SUSTAINABLE PACKAGING

THE TOOLS FOR A FUTURE PROOF FOOD SYSTEM

FOOD 2030: CLIMATE, CIRCULARITY

Sustainable packaging optimises the use of recycled and renewable materials to minimise its ecological footprint and environmental impact. It has to be beneficial and safe for consumers, maximise efficiency, minimise waste generation, and meet market criteria for both performance and cost.

SPECIFIC R&I BREAKTHROUGH TOPICS

New materials: Besides polyethylene terephthalate (PET) and polypropylene, chitosan and polyhydroxyalkanoates (PHAs) are being used as polymers to substitute conventional biodegradable plastics for the packaging industry. The so-called intelligent packaging (consisting of materials that monitor food conditions and/or the surrounding environment where food packages are stored) is also gaining relevance in the packaging scenario.

Biodegradable materials: There are fully recyclable plant-based materials available from food side-streams, like sugar cane, maize, corn, mushroom roots, seaweed agar, potato starch, cellulose pulp, palm leaf, and beeswax. In addition, some original innovations are organic packages made from agro-industrial by-products that are re-usable (eg compostable food packages containing seeds to be planted) or even edible (eg packages made of nuts, dried fruits and seeds).

New recycling methods: Some innovations in the field of polymer recycling are solvent extraction, the conversion of plastic into fuel (using mixed polymer waste that is otherwise difficult to recycle) and depolymerisation, where the polymer is broken down into raw materials or useful chemical intermediates. Anaerobic digestion is an innovative form of recycling that decomposes organic material and turns it into energy.

Reduced packaging: Several steps are being made to minimise packaging volume and weight, including product/packaging ratio, removing unnecessary components or layers (eg turning plastic pasta/baked goods bags into recycled paper ones), but without sacrificing product safety. Some of the most innovative packaging

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No774088

solutions are the disappearing ones, designed in a way so that products do not need packaging at all, or the box in which they are contained can be water-soluble.

New models in the food system: Design thinking is now emerging in the packaging field to elaborate innovative food packaging systems that minimise resource use while being in harmony with shelf life and distribution conditions, as well as consumer food purchase and consumption behaviour.

EXPECTED IMPACT

Higher sustainability of the food system, less environmental impact, better use of resources and waste streams. More sustainable food packaging can improve food safety by reducing bacterial contamination, prolonging shelf life, ensuring convenience in food distribution and handling.

MARKET OPPORTUNITIES / CHALLENGES

- The spread of e-commerce could place a focus on increased packaging requirements.
- Retailers could require ever-longer shelf lives for food products, which could create more niches for smart sustainable packaging technologies.
- Data protection remains a delicate challenge to be faced where consumer behaviour and purchasing habits are concerned.
- Developing sustainable packaging is a multidisciplinary challenge, integrating the packaging industry, logistics, retailers, and primary producers. Therefore, a systemic and collaborative approach is required to reach the sustainability goal.
- Consumers and society at large may have different and conflicting conceptions of what is considered sustainable in terms of packaging, finding the appropriate trade-off represents a challenge itself.

EXAMPLE REFERENCES

Han JH (2014). Innovations in Food Packaging. Academic Press.
Wyrwa, J and Barska, A. Innovations in the food packaging market: active packaging. European Food Research and Technology (2017)
Vanderros et al. (2014) Intelligent food packaging: The next generation. Trends in Food Science & Technology

ASSOCIATED TRENDS IN FIT4FOOD2030 (URL)

- Scarcity of natural resources
- New shopping behaviour
- Responsible consumers
- Biobased packaging
- Packaging 4.0
- Reduction of plastic packaging
- Packaging and health
- Food waste recovery up-cycling/waste cooking.
- Food regulation

ASSOCIATED CASES IN FIT4FOOD2030 (URL)

- Mimica Touch
- TIPA
- BeeBee Wraps
- Eco-Kiddles
- NanoPack
- Novell Compatible coffee capsules#
- Skipping Rocks Lab
- SusFoFlex
- YPACK
- Ecoberries by CoreOrganic

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No774088