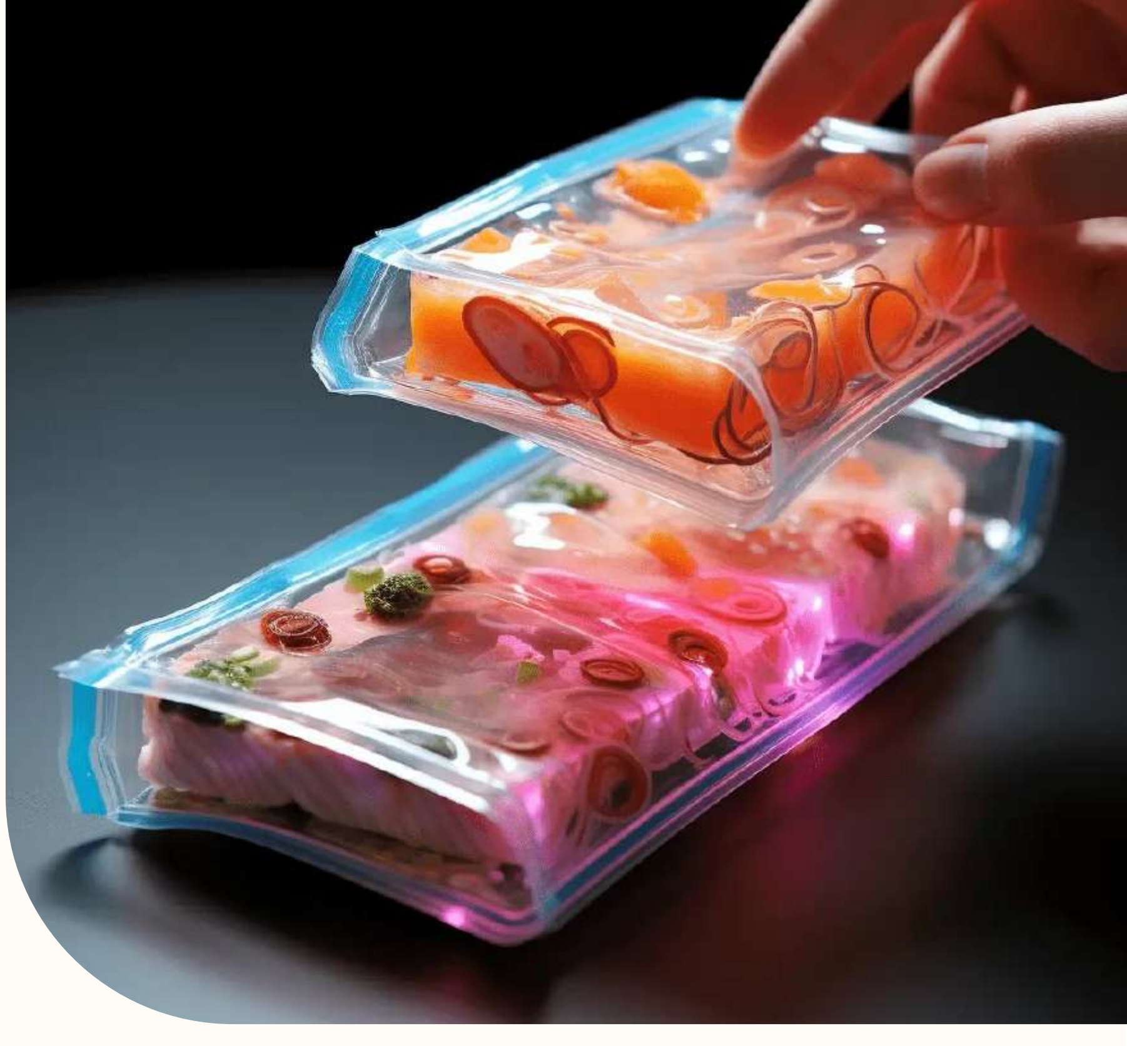
Ingenious e Brain

SUSTAINABLE PACKAGING IN FOOD & BEVERAGE INDUSTRY



Reduction of Plastic Footprint in F&B Industry

What's the buzz about sustainable packaging in the F&B sector?

- Due to increasing consumer awareness, all businesses now place a high priority on the safety and sustainability of product packaging due to the adverse effects that packaging, particularly plastics, has on human health and the environment
- Consumer demand and packaging regulation bodies both have put pressure on the F&B industry to adopt sustainable packaging solutions

Why is climate-positive packaging important?

40 % of total plastic produced is used for Food & Beverages packaging

91 % of the plastic produced is non-recyclable, generating millions of tons of greenhouse gas emissions

Sustainable Packaging Industrial Trends

- Bioplastics (PLA, PHA, PBS, FDCA)
- Plant-based Material (Mushroom, Sugarcane Bagasse, Hemp, Seaweed)
- Compostable Material (Paper, Cardboard)
- Post-consumer Recycled Materials (Plastic, Aluminium)
- Edible Packaging (Polysaccharides, Protein, Lipid)

Consumer Trends

43 %
Customers reckon the importance of sustainability
- *as per The Food Institute's research*

78 %
Customers consider plastic-free packaging is favorable for the environment
- *as per the EIT Food Trust Report 2021*

86 %
Consumers below 45 are ready to pay extra for sustainable packaging
- *as per the global study conducted by Trivium Packaging*

Industrial Trends

Chemical Recycling of Plastics

agilyx

Agilyx uses chemical recycling technology to convert post-use polystyrene waste into recycled styrene monomers

Mechanical Recycling of Plastics

KIVO GROUP FLEXIBLE PLASTICS *Innovation is our motivation*

Kivo uses an extruder to recycle the waste plastic by mechanically grounding & melting it. Later, plastic granules are made from it

