

Upfield Professional cream alternatives (100% plant-based and blends) vs. dairy creams in Europe

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UPFIELD PROFESSIONAL CREAM ALTERNATIVES VS. DAIRY CREAMS. LCA TECHNICAL SUMMARY

Upfield's Professional cream alternatives are used as a dairy cream substitute for cooking and whipping. In 2021, Quantis was commissioned to conduct a Life Cycle Assessment (LCA) of Upfield's Professional cream alternatives for the European market, compared to dairy creams sold in the same market. The study included six recipes, three 100% plant-based and three blends, each with fat percentages of 15%, 31% and 35%. This document provides a short summary of the study scope, functional unit and system boundaries, method and data sources, climate footprint and land occupation results, and equivalencies used for comparative claims.

LIFE CYCLE ASSESSMENT

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 followed the regionalised LCA methodology described by Liao et al. (2020) to compare the environmental impacts of Upfield's Professional cream alternatives with dairy creams sold in Europe 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, energy mixes, packaging designs, transportation and end-of-life scenarios. Spatially differentiated agricultural life cycle inventory data were generated (archetypes), as well as land use change (LUC) emissions for agricultural ingredients. A total of 17 environmental indicators were assessed. The LCA compares environmental impacts of Upfield's 100% plant-based and blend cream alternatives to dairy creams using an attributional approach as per PAS 2050 (BSI, 2012), aligned 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 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 Upfield Professional alternatives and dairy creams, the functional unit (FU) was 1 kg of product for cooking or whipping.

ENVIRONMENTAL IMPACT INDICATORS CONSIDERED

The assessment includes a total of 17 indicators: 15 environmental impact indicators from the European Commission Environmental Footprint (EF) 2.0 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 from irrigation water.

FROM CRADLE-TO-GRAVE

The LCA considers all identifiable activities across the product life cycle (cradle-to-grave) for all products in the three markets (see Figure 1).

The study includes impacts from:

- Farming (crop production or milk production)
- Production of 100% plant-based / blend cream alternatives or dairy creams
- Packaging
- Distribution
- Retail
- Use at consumer
- Waste treatment of packaging

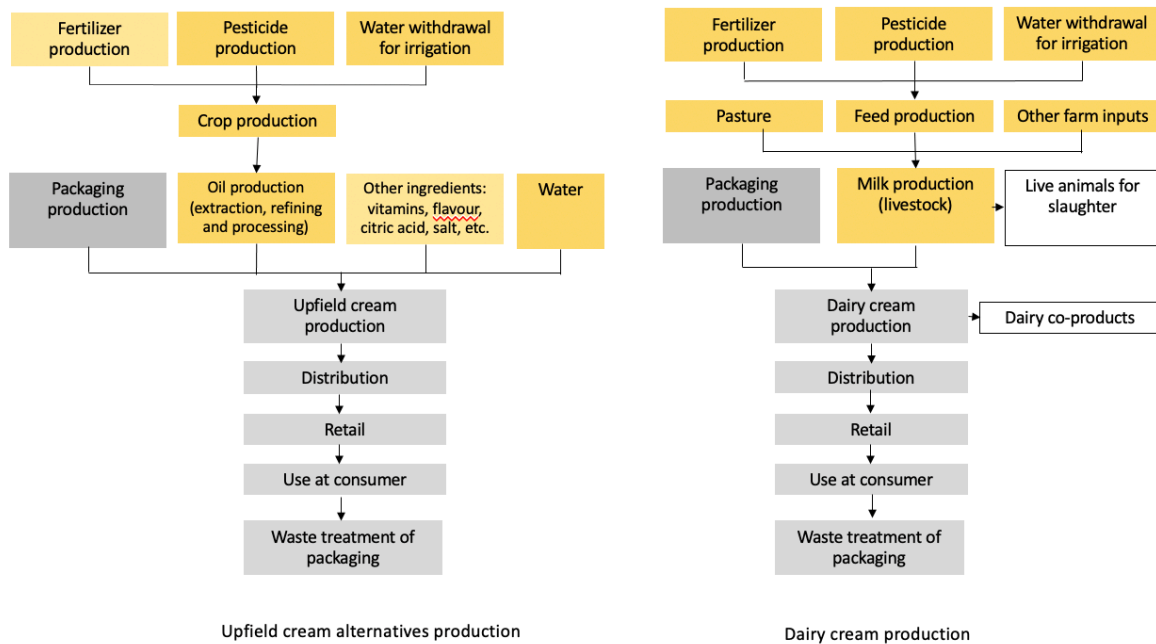


Figure 1. Schematic of the systems evaluated

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 restaurants, hotels or canteens.

DATA COLLECTION AND MODELLING

- 100% Plant-based and blend cream alternatives: primary data for the recipes and ingredient sourcing for Upfield Professional cream alternatives were provided by Upfield.
- Dairy creams: default data representative of European averages was used. 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 differentiated agricultural life cycle inventory data were generated (archetypes), 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 9.1 was used to model individual datasets (such as oilseeds and packaging) required for 100% plant-based products and for the life cycle of dairy products.

RESULTS AND DISCUSSION

CLIMATE CHANGE IMPACTS

Table 1 shows that most Upfield Professional 100% plant-based and blend cream alternatives have a lower climate impact than dairy creams. The climate change impacts of 1 kg Upfield Professional 100% plant-based and blend cream alternatives vary between 1.2 and 3.7 kg CO₂-eq depending on recipe and fat percentage, whereas the impact for dairy cream vary between 3.3 and 6.9 kg CO₂-eq.

PRODUCT	Climate change impacts (kg CO ₂ eq/kg)		Savings	
	Upfield	Dairy	kg CO ₂ eq/kg	%
EUROPE				
100% Plant-based (15% fat)	1.2	3.3	2.0	-62%
100% Plant-based (31% fat)	2.0	6.3	4.4	-69%
100% Plant-based (35% fat)	2.2	6.9	4.7	-68%
Blend (15% fat)	2.6	3.3	0.71	-22%
Blend (31% fat)	3.5	6.3	2.9	-45%
Blend (35% fat)	3.7	6.9	3.3	-47%

Table 1. Climate change impacts for Upfield Professional 100% plant-based and blend cream alternatives in Europe and dairy creams in the same market. Results are expressed in kg CO₂-eq per kg of product

Figure 2 shows that the main drivers of climate impacts for Upfield cream alternatives are the farm / ingredients stage (oilseed farming and associated LUC emissions), as well as the distribution stage, which can vary significantly depending on distances travelled to consumer markets.

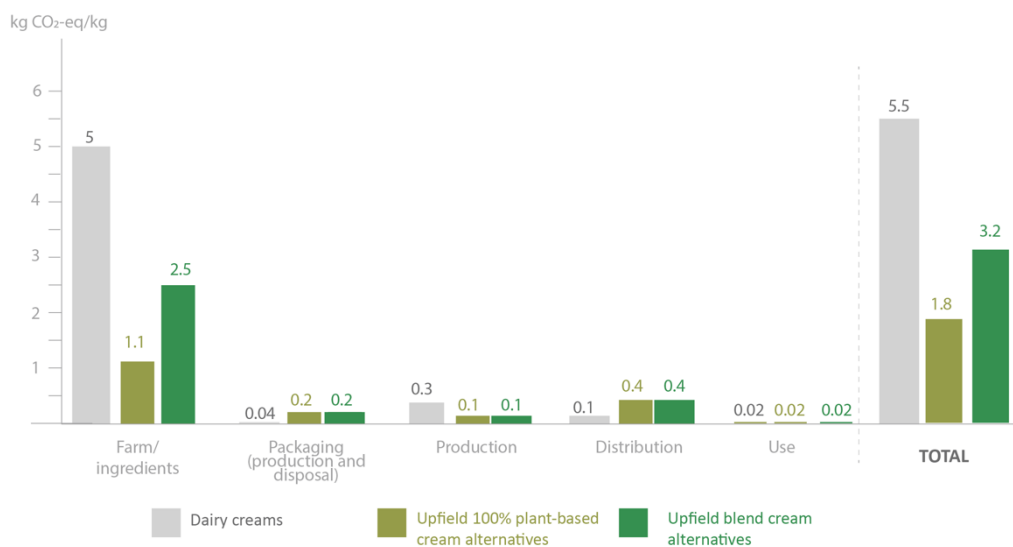


Figure 2. Climate change results per life cycle stage per 1 kg of product in Europe , average for the 15%, 31% and 35% fat percentages

There are opportunities for further reducing the environmental impacts of 100% plant-based and blend cream alternatives by avoiding land use change related climate risks and implementing regenerative agricultural practices. Meanwhile, it is important to consider potential constraints, such as the choice of oils based on consumer preferences (taste, nutritional benefits and product function, e.g., harder fats are used for products in warmer climates).

LAND OCCUPATION

In terms of land occupation, all Upfield Professional 100% plant-based and blend cream alternatives have lower results compared to dairy cream (Table 2). The land occupation of 1 kg Upfield Professional 100% plant-based and blend alternatives varies between 1.5 and 2.4 m².y depending on recipe and fat percentage, whereas that of dairy cream varies between 3.2 and 6.9 m².y.

PRODUCT	Land Occupation (m ² .y /kg)		Savings	
	Upfield	Dairy	m ² .y /kg	%
EUROPE				
100% Plant-based (15% fat)	1.5	3.2	1.7	-52%
100% Plant-based (31% fat)	1.8	6.3	4.6	-72%
100% Plant-based (35% fat)	1.8	6.9	5.1	-73%
Blend (15% fat)	1.3	3.2	1.9	-59%
Blend (31% fat)	2.2	6.3	4.1	-65%
Blend (35% fat)	2.4	6.9	4.5	-65%

Table 2. Land occupation for Upfield Professional 100% plant-based and blend products in Europe and dairy creams in the same market. Results are expressed in m² per year per kg of product.

WATER CONSUMPTION

For products with a comparatively low concentration of dairy ingredients, the data quality of water consumption is not robust enough to draw a reliable comparative conclusion to support external communication. For spreads and butter, despite the high 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. For further information, please contact sally.smith@upfield.com or anthony.lin@upfield.com

CONCLUSIONS AND OUTLOOK

This study shows that Upfield Professional 100% plant-based and blend cream alternatives have, in all cases, lower climate impacts and land occupation than dairy cream. The climate impacts for Upfield Professional products are dominated by vegetable oil ingