

Packaging in the dairy industry

The high legal and safety requirements for packaging in the dairy industry

Packaging is an integral and essential component of the food and drink value chain, from the production stage to the consumption stage, and supports resilient and sustainable food supply chains. This fact sheet intends to illustrate the key role of packaging – designed to minimise its environmental footprint and following a circular economic model – throughout the dairy supply chain and in the consumers' daily lives. The focus is on the high legal and safety requirement followed in the dairy industry whilst ensuring functionality and sustainability.

To know more about how the dairy industry chooses its packaging options, [check out our fact sheet!](#)

I. The functions of packaging

When choosing the most suitable packaging design, many aspects must be taken into consideration. *Graphic adapted from (1):*



Convenience

- ✓ Product preparation and serving
- ✓ Product storage
- ✓ Portioning
- ✓ Easy opening and reclosure

Protection

- ✓ Increase shelf life
- ✓ Prevent breakage: *mechanical protection*
- ✓ Prevent contamination, tampering and theft
- ✓ Prevent spoilage: *barrier to moisture, gases, light, flavours and aromas*



Handling

- ✓ Transport from producer to retailer
- ✓ Point of sale display




Information

- ✓ Product identification
- ✓ Product preparation and usage
- ✓ Nutritional and storage data
- ✓ Safety warnings
- ✓ Contact information
- ✓ Opening instructions
- ✓ End of life management
- ✓ List of ingredients



Unitisation

- ✓ Provision of consumer units
- ✓ Provision of retail and transport units

Promotion

- ✓ Description of product
- ✓ List of ingredients
- ✓ Product features & benefits
- ✓ Promotional messages and branding



Waste reduction

- ✓ Enables centralised processing and reuse of by-products
- ✓ Facilitates portioning and storage
- ✓ Increases shelf life
- ✓ Reduces transport energy
- ✓ Easy emptying



The main function of packaging is to deliver products to consumers in optimal condition. Food packaging plays an important role in ensuring food safety, hygiene and consumer protection while also providing for a smooth food supply. Its primary function is to contain, preserve and protect the product throughout the manufacturing, transport, storage, and consumption chain, enabling consumers to get safe and proper access to nutritious food. ⁽²⁾

Good packaging is designed to be the most adequate for a specific product's requirements and constraints at each stage of its life cycle while minimising the economic and environmental impacts of both the product and its package. Well-designed packaging uses only the right amount and type of material needed to perform this task. ⁽¹⁾ The basic role of dairy packaging, as well as for any other food product, is to ^(2,3):

- ✓ provide a physical barrier to food in order to prevent the item from different damage (mechanical, physical, microbial contamination, etc.)
- ✓ allow efficient transport distribution
- ✓ offer convenience
- ✓ constrain weight and nutrient losses
- ✓ prolong shelf life (milk is the best example of a food product whose shelf life can be extended from hours into weeks and months thanks to processing technology, packaging material and technology)
- ✓ reduce waste
- ✓ reduce the use of preservatives while maintaining the taste and nutritional value of food
- ✓ enable easy use
- ✓ inform the consumer about the content and underlining key information of the packed product
- ✓ maintain the best product quality
- ✓ help to promote goods in a competitive marketplace



Did you know?

The first packaging of milk started with the introduction of sterilised milk processing, in which the glass bottle formed an integral part. The glass bottle as the retail package for milk was used until the 1930s, at which time waxed paper was introduced. The development and introduction of plastic materials, both alone and in combination with paper, resulted in a wide range of containers suitable for dairy products packaging. ⁽⁴⁾

Spotlight on food safety

The dairy sector has a long tradition of guaranteeing and improving the quality of its products, including from a food hygiene perspective. Food safety is the result of the compliance with legal requirements in terms of food and feed hygiene and of industry's own checks. The dairy sector has complied with all these requirements and principles for decades and they are updated on a regularly basis.

The overall concept of 'Food safety culture' is in place all along the dairy sector. Such an approach – a combination of strict compliance with EU hygiene legislation and often special standards specific to our sector – entails good cooperation across the dairy chain, focus on research and innovation, additional survey and monitoring programmes, and ability to address new challenges.

Many dairy products require specific handling at production level, in transportation and in the consumer's home. This can only be achieved with the adequate packaging that safeguards the products from external influences and remains as light and practicable as possible. The design of dairy packaging needs to assure safety and quality as a non-negotiable baseline before addressing logistics, recyclability and other criteria.

Traceability measures must be in place to make it possible to recall any defective products or provide the public with specific information. National authorities may suspend the use of a particular material if detailed grounds emerge that it might endanger human health. They immediately inform the European Commission and the other EU countries of their decision. ⁽²⁾

Food contact materials

Packaging materials and articles such as bottles and containers that get into contact with food, either directly or indirectly, must be identified as 'for food contact'.

