Europe-wide life-cycle assessment of packaging for long-life food

Carton	*400 ml*
Can	*425 ml*
Pouch	*460 ml*
Glass	*425 ml*
Pot	*400 ml*

In a Europe-wide life-cycle assessment of packaging solutions for long-life foods (such as soups, sauces, tomato products, ready meals and vegetables), the environmental impacts of food metal cans, glass jars, retort pouches, plastic pots and carton packs (aseptic and retort) were investigated.

In this life-cycle assessment, all the factors and processes that have an impact on the environment along the product life cycle of these packaging systems were critically examined and assessed: from the extraction and processing of the raw materials to the package manufacturing process, transport, filling process and distribution to the point of sale and recovery or disposal of the packaging after use.

At each stage of the product life-cycle, the key environmental impact categories relevant to the resource, and the emission-related categories, were investigated and evaluated. The results are relevant for the European market, and are not limited to a single country.

Life-cycle assessments (LCA) are an important tool for generating credible, scientifi cally sound and reliable facts on the environmental impacts of a product – when following the relevant ISO standards 14040ff. This LCA was carried out by the independent German Institute for Energy and Environmental Research (IFEU), one of Europe's most reputable environmental research institutes. A critical review confirms the study's compliance with the corresponding ISO standard 14040ff .

The results confirm, that the aseptic and the retortable carton packaging system have the best results in all environmental impact categories.

SIG

Results combisafe food retort carton pack

Material type and material quantity are the decisive factors

The key factors determining the environmental impacts produced by a food packaging system during the packaging life-cycle are the material used to manufacture the packaging, and the quantity of the material used.

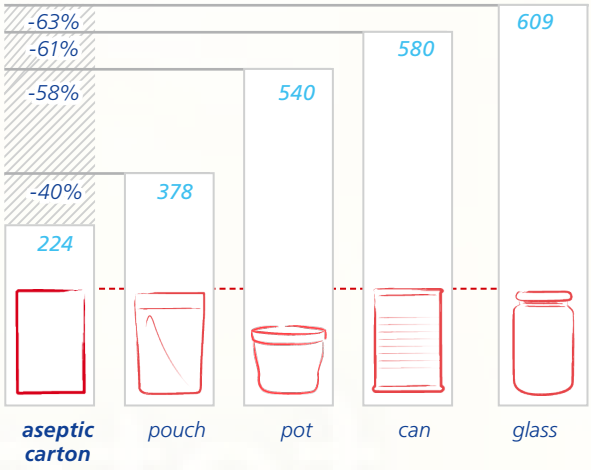
Carton is top performer in all environmental impact categories

In the latest study, carton packaging has the best results in all environmental impact categories. In the impact categories 'Consumption of fossil resources', and 'CO_2 emissions', for example, the carton has significant advantages over the other packaging forms included in the study. The study confirms that using combibloc aseptic carton packs can reduce CO_2 emissions by up to 63 per cent and the consumption of fossil resources by up to 69 per cent compared to other packaging alternatives.

Further, the results – which are based on the average EU recycling rates – have undergone an in-depth sensitivity analysis. The results confirm the outstanding performance of cartons in all impact categories, even in situations with zero recycling for cartons vs. high recycling for competing systems.

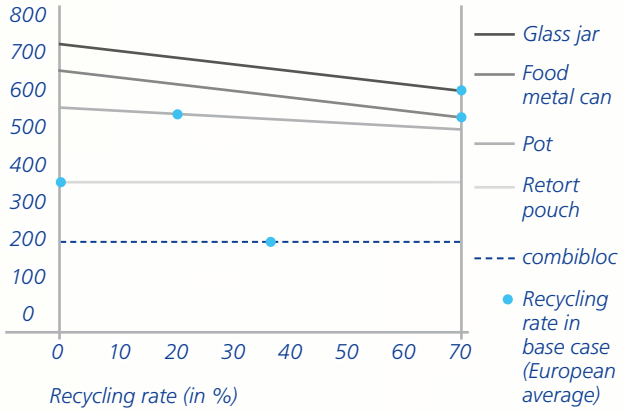
Example:

Impact category climate change/Aseptic carton vs. packaging alternatives (in kg CO_2 equivalent per packaging required for 1,000 L food)



Sensitivity analysis recycling

Climate change (in kg CO_2 equivalent per packaging required for 1,000 L food)



Overview LCA results

combibloc food aseptic (400ml) vs. alternatives

Significantly better[1]
No significant difference[1]
Extensively better[2]

Per packaging required for 1,000 L food	*Retortable pouch [460ml]*	*Glass jar [425ml]*	*Steel can [425ml]*	*Plastic pot [400ml]*	
Climate change [in kg CO_2 equivalent]	-40%	-63%	-61%	-58%	Emission-related impact categories
Acidification [in g SO_2 equivalent]	-43%	-64%	-52%	-60%	
Summer smog [in g Ethene equivalents]	-53%	-53%	-48%	-72%	
Ozone layer depletion [in mg R11 equivalents]	-40%	-81%	-43%	-59%	
Terrestrial eutrophication [in g PO_4 equivalents]	-47%	-72%	-49%	-64%	
Aquatic eutrophication [in g PO_4 equivalent]	-37%	-41%	-18%	-55%	
Human toxicity [in g PM_{10} equivalent]	-45%	-69%	-52%	-61%	
Transport intensity [in km]	-80%	-79%	-39%	-85%	
Abiotic resource depletion [in g antimony equivalents]	-40%	-62%	-54%	-63%	Resource-related impact categories
Non-renewable primary energy [in giga joule]	-39%	-59%	-54%	-61%	
Total primary energy [in giga joule]	-33%	-53%	-47%	-55%	
Fossil resource [in kg crude oil equivalent]	-44%	-60%	-38%	-69%	

[1] at a 10% significance level
[2] acategories exceeding 50% are marked by SIG as "Extensively better" for an easier understanding