Milk factsheet

Aseptic packaging and technology: Making perishable foods safe and available

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We rely on food and beverages for our daily nutrition. Many of these items, such as milk, juice and plant-based alternatives, are highly perishable. Their short shelf lives present **many sustainability challenges**.

The EU produces
250
MILLION TONNES
of perishable foods per year.[1]

If not aseptically processed and packed, perishables must be kept in the cold chain, with a shorter shelf life.

Otherwise, the food will decay and spoil within days.

Failure to follow precautions may pose risks to human health.

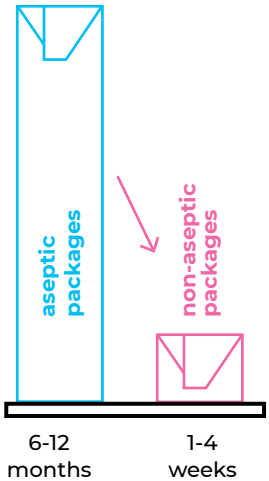
European policymakers now face the challenge of regulating packaging for this type of food **in line with the EU Green Deal ambitions,[2] aiming to make food systems sustainable and resilient**, while supporting reduction in food loss, food waste and carbon footprint.

The aseptic process of heat treatment, filling and packaging at the food producer enables the absence of harmful microorganisms across the entire distribution chain until consumption.

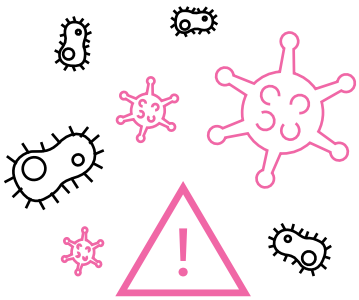
Everything in the production chain must be commercially sterile. That includes food and packaging materials, all machinery and the environment in which the food is packaged.

Without aseptic packages:

1 Shorter shelf life of perishable foods[3]

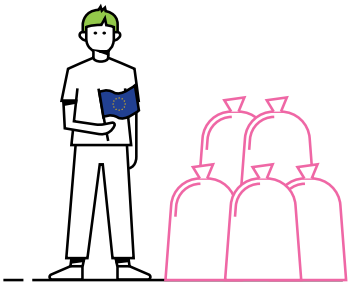


2 Increased growth of pathogens posing a health risk[4]



Food and beverages need to be at **pH <3.7 and kept at <4°C** along the whole value chain to exclude at least bacterial foodborne pathogens. This would require a redesign of the entire distribution chain.

3 Increased risk of additional food waste



131kg
food waste
per EU citizen per year [5]

[1] Key figures on the European food chain, Eurostat, 2021 / [2] A European Green Deal, European Commission, 2019 / [3] Extended shelf life milk-advances in technology, Rysstad and Kolstad, 2006 / [4] Growth of food-borne pathogens Listeria and Salmonella and spore-forming Paenibacillus and Bacillus in commercial plant-based milk alternatives, Klaudia Bartula, Máire Begley, Noémie Latour, Michael Callanan, FOOD MICROBIOLOGY, 2023. / [5] Food waste per capita in the EU remained stable in 2021

By using aseptic packaging and technology, perishable foods:

- can be stored at ambient temperatures
- for 6-12 months
- without the need for cold chain distribution
- minimising food loss and waste during distribution and in homes

From Cow to Carton. Aseptic processing and packaging of milk for better health and more time on the shelf

Europe produced an estimated 160.1 million tonnes of raw milk in 2021[1]. As a highly sensitive product, milk requires stringent processing and packaging solutions.

Milk coming from a healthy cow is virtually bacteria free. As soon as the milking process begins, it becomes vulnerable to contamination by microorganisms. Since milk is a conducive environment for microbial growth, it is important to keep the milking area and equipment very clean to maintain good raw-milk quality.

The way milk is subsequently processed, packed and handled throughout the value chain impacts food safety, shelf life and the probability of food waste.

Food safety: Milk is heat treated to reduce or eliminate bacterial content. It is then stored using aseptic packaging technology which protects it through the distribution process so that it remains safe until consumption.

Shelf life: Through heat treatments and with aseptic packaging technology, milk shelf life can be extended to 6 - 12 months at ambient temperature. This process removes the need for cold chain distribution and reduces the potential for food waste.

