

# **Violife Vioblock vs. dairy butter in the average European market**

Life Cycle Assessment  
Technical Summary

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## **VIOLIFE VIOBLOCK VS. DAIRY BUTTER. LCA TECHNICAL SUMMARY**

In 2017, Upfield commissioned Quantis to carry out a broad LCA study of a large set of plant-based spreads and creams, dairy butter, spreads and creams.

Since the original study, the VIOLIFE VIOBLOCK has been re-assessed and critically reviewed for the EU average market. Two packaging types were assessed (250 g paper parchment and 250 g parchment laminate).

This summary presents the updated LCA study (average results considering the two types of packaging).

### **LIFE CYCLE ASSESSMENT**

LCA is a metric-based methodology used to assess environmental impacts resulting from, for example, greenhouse gas emissions, waste production, water, land and energy use. Environmental impacts are calculated over the life cycle of a product, from extraction of raw materials to the end-of-life.

### **METHOD**

This study follows the regionalised LCA methodology described by Liao et al. (2020) to compare the environmental impacts of VIOLIFE VIOBLOCK with dairy butter sold on the average European market on the basis of 1 kg of product. Data was collected with a cradle-to-grave approach for the product recipe, key ingredients sourcing countries, production factory location, packaging designs, transportation and end-of-life scenarios. Spatially (archetype) differentiated agricultural life cycle inventory data were generated, as well as land use change (LUC) emissions for agricultural ingredients. A total of 16 environmental indicators were assessed. The LCA compares environmental impacts of Upfield's plant-based products and dairy butter using an attributional approach as per PAS 2050 (BSI, 2012), aligning with the latest international standards for dairy products, published by the International Dairy Federation (IDF, 2015) and the European Dairy Association (EDA, 2016).

### **CRITICAL REVIEW**

The LCA respects the ISO 14040 and 14044 standards for public disclosure of results. The study has been peer reviewed by a panel of three independent experts on topics such as LCA, agronomy and dairy production.

### **FUNCTIONAL UNIT**

The functional unit (FU) is a reference unit for which all results are calculated and presented. For dairy butter and VIOLIFE VIOBLOCK, the functional unit (FU) is 1 kg of product (fresh matter) for spreading, baking or shallow frying, at the consumer's home.

### **ENVIRONMENTAL IMPACT INDICATORS CONSIDERED**

The assessment includes a total of 16 indicators: 14 environmental impact indicators from the European Commission Environmental Footprint (EF) 3.0 method and two additional indicators: land occupation ( $m^2.y$ ), which reflects the total area of land used over one year and is a proxy for biodiversity and ecosystem services (Nemecek et al. 2011, Milà i Canals et al. 2012), and water consumption ( $m^3$ ), the total amount of fresh water consumed (ISO 14046), which includes, for example, evapotranspiration of irrigation water.

### **FROM FARM-TO-PLATE**

The LCA considers all identifiable activities across the product life cycle (cradle-to-grave) for a 250 g paper parchment package and a laminate parchment of VIOLIFE VIOBLOCK sold on the average European market.

### The study includes the impacts from:

- Farming (crop production or milk production)
- Manufacturing of plant-based margarines and spreads or dairy butter
- Packaging production
- Distribution
- Retail
- Use at consumer
- Packaging end-of-life

