

Module's syllabus

Title: Eco-Design of Food packaging

General information	
Course	Eco-design of food packaging
Scope	Sustainability, design thinking, food safety
Language	English
Evaluation	Case studies/ multiple choice questions
Holders	Milena Corredig
Length	One day course
Didactic method	Lectures with activity-based content
Location	Online or in class or hybrid

Learning objectives
<ol style="list-style-type: none">1. Understand the fundamentals of eco-design and its importance in the context of food contact materials.2. Identify sustainable materials suitable for food packaging applications.3. Understand the environmental impact of different food packaging.4. Develop innovative and sustainable design solutions for food packaging.

Required skills

Learners need a multidisciplinary skill set, including a foundational understanding of environmental sustainability (eco-design principles, life cycle assessment, and the UN's SDGs), food packaging basics (material properties, functions, and sustainability challenges), and safety and risk assessment (food safety regulations, toxicology, and migration studies). Knowledge of materials science, particularly biodegradable and compostable materials, is essential, alongside the ability to balance functionality, sustainability, and cost in design thinking. Learners should be proficient in analysing case studies, understanding eco-design standards, and interpreting sustainability data. Additionally, skills in communication, interdisciplinary collaboration, and awareness of emerging trends like circular economy, sustainable-by-design and eco-design for innovative materials are important, as well as a basic understanding of statistical methods for risk assessments and lifecycle analyses.

Subjects

Challenge based lecture/discussion: How can we design safe food packaging that minimizes environmental impact across its entire lifecycle—from material sourcing to disposal—while still ensuring food safety, durability, and consumer convenience?

Teaching session 1: Eco-design principles and Safe and Sustainable by Design (SSbD)

Teaching session 2: Safety and risk assessment of eco-designed food packaging

Case study 1: Identify an existing fossil fuel plastic that can be replaced by an eco-designed plastic, e.g. PET with PLA, based on food and functional properties

Teaching session 3: Existing eco-designed food packaging materials. Pros and cons

Case study 2: Propose/describe an innovative solution from holistic perspective (applications, environmental impact, raw materials, cost etc.)

Teaching methods

Lectures, case studies

Verification of learning

The achievement of the training objectives for the six teaching sessions would be assessed through the presentation of the required topics, evaluating the learner's ability to analyze, synthesize, and articulate their thoughts, as well as their judgment and calculation skills. Specifically, multiple-choice questions and case studies are used to assess decision-making in scenarios that reflect real-world conditions related to eco-design of food packaging. These methods help gauge how well learners apply their knowledge in practical, operational contexts.

Indicative resources

- European commission, Research and Innovation/Safe and sustainable by design/[Link 1](#)
- European commission, Joint Research Centre/ Safe and sustainable by design chemicals and materials-Framework for the definition of criteria and evaluation procedure for chemicals and materials/[Link 2](#)
- European commission, Joint Research Centre/Eco-design for Sustainable Products Regulation-preliminary study on new products/[Link 3](#)
- European Food Safety Authority (EFSA)/ Principles that could be applicable to the safety assessment of the use of mixtures of natural origin to manufacture food contact materials/[Link 4](#)
- Intentionally (IAS) and non-intentionally added substances (NIAS)/European Commission (EU) Regulation 10/2011/[Link 5](#)
- Food contact chemicals in life-cycle assessment/ Challenges of including human exposure to chemicals in food packaging as a new exposure pathway in life cycle impact assessment/[Link 6](#)
- Food waste and date labelling/[Link 7](#)

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