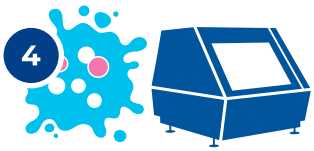
How long shelf life is achieved

1 Safe, high-quality milk production begins on the farm. Quality checks are conducted on raw milk for bacteria contamination which can occur during milking, transportation and storage.

2 With quality control, only the best quality milk is selected for UHT (Ultra High Temperature) treatment.

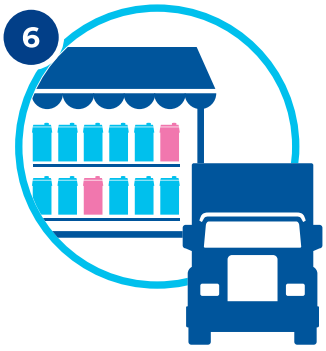
135° C

3 With UHT treatment, milk is treated with high temperatures to eliminate bacteria while maintaining nutritional value.



4 Homogenisation gives the milk a uniform smooth texture, taste and colour without impacting its nutritional value.

5 Milk is then packed in aseptic carton packaging to avoid spoilage from contact with microorganisms, while preventing exposure to light, which can destroy vitamins and alter flavour and colour.

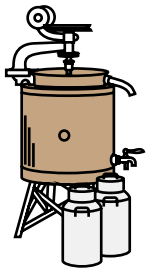


6 With aseptic packaging, milk can be shipped and stored for up to 12 months in ambient temperatures without the need for refrigeration.

This is why beverage cartons are the packaging of choice for 75% of fresh milk packed in the EU[2].

[1] Key figures on the European food chain – 2023 edition / [2] Source: https://www.beveragecarton.eu/wp-content/uploads/2022/03/ACE-Impact-assessment-study-of-an-EU-wide-collection-for-recycling-target-of-beverage-cartons-Roland-Berger.pdf

Did you know that there are different ways to heat treat milk and extend shelf life?



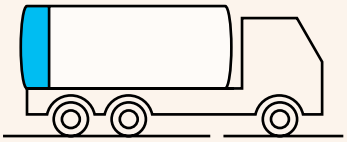
Since the mid 20th century it has been common practice to **pasteurise milk in order to safeguard it for human consumption** as milk was a common transmitter of tuberculosis and typhus.

There are three principal categories of heating methods:

1. **Pasteurisation**
2. **Extended shelf life (ESL) treatment**
3. **Ultra-high Temp. (UHT) treatment**

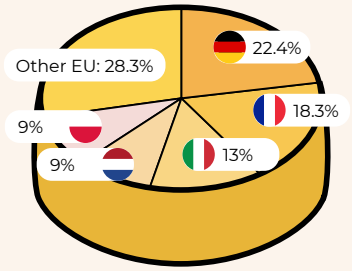
All heat treatment extends the shelf life of foods and beverages. Several methods of heat treatment are used to destroy microorganisms like bacteria, spores, yeast, mould and viruses. Besides killing microbes, heating inactivates enzymes present in milk that can have a negative impact on taste and appearance during storage.[1]

The scale of milk production in Europe (2021)[2]

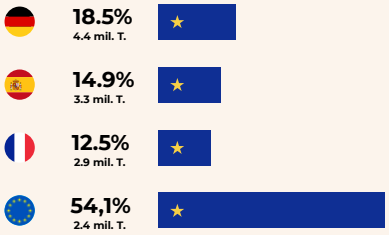


160 million tonnes of milk produced

- 22.5 million tonnes (≈14%) used to produce fresh milk
- The remaining 137.5 million tonnes were used to produce other dairy products



Germany, France, the Netherlands, Italy and Poland accounted for over two thirds of cow milk (71.7%) collected by EU dairies used to produce fresh and manufactured products such as drinking milk, cheese, butter and whey.



Germany was the largest producer of drinking milk with 4.2 million tonnes, or 18.5% of the total EU market.

The other top fresh milk-producing countries are **Spain and France.**

Aseptic filling technology combined with innovative packaging, including aseptic beverage cartons, keeps food and beverages safe and flavourful for up to 12 months, without the need of refrigeration or preservatives.[3]

[2] Key figures on the European food chain – 2023 edition / [1,3] Milk: How and why we treat with heat, Tetra Pak

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Learn more about packaging perishable liquid foods