, and communicates information to the consumer based on its ability to sense, detect, or record external or internal changes in the product's environment.
- **Sealed Air Corp** offers a bag for food packaging Cryovac brand. This bag allows the food to be cooked without removing it from the bag. It also has a **temperature-monitoring system** for perishable food, and flexible pouches that can store wetter foods in less storage space than cans. This also eliminates the chances of contamination due to metal shaving while opening the can.
- **Insignia Technologies** use patented intelligent **pigments and inks** that change color in response to changes in temperature or CO2 level. The color change can be observed under UV lights. The color change indicates about the freshness of the food.

Source: University and company websites

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# Key Trends : IoT will drive the Smart Food Packaging

➤ As discussed in the previous slides**, smart packaging** has become a latest trend in the market. It not only provides active protection of food from environment but also helps in **optimizing the supply chain** and at the same time reduced the food wastage. The additional benefits of IoT includes observing **consumer buying behavior, brand loyalty** and **elimination counterfeit products** among others.

➤ Smart packaging is developing faster than ever, with technologies such as **printed electronics** and the **IoT** helping to communicate with consumers.

➤ Components including but not limited to barcodes/QR codes, sensors/printed electronics, smart indicators, pigments and ink comprise the food packaging IoT infrastructure.

**Currently Available Solutions**



➤ **Amcor** offers a digital packaging system **MaXQ**, that uses barcodes, print and QR codes to grow consumer engagement and loyalty.

➤ **MaXQ digital system** enables the consumers to directly interact with a brand's consumer care team to gain real-time product feedback, customer satisfaction and other measurable marketing insights.

➤ **MagicAdd** provides **internet of packaging (IOP)** using intelligent back-end technology which updates information about a particular product in the cloud during its lifecycle; making it possible to track the product at any time among the supply chain.

➤ This platform uses blockchain to update and store code information securely on to the cloud.

Source: Amcor website, Magic Add website

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