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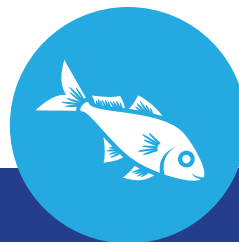


FOODGUARD

Making Food Packaging Future-Proof and Sustainable



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Making Food Packaging Future-Proof and Sustainable

Sustainable Packaging: Why It Matters?

Sustainability in food packaging is no longer optional. Across the value chain, from raw material producers to retailers, stakeholders are navigating rising pressure from consumers and policymakers to reduce environmental impact.

A central question is: **What criteria should we use** to select sustainable packaging for food products?

This newsletter outlines Pack4Food's three key messages:

1. Why sustainable packaging must start with the food product
2. How to apply eco-design principles (the 5 R's)
3. What future-ready recycling and policy frameworks are emerging

Policy Spotlight: The EU Green Deal sets ambitious climate targets, including a 55% cut in greenhouse gas emissions by 2030. Packaging systems must evolve to meet these goals. **FOODGUARD** supports this transition by aligning the packaging of the food pilot case studies with current and upcoming EU legislation.

Key Principle #1: Always Consider the Packed Product

Packaging has **four key functions**:

- Containment
- Protection
- Convenience
- Communication

Sustainable food packaging is effective only if it protects the food, ensures its shelf-life, reduces waste and is at the end recyclable.



Did You Know?

Using less packaging may sound sustainable but it can backfire. The SORAS Curve illustrates how reducing food packaging too much may lead to increased food waste and hence its total environmental impact.

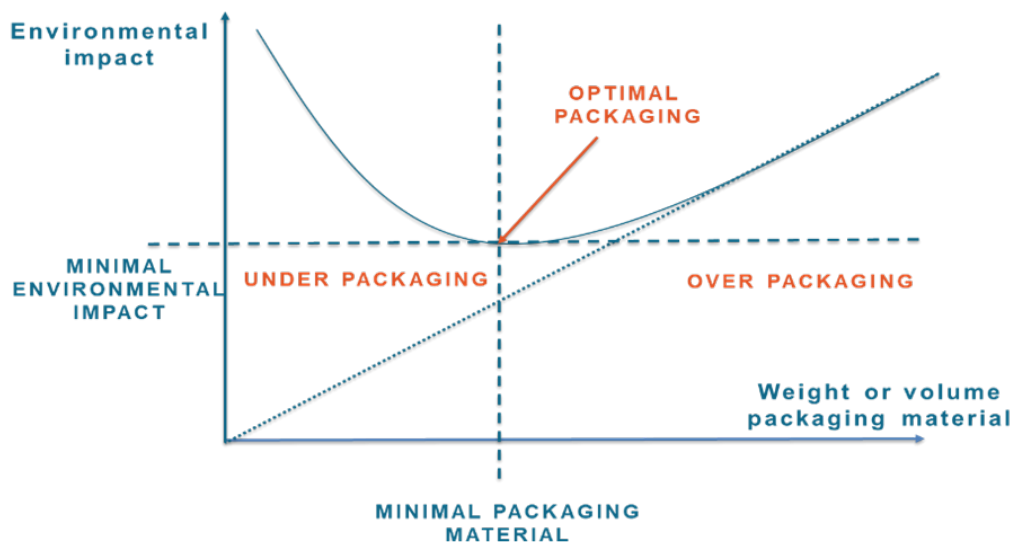


Figure 1: Representation of the SORAS curve, developed by Innventia ab

To optimize **packaging sustainability**, the following steps are necessary:

- Assess the food's intrinsic properties (e.g. pH, moisture)
- Map extrinsic factors impacting the food's shelf-life (e.g. O₂ exposure)
- Design packaging that balances shelf life with material efficiency

THE 5 R's OF ECO-DESIGN

Key Principle #2: Apply Smart Eco-Design

Food packaging must be optimized through the **5 R's strategy**:

- **Remove:** Eliminate unnecessary packaging or packaging components
- **Reduce:** Use less material or switch from multilayers to monolayers
- **Reuse:** Enable return or refill models (e.g. deposit systems), with safety and return logistics in mind
- **Recycle:** Use materials that can be recycled (e.g. monolayers) and integrate recycled content when possible and safe.
- **Renewable:** Explore bio-based or fibre-based materials, ideally from waste streams

Eco Tip: A technically superior package must be used correctly across the whole value chain—from production to consumer, to realize its full environmental benefits.

END-OF-LIFE MATTERS

Key Principle #3: Design for End-of-Life and Circularity

A package's journey doesn't end at disposal. Effective systems must support:

- Efficient collection
- Accurate sorting
- Scalable recycling



Focus on Plastics

EU Regulation 2022/1616 allows PET mechanical recycling from post-consumer waste and polyolefins recycling from post industrial waste in closed-loop systems

Emerging technologies for chemical plastic recycling:

- Dissolution (e.g. APK, Saperatec)
- Depolymerization (e.g. Cure)
- Pyrolysis (e.g. Renasci, Sabic)



Focus on Paper & Cardboard

These are widely recyclable but for food application often coated to increase barrier properties, complicating recycling. **4Evergreen Consortium** is setting recyclability standards.

Guidelines to Watch:

- **Recyclass:** For plastic recyclability
- **Ceflex:** For flexible packaging
- **Upcoming EU acts linked with PPWR (40/2025):** Will define recyclability standards

INNOVATION & FINAL THOUGHTS

Smart Solutions and Real Impact

In addition to material innovation, FOODGUARD leverages smart packaging technologies to cut waste and carbon impact.

iFGMS Platform or intelligent FOODGUARD Management System

- Monitors temperature across the food chain
- Uses IoT + machine learning to predict shelf life
- Provides data-driven insights to optimize packaging
- Includes block chain to guarantee traceability

Dynamic Labels & Sensors

- Real-time “best before” information
- Consumer education for proper storage and reduced waste

Conclusion: Moving Forward Together

The path to sustainable packaging involves the whole value chain!

FOODGUARD promotes:

- **Packaging design starts from** the specific **food shelf life** needs first
- **Packaging needs continuous** optimization

A **value chain thinking approach** is needed: together, we can make food packaging smarter, safer and more sustainable to decrease food waste!



Figure 2: Representation of the pilot food cases in FOODGUARD

This newsletter is part of Deliverable 2.2 “Developing Sustainable Packaging Solutions for FOODGUARD Pilot Cases”

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