

Packaging in the dairy industry

How the dairy industry chooses its packaging options

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 what drives the dairy industry towards specific packaging options, in particular regarding the choice of the packaging material.

To know more about the high legal and safety requirement for packaging in the dairy industry, [check out our factsheet!](#)

I. Packaging choice

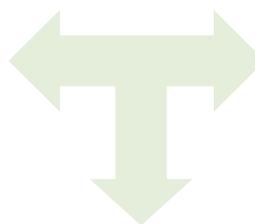
Milk and dairy products are packaged into different materials considering numerous factors such as product type, processing and storage conditions, requirements for handling and the end purpose. Most frequently glass and/or plastic bottles, laminates (multilayer materials), pouches, plastic tubs, cans and other containers are used. All of those have one thing in common – they must provide all product information required by the legislation. ⁽¹⁾

There is no good or bad packaging material as such, or a 'one-size-fits-all' approach, it all depends on the balance between the necessary packaging function and the minimum effect on the environment. Although it is generally required for a packaging material to be inert and not to interact with the packed dairy product, current trends go towards the development of packaging that includes certain interactions in order to extend the shelf life. This is provided through a so-called active, smart or intelligent packaging concept ([check out our factsheet on Dairy's high legal and safety requirements](#)). ⁽¹⁾



- ✓ Improve the design
- ✓ Find new more sustainable materials
- ✓ Recyclability, reusability and compost-ability
- ✓ Recycled content
- ✓ Collection

Overall dairy strategy



- ✓ Food safety
- ✓ Food waste

Development of functional, safe and environmentally friendly packaging solutions

II. Packaging materials



Plastics

Plastics, made from oil or biomass, exist in a number of specialised varieties. Polyester (PET), polyethylene (PE and HDPE), polystyrene (PS), and polypropylene (PP) are used to make bottles and other lightweight containers as well as flexible packaging. ⁽²⁾

Plastics as a packaging product combines flexibility (from film to rigid applications), strength, **lightness, stability and ease of sterilisation**. Plastics food packaging, for instance, does not affect the taste and quality of the foodstuff. **In fact, the barrier properties of plastics ensure that food keeps its natural taste while protecting it from external contamination.** ⁽³⁾ Plastic packaging is also very resistant to moisture, heat and cold, and it facilitates convenient storage and distribution options. Multi-laminated plastics films provide long shelf life for perishable food. Plastic packaging can be reused, recycled or used for energy recovery. Certain types of plastics can also be composted. ⁽²⁾

High-density polyethylene (HDPE) bottles are best suitable for storing pasteurised milk. Polyethylene terephthalate (PET) is another plastic material used for milk packaging. Pigmented PET protects the food from light, which in turn helps to protect food flavour against light-induced lipid oxidation.

Drinking-yogurt products are packaged in HDPE bottles sealed with either aluminium foil laminate heat-seal closures, or with PE-LD caps. Bottles made from other plastics (e.g. PET) may also be used.

Opaque or semi-opaque packaging materials, most usually containing a white pigment such as TiO₂, are normally used for yogurt ⁽⁴⁾, i.e. polystyrene – used mainly for the thin-wall type packaging – is common for dairy products such as yoghurt, buttermilk and dairy desserts. ⁽⁵⁾

Different types of packaging concepts are also required for various types of cheeses. Permeability to O₂, CO₂, and water vapour transmission rates for packaging films are among the most essential factors in determining the package atmosphere composition, which may influence the product's deterioration rate. ⁽⁴⁾



Metal

Metal, including aluminium, is used to make containers, foils and closures. Foils are often used in laminates with paper and plastic materials to make flexible packaging and food and beverage containers. ⁽²⁾

Due to its strength and rigid nature, metal packaging is filled at high speeds with virtually no product loss, increasing overall efficiency including energy and CO₂. Metal packaging is easy to handle in store, reducing spoilage and costs. It is unbreakable, reducing the risk of leaking or tearing during transportation, warehousing, on retail shelves or in consumers' homes. ⁽⁶⁾

In the dairy sector metal is used in a few applications, like cans for condensed milk and milk powders, and aluminium foils for butter.



Cardboard

Paper and board are based on organic fibres from wood and other biomass sources. For product packaging, paper is frequently used in combination with coatings, foil, wax or plastic materials to provide barrier properties and seal-ability. ⁽²⁾

Cartons are used to protect and distribute some dairy products, and are, on average, made of (by weight):

- ✓ **75% paperboard** – a renewable material stemming from responsibly managed forests
- ✓ **21% polymers** – mostly polyethylene, to prevent leakage
- ✓ **4% aluminium** – to protect drinks and food from light and oxygen

Products packaged in cartons can be stored up to 12 months without refrigeration and need for added preservatives. The cartons for fresh dairy products do not require aluminium layers. They are distributed refrigerated.

Paper is readily recycled, and high recycling levels are achieved. Once recycled, the fibre is used for other applications in paper-based products. ⁽²⁾ Cartons are either collected with lightweight packaging or with paper-based packaging.