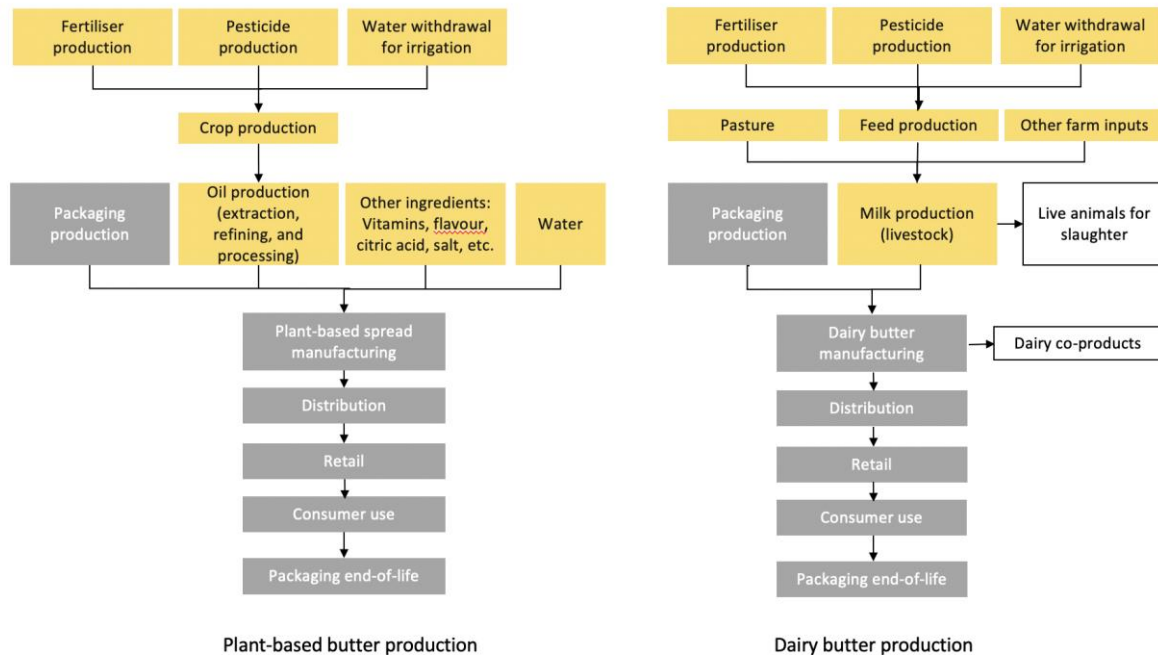


Figure 1. Schematic of the systems evaluated

### The study does not include impacts from:

- Capital goods at the distribution centre and at the point of retail
- Labour, commuting of workers, administrative work, cattle insemination and disease control processes
- Food loss and food waste during distribution, at retail point and at the consumer's home

### DATA COLLECTION AND MODELLING

- Plant-based margarines and spreads: Primary data for the recipes and ingredient sourcing for VIOLIFE VIOBLOCK were provided by Upfield.
- Dairy butter: data representative of average European dairy practices and published by the European Dairy Association and the European Commission were used to model dairy processing, packaging and distribution.
- Data was compiled for different product recipes, key ingredient sourcing countries, production factory locations, energy mixes, packaging designs, transportation and end-of-life scenarios. Spatially (archetype) differentiated agricultural life cycle inventory data were generated, as well as LUC emissions for agricultural ingredients in all markets relevant to each system's supply chain. All data has been assessed to ensure that it meets the quality standards required to make comparative assertions. The LCA modelling tool SimaPro version 9.2 was used to model the life cycle of both plant-based and dairy products.

## RESULTS AND DISCUSSION

### CLIMATE CHANGE IMPACTS

Table 1 shows that VIOLIFE VIOBLOCK has significantly lower climate impacts than dairy butter. The climate change impact for 1 kg of VIOLIFE VIOBLOCK on the average European market is 4.3 kg CO<sub>2</sub>-eq, whereas the average impact for dairy butter is 17.4 kg CO<sub>2</sub>-eq per kg of butter.

Climate change (kg CO <sub>2</sub> -eq/kg product)		Calculated savings*	
VIOLIFE VIOBLOCK	Dairy butter	kg CO <sub>2</sub> -eq / kg	%
4.3	17.4	13.1	-75%

Table 1. Climate change impacts for VIOLIFE VIOBLOCK and dairy butter on the average European market. Results are expressed in kg CO<sub>2</sub>-eq per kg of product)

\*Calculated savings are rounded down when making claims

Figure 2 shows that the main drivers of climate change impacts for VIOLIFE VIOBLOCK are ingredients (oilseed farming and the associated land use change emissions), which can vary significantly depending on the type of oilseed, its quantity and sourcing countries.

