First Europe-wide life-cycle assessment for UHT milk packaging

In a recent, Europe-wide life-cycle assessment of packaging used for UHT milk, the environmental impacts of carton packs and disposable PET and HDPE bottles (1,000 ml) have been investigated.

At each stage of the product life-cycle, the key environmental impact categories relevant to the resource and the emissionrelated categories were investigated and evaluated.

The results of the analysis are relevant for the European market, and are not limited to a single country. The lifecycle assessment was commissioned by SIG Combibloc and conducted by the IFEU Institute. A critical review confirms the study's compliance with the corresponding ISO standard 14040ff.

Beverage carton	*1,000 ml*
PET bottle	*1,000 ml*
HDPE bottle	*1,000 ml*

In the latest life-cycle assessment, all key factors and processes within the life cycles of the various UHT packaging solutions that are of relevance for the product's environmental performance were evaluated: beginning with the extraction and refining of the raw material used to make the packaging, through the processes of manufacturing and transporting the finished packages, the packaging of the beverage, and distribution up to the retailing stage, right up to the recycling or disposal of the packaging after use.

ISO 14040ff-compliant and critically reviewed

- Life-cycle assessments are an important tool for generating credible, scientifically sound and reliable facts on the environmental impacts of a product.
- For the detailed analysis and evaluation of environmental impacts, a life-cycle assessment is currently the only tool that is based on a globally consistent and binding standard, in the form of ISO 14040ff.

Institute for Energy and Environmental Research (IFEU)

The independent IFEU Institute, based in Heidelberg, Germany, is one of Europe's most reputable environmental research institutes. The Institute has many years of experience in the area of LCAs, and has already conducted numerous life-cycle assessments to study the environmental performance of PET bottles, beverage cans and beverage cartons.

Results:

Material type and material quantity are the decisive factors

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

Carton pack is top performer in virtually all environmental impact categories

In the 1-litre format, carton packs generate 34 per cent less CO_2, use 56 per cent less fossil resources, and consume 30 per cent less primary energy compared to HDPE multilayer bottles; when compared to disposable PET bottles, these figures are 45 per cent for CO_2, 57 per cent for fossil resources and 36 per cent for primary energy.

Manufactured mainly from wood fibres, a renewable resource, the carton pack demonstrates the greatest environmental impact in the impact category 'Use of nature'. In contrast to finite resources, however, with responsible forest management there can be a constant supply of this renewable raw material. With the full FSC® certification of all the companies supplying its unprocessed paperboard, and of all its own production facilities and sales organisations, SIG Combibloc is able to prove that 100% of the wood fibres used to manufacture its carton packs originate from controlled or FSC-certified sources.

Based on the positive findings, the institute that carried out the study recommends the carton to business and consumers as a packaging solution whenever environmental considerations are a factor in decision-making.

The carton pack has the potential to further improve its environmental performance, so that it can continue to maintain its position as one of the most environmentally friendly packaging solutions around. One possibility currently being looked into is further increasing the fraction of the sustainable, renewable raw material used in the composite structure of the cartons.

Overview LCA results

Beverage carton vs. PET bottle and HDPE bottle

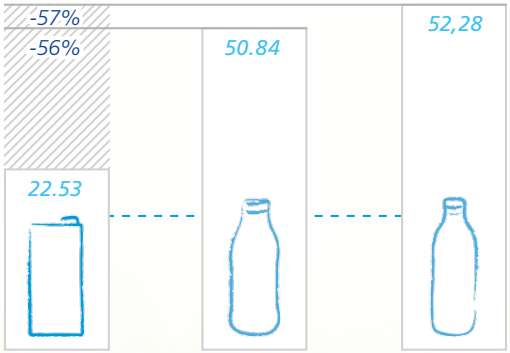
carton significantly better
no significant difference
carton significantly „worse"[1]

	carton vs. PET	carton vs. HDPE	
Fossil resource consumption (in kg crude oil equivalent)*	-57%	-56%	
Non-renewable primary energy (in giga joule)*	-50%	-46%	Resource-related impact categories
Total primary energy consumption (in giga joule)*	-36%	-30%	
Use of nature (in m^2)*	+95%	+95%	
Climate change (in kg CO_2 equivalent)*	-45%	-34%	
Acidification (in g SO_2 equivalent)*	-43%	-14%	Emission-related impact categories
Eutrophication (in g PO_4 equivalent)*	-16%	+22%	
Human toxicity PM_{10} (in g PM_{10} equivalent)*	-39%	-9%	

* per packaging required for 1,000 L non-carbonated soft drinks
[1] at a 10% significance level

Fossil resource consumption

(in kg crude oil equivalent: per packaging required for packaging 1,000 L UHT milk)



Climate change

(in kg CO_2 equivalent; per packaging required for packaging 1,000 L UHT milk)