- ✓ Dairy producers have an extensive set of rules to comply with, namely the [Hygiene Regulation \(EC\) No. 852/2004](#), the [Food Contact Material regulation 1935/2004](#) and the [General Food Law Regulation \(EC\) No. 178/2002](#).
- ✓ Many materials are difficult to recycle with today's existing technology and infrastructure, and even less meet the strict quality and food safety requirements for food and drink applications.

Food waste prevention

30% of food is wasted globally across the supply chain, which – by producing almost 10% of global greenhouse emissions – is the biggest contributor to carbon emissions. It is still difficult to measure the amount of consumer waste, which is the main part of food waste.

Packaging materials and packaging design can guarantee a longer shelf life of dairy products, thus reducing food waste.

Packaging has to be as sustainable as possible, but never at the expense of its primary role, which is to protect the food inside from spoilage, prolong its shelf life and reduce food waste, whilst maximising efficiency in the food supply chain. If the function of packaging is compromised, then more resources are lost in the end than are saved. For example, around 3% of the carbon footprint of a packaged food product is linked to packaging and 97% to food. This shows the importance of protecting the food adequately along the chain. ⁽⁵⁾



Did you know?

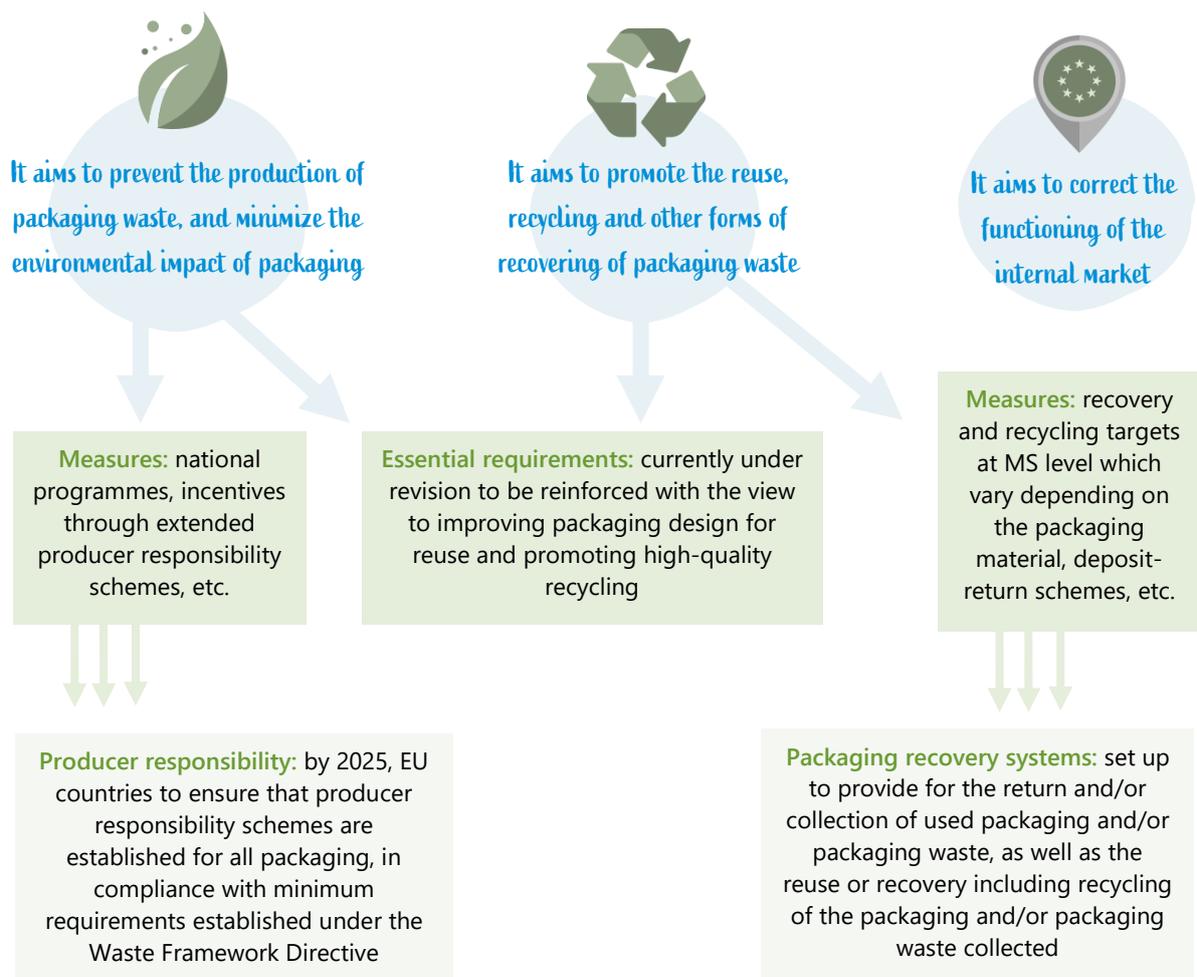
In this framework, the [Dairy Product Environmental Footprint \(PEF\)](#) methodology is a very useful tool, as it will allow to measure improvements in a product environmental impact following some changes including on packaging choice.

II. Legislation

The 1994 EU Packaging and Packaging Waste Directive (PPWD) (Dir./62/ED) was revised in 2018 (Dir. 2018/852). This revised Directive has become law in the EU countries in July 2020. The packing legislation is currently undergoing a new revision, which constitutes **an essential aspect of the new EU Green Deal and Circular Economy Action Plan**.

The PPWD as amended sets out the EU’s rules on managing packaging and packaging waste. It covers all packaging placed on the European market and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household, or any other level, regardless of the material used. ⁽⁶⁾

About the EU Packaging and Packaging Waste Directive:



III. Packaging sustainability

Sustainable packaging should address and balance the overall environmental footprint of the packaging, its functionality and food waste. Its sustainability should be assessed based on data. **In this framework, packaging design is only one important aspect, as it needs to be complemented with a more unified policy, and efficient collection systems and recycling infrastructure across Europe.** In fact, even the most sustainable packaging is not enough if the end-of-life infrastructure is not adequate. A sustainable packaging should ⁽¹⁾:

- ✓ be designed holistically with the product to optimise overall environmental performance;
- ✓ be made from responsibly sourced materials;
- ✓ be designed to be effective and safe throughout its life cycle, to protect the product;
- ✓ meet market criteria for performance and cost;
- ✓ meet consumer choice and expectations;
- ✓ be sorted and recycled or recovered efficiently after use.

Life cycle approach

When choosing the appropriate packaging for a product, companies consider the full life cycle of a product, encompassing the environmental pressures and benefits, the trade-offs and areas for achieving improvements. In this framework, the packaging choice must be done carefully by taking a life cycle approach.

According to a recent European study ⁽⁷⁾, **if plastic were to be replaced by other materials in its principal applications**, the weight of packaging would increase almost fourfold, there would be a 60% increase in the volume of waste produced and a 57 % increase in lifecycle energy consumption.

Similarly, if packaging is reduced, at some point the increase in product loss may exceed the savings from the use of less packaging material. Indeed, since the environmental impact of the product in most cases is more than 10 times the impact of the packaging, the environmental damage of such a 'saving' is enormous. **Any reduction in packaging beyond that point is a false economy since the total amount of waste in the system increases.** ⁽¹⁾ For example, the CO₂ footprint of food waste might be higher than the CO₂ footprint of the package itself, without forgetting the other relevant environmental indicators as outlined in [the Dairy PEF](#).

Did you know?

Collection is the precondition to recycling. Collecting all packaging materials separately significantly increases the volume of materials available for recycling, which in turn creates a more predictable, high quality waste stream.

This provides a strong incentive for investment and innovation in sorting and recycling technologies, which creates green economic.



Research & innovation

Research, investment, and innovation in sustainable cutting-edge solutions play a vital role in supporting the reduction of packaging waste and enhancing the sustainability of packaging in an economically viable manner. Such innovative solutions contribute positively to the overall environmental footprint of dairy products and to the dairy industry's overarching goal of fostering sustainable production while ensuring the protection of our consumer's health.

Packaging of dairy products develops continuously along with advances in material technologies, which are in turn a response to consumer demands.⁽³⁾ Examples of such innovative food packaging are the so-called 'active' and 'smart' packaging techniques, which can extend the shelf life of food and give information on its freshness, provided it does not adversely affect its composition.⁽²⁾

Active packaging

Active packaging – which has been commercialised so far – mostly includes substances that absorb moisture, oxygen, carbon dioxide, ethylene, flavours and odours or release carbon dioxide, antimicrobial agents, antioxidants and flavours.⁽⁴⁾ Modified atmosphere packaging (MAP), for example, can be applied to dairy products to control some of the associated fungal problems and extend their shelf life.⁽³⁾

Smart packaging

Smart packaging features special functions resulting in safer, more nutritious or appealing food products, whilst being environmentally friendly. It can convey more information and yield improved traceability. In addition, smart packaging technologies can be further optimised by the incorporation of nanotechnology, enhancing package function. Intelligent packaging contains a device that can monitor the condition of the product, package or packaging environment. Mostly used in dairy packaging are time-temperature indicators and indicators of ripening.⁽³⁾

IV. References

- (1) <https://euopen-packaging.eu/>
- (2) <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1592318736233&uri=LEGISSUM:I21082a>
- (3) https://www.researchgate.net/publication/329809548_Packaging_perspective_of_milk_and_dairy_products/
- (4) <https://www.newfoodmagazine.com/article/27263/dairy-packaging-materials-and-methods/>
- (5) Tackling the food waste challenge with science, p.11, Packaging Europe volume 15.3 2020
- (6) <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1592318736233&uri=LEGISSUM:I21207>
- (7) European Commission, press release, 16 January 2018, in EESC opinion on the Plastic Strategy (NAT/721)

European Dairy Association (EDA)

www.euromilk.org/eda

eda@euromilk.org

Avenue d'Auderghem 22-28, 1040 Brussels, Belgium

[@EDA_Dairy](https://twitter.com/EDA_Dairy)