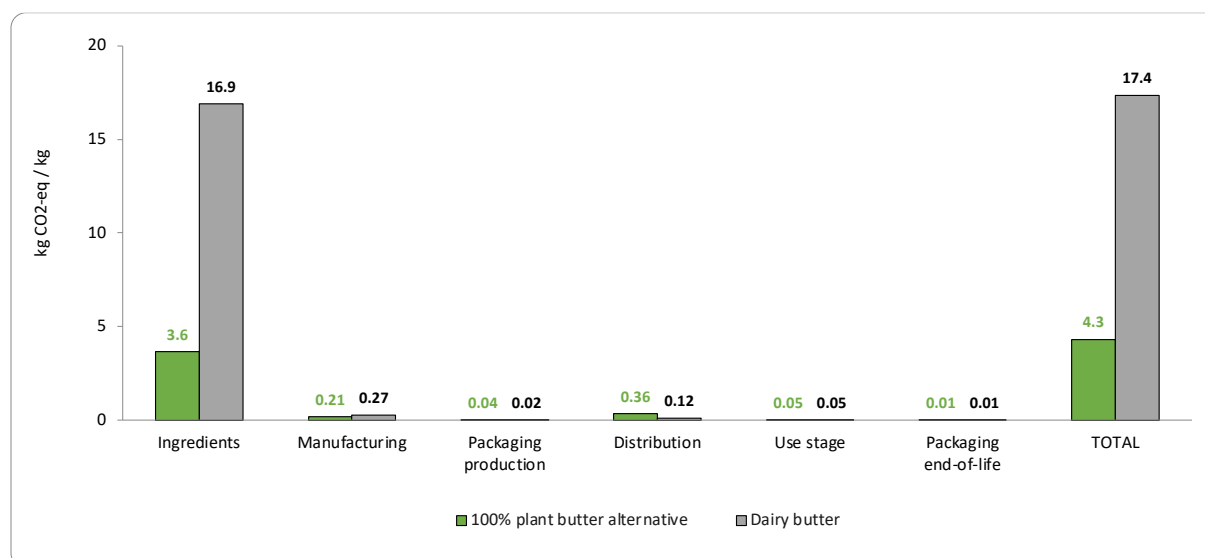


Figure 2. Climate change results per life cycle stage for 1 kg of product in Europe (values are the average considering the two packaging types: 250 g paper parchment and 250 g parchment laminate)

### LAND OCCUPATION

In terms of land occupation, VIOLIFE VIOBLOCK has a lower result compared to dairy butter (Table 2). Land occupation of VIOLIFE VIOBLOCK is 7.4 m<sup>2</sup>-y per kg of product, whereas that of dairy butter is 17.8 m<sup>2</sup>-y per kg of product.

Land occupation (m <sup>2</sup> -y/kg product)		Calculated savings*	
VIOLIFE VIOBLOCK	Dairy butter	m <sup>2</sup> -y /kg product	%
7.4	17.8	10.4	-58%

Table 2. Land occupation for VIOLIFE VIOBLOCK and dairy butter in the average European market. Results are expressed in m<sup>2</sup> per year per kg of product.

\*Calculated savings are rounded down when making claims

## WATER CONSUMPTION

For dairy butter, despite the uncertainty related to water consumption results, the conclusions can still be considered valid; the comparative conclusions are less sensitive to data choice, due to the higher concentration of dairy milk in butter (Table 3).

Overall, VIOLIFE VIOLBLOCK water consumption is driven by yield and irrigation of crops and orchards. VIOLIFE VIOLBLOCK has a lower water consumption than dairy butter in the average European market. The water consumption of 1 kg VIOLIFE VIOLBLOCK is 0.016 m<sup>3</sup> of water per kg of product, whereas water consumption for dairy butter is 0.086 m<sup>3</sup> of water per kg.

Water consumption (m <sup>3</sup> water/kg product)		Calculated savings*	
VIOLIFE VIOLBLOCK	Dairy butter	m <sup>3</sup> water /kg product	%
0.016	0.086	0.070	-82%

Table 3. Water consumption for VIOLIFE VIOLBLOCK and dairy butter in the average European market. Results are expressed in m<sup>3</sup> of water per kg of product.