Carbon Capture & Transformation into Sustainable Packaging

LanzaTech
DANONE ONE PLANET. ONE HEALTH

LanzaTech NZ, Inc., and Danone, have engineered a bacterium to convert captured carbon into monoethylene glycol (MEG), a building block for sustainable PET bottles

Biowaste into Paper Packaging

tensei

Tensei uses crop waste, grasses, and agricultural residue to manufacture paper-based packaging for the food industry

Waste Gases to Sustainable Packaging Material

MANGO MATERIALS

Mango Materials harvests methane from wastewater and converts it into polyhydroxyalkanoate (PHAs) biopolymers. These pellets can be used to make bioplastic

Municipal Waste to Sustainable Packaging Material

Enerkem
NOVA Chemicals

Enerkem has collaborated with NOVA Chemicals to produce ethylene, a building block of plastic, to achieve recycled content in packaging

Products from Innovative Sources

Solution Provider	Type of Material	Source	Product	Application
NOTPLA	**Seaweed-based Material**	Seaweed	**Notpla Ooho**	Packaging for Beverages
replan RECYCLING PLANET	**Waste Upcycled Material**	Upcycled Polythene & Aluminum	**EcoAllene®,**	Packaging for F&B
CelluForce	**Cellulose-based Material**	Cellulose	**CelluForce NCC®**	Packaging for F&B
Lactips	**Milk Protein-based Material**	Casein Milk Protein	**Lactips Bio Pellets**	Packaging for F&B
seelution	**Bio-based Barrier Material**	Plant	**Skalax®**	Packaging for Sensitive Foodstuff
agilyx	**Post use Polystyrene-based Material**	Post use Polystyrene	**TruStyrenyx™**	Packaging for Yogurt
SULAPAC	**Wood-based Material**	Wood	**Sulapac®**	Packaging for Supplements
ORIGIN	**Carbon-negative Material**	Cardboard & Sawdust	**Beverage Bottles**	Packaging for Beverages
zume	**Fiber-based Material**	Molded Fiber	**Pizza Pod**	Packaging for Pizza
shelf	**Ceramic-based Material**	Ceramic	**Ceramic Ramekins**	Packaging of Dessert Mousse

DID YOU KNOW?

- 12,000 Food Contact Chemicals (FCCs) are utilized to create Food Contact Materials (FCMs) globally
- Numerous regulations have been enacted globally to safeguard consumers from the adverse effects of FCMs used to wrap food & beverages

Regulatory Scenarios in Different Regions of the World

USA

Regulatory Authority: US Food & Drug Administration (FDA)

- FDA thoroughly reviews the FCCs for risk analysis before approval
- Exemptions to risk assessment requirements (under the Threshold of Regulation, Generally Recognized as Safe (GRAS), and Basic Resin Doctrine) are eliminated
- Risk assessment through feeding studies to investigate endocrine disruption and effects on reproduction and nourishment
- Product labels should specify all the chemicals used in food packaging

Europe

Regulatory Authority: European Commission (EC)

- A sound regulatory framework, well-thought-out, and scientifically-supported regulations on FCM
- Issuing a written Declaration of Compliance (DoC) for each FCM is mandatory
- Businesses must mention about abiding by all applicable laws in the DoC and provide proof of compliance through labeling and supply chain documents
- Ensure conformity between FCM legislation and chemical legislation (REACH) to avert using substances prohibited by chemical legislation

APAC

The Asia Pacific region has complicated FCM rules due to the existence of multiple sub-region markets and jurisdictions endorsing local norms. Hence, compliance is needed on the following:

- Generating a list of chemicals prohibited in food packaging and specifying requirements for toxic-free packaging
- Mandate labeling of the chemicals used in packaging and the health hazards they pose

RoW

- South African food regulations are aligned with CODEX Alimentarius Commission guidelines
- The regulatory body prohibits manufacturing and trading of polycarbonate infant feeding bottles comprising Bisphenol A (BPA)
- As per Abu Dhabi Food Control Authority, BPA use is prohibited in manufacturing polycarbonate infant feeding bottles, and the concentration of vinyl chloride monomer shall not exceed 1 mg per kg in the final product

Entity Ecosystem

Solution Provider

Post-consumer Recycled Plastic

Nestlé, General Mills, Keurig DrPepper, McDonald's, Coca-Cola, Mondelēz International, PEPSICO, Unilever, DUPONT

Plant-based Packaging

Kellogg's, Heinz, Fonterra Dairy for life, Tetra Pak PROTECTS WHAT'S GOOD, Coca-Cola, DANONE ONE PLANET. ONE HEALTH

Biopolymer-based Packaging

Ingredion, Arla, kuraray, Cargill, BACARDÍ

Paper-based Packaging

DIAGEO, HERSHEY'S, Carlsberg, McCain, Tyson, Kruger

Start-ups

Plant-Based Packaging

Xampla, BioPack the nature's packaging, Candy Cutlery, agropak, zume

Bio-Based Packaging

Lactips, TIPA Compostable Packaging

Edible Packaging

DO EAT, evoware, Lactips

Seaweed-based Packaging

NOTPLA, kelpi, FlexSea, evoware, B'ZEOS GREEN TECH

Water Soluble Material

INVISIBLE CO., Soarnol, DECOMER TECHNOLOGY

Academia/ Universities

Biopolymer-based Packaging

IUNAN INSTITUTO UNIVERSITARIO DE NANOQUÍMICA, eus Editorial Universidad de Sevilla, NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE, MOKPO NATIONAL UNIVERSITY 1946

Biodegradable Paper-based Packaging

MICHIGAN STATE UNIVERSITY, RIGA TECHNICAL UNIVERSITY 1862, LUND UNIVERSITY, QINGDAO TECHNOLOGICAL UNIVERSITY 1953