Carton packages for dairy products have a low carbon footprint through their lifecycle. Moreover, the product-to-packaging ratio for food & drink cartons is as high as 96:4, meaning only four percent is packaging while the remaining weight is the product inside.

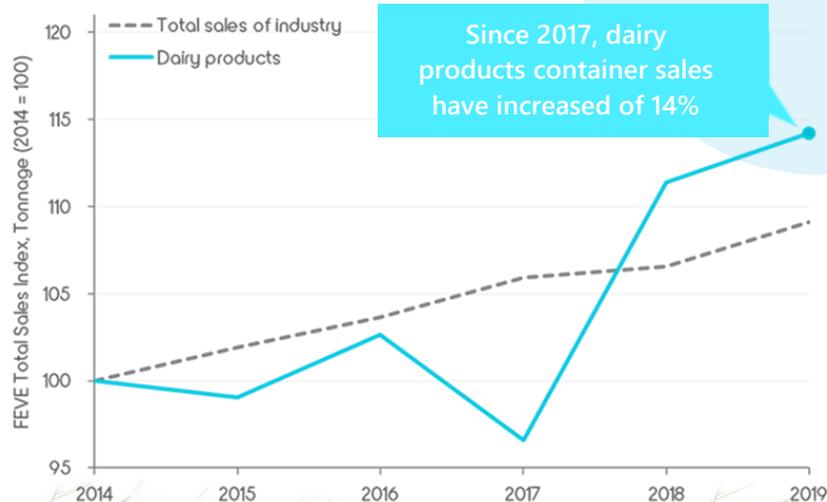
Cardboard is mostly used for liquid milk and drinkable fermented milks containers, as well as cream and other liquid dairy products.



Glass

Made from sand, soda, ash and limestone, glass makes impermeable containers that are easy to open and reclose. **It is inert and thus it is safe to store food and drinks. Glass is 100% recyclable and can be recycled endlessly with no loss in quality or purity. Glass recycling is a closed loop system, creating no additional waste or by-products.**⁽⁷⁾ In most countries, bottles and other glass containers are either returned to be refilled or are recycled at a high rate. ⁽²⁾

In dairy, glass is used mainly for desserts and fermented milks, and for liquid milk. Dairy is around 1% of the total sales of glass packaging by weight in 2019 and around 4% of total sales in the 'food' category.



Source: FEVE

III. Best practices

The dairy industry is involved in many initiatives to further streamline the environmental impact of its packaging and strives to also find improved solutions for collection and recycling. Most dairy companies have targets on reusability, recyclability, composability, as well as recycled content, sorting and collection, design, and carbon footprint of packaging. For example:

Carbon footprint: significant reduction in the carbon footprint of packaging

Packaging recyclability: aiming at packaging 100% reusable, recyclable or compostable, and more than 50% of plastic packaging actually recycled

Recycled content: increase share of recycled content in our packaging, where food safety and regulation permits

Recycling infrastructure: cooperate with municipalities and other external stakeholders to improve recycling systems

Food waste: help consumers reduce food waste through guidance and suitable packaging

Littering and marine pollution: cooperate with municipalities and other external stakeholders to avoid littering and reduce ocean plastic pollution

Sustainable design: work with suppliers and engage in research to find new more sustainable materials and improve the design of dairy packaging



- ✓ Eliminate problematic or unnecessary plastic packaging
- ✓ Reduce the weight of packaging
- ✓ Increase use of certified materials
- ✓ Increase use of bio-based plastic
- ✓ Use mono plastic materials suitable for recycling

IV. Case studies in the dairy sector

FrieslandCampina

Sustainable Packaging assessment tool developed by Quantis: LCA based with indicators for recyclability and food waste ⁽¹³⁾

FrieslandCampina

Recyclable cheese packaging, and further plastic reduction ⁽¹⁴⁾

FrieslandCampina

Use of paper straws ⁽¹⁵⁾

FrieslandCampina

Plant based packaging for Chocomel ⁽⁹⁾

Danone

Actimel black bottle uses special pigments that are near infrared-detectable, making them easy to sort and recycle ⁽¹¹⁾

Arla

1kg container format used for Arla's global Skyr brand in Denmark, launched in April 2020. It reduces plastic content by 40% and CO2 footprint by 30% by removing 16 grams of plastic and utilising cardboard to provide the container with sufficient solidity

Arla

Arla Germany's fresh organic white milk range converted in March 2020 to a new carton using unbleached cardboard combined with bio-based plastics to move from fossil to renewable packaging

Arla

The new format for Kærgården spreadable butter "Natural Tub", to be launched in 2020-2021, becomes 100% recyclable by converting to a mono material PP with an easily removed cardboard wrapper to provide solidity

Valio

All gable-top milk, buttermilk, cream and yoghurt cartons completely plant-based. The caps are also fully plant-based ⁽¹²⁾

Valio

Their delicacy cheeses' new packages are now made from at least 90% recycled plastic. Over 50% of Mifu slice and Mifu jauhis packages' plastic is recycled ⁽¹⁰⁾

Nestlé

Creation of the Nestlé Institute of Packaging Sciences, dedicated to the discovery and development of functional, safe and environmentally friendly packaging solutions ⁽⁸⁾



V. References

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