\*Calculated savings are rounded down when making claims

## CONCLUSIONS AND OUTLOOK

This study shows that VIOLIFE VIOLBLOCK has lower climate impacts, water consumption and land occupation compared to dairy butter. The climate change impact for VIOLIFE VIOLBLOCK is dominated by vegetable oil ingredients' production. When moving towards transparency of sustainable supply chains and developing potential mitigation strategies, producers can only understand the impacts of their products and look for opportunities to reduce these impacts if they fully and accurately assess their product supply chains. Towards more sustainable plant-based margarines and spreads, a key factor would be to reduce embodied environmental impacts from oilseed ingredients through better understanding and improvements in supply chain sourcing, farm level agricultural practices, and product recipe design. The key challenges of performing regionalised LCA lies in the collection and organization of all relevant data and models, performing gap assessment and prioritization, developing missing data or improving data quality, and linking inventory data with impact assessment, to draw robust conclusions and meet requirements for data quality.

## CALCULATION OF EQUIVALENCIES

Equivalencies are used to put into perspective the results of the climate impacts of VIOLIFE VIOLBLOCK and dairy butter to render the information more meaningful and understandable for a larger audience. The equivalencies were assessed by calculating the CO<sub>2</sub>-eq savings between VIOLIFE VIOLBLOCK and dairy butter and then converting the savings amount into equivalencies of different daily activities such as CO<sub>2</sub>-eq emissions of driving a car or charging a smartphone overnight. Table 4 shows the data sources and units used for equivalencies calculated for the average European market.

## GENERAL CLAIMS ON CLIMATE CHANGE SAVINGS<sup>1</sup>

- The climate footprint of 1 kilogram of VIOLIFE VIOLBLOCK is 4.3 kg CO<sub>2</sub>-eq per kg of product. For a 250 g pack, it is 1.1 kg CO<sub>2</sub>-eq, for 100 g it is 0.43 kg CO<sub>2</sub>-eq and for a single serving of 10 g it is 0.043 kg CO<sub>2</sub>-eq.
- In the average European market, VIOLIFE VIOLBLOCK has 75% lower climate impacts, occupies 55% less land and uses 80% less water when compared to the same amount of dairy butter.

- Compared to 1 kg of dairy butter, the same amount of VIOLIFE VIOBLOCK on the average European market emits 13 kg less carbon, uses 0.07 m<sup>3</sup> less of water and occupies 10 m<sup>2</sup> less land per year
- 1 kg of VIOLIFE VIOBLOCK saves 13 kg of CO<sub>2</sub>-eq emissions compared to dairy butter.
- The same amount of VIOLIFE VIOBLOCK saves 75% of greenhouse gas emissions compared to dairy butter.

<sup>1</sup>NOTE: percentages may be rounded to make them as easy to understand as possible by the general public (e.g. 72% is rounded to 70%). As approximations exist in any life cycle assessment, a conservative approach avoids misleading communication and greenwashing.

## EQUIVALENCIES DATA SOURCES

Equivalency	Equivalency unit	Climate change impacts (kg CO <sub>2</sub> eq)	Source
Charging a phone over night	daily	0.008	PEFCR Retail
Driving a car (petrol car EURO 5)	1 km	0.35	ecoinvent
Plastic bottles saved	500 ml	0.017	ecoinvent
One person on an intercontinental flight	1 km	0.22	ecoinvent
Equivalency	Equivalency unit	Land Occupation (m <sup>2</sup> .y)	Source
Average size of a parking spot	m <sup>2</sup>	17.7	Internet various sources
Premier League football pitch sizes	m <sup>2</sup>	7.140	Internet various sources
Equivalency	Equivalency unit	Water consumption (m <sup>3</sup> )	Source
Leaving the tap on	Per minute	0.012	Internet various sources

Table 4. Equivalencies units and data sources

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For further information about the environmental impacts of our products and comparative claims against dairy products, please contact [www.upfield.com/contact/](http://www.upfield.com/contact/)

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Quantis guides top organizations to define, shape and implement intelligent environmental sustainability solutions. In a nutshell, our creative geeks take the latest science and make it actionable. They deliver resilient strategies, robust metrics, useful tools, and credible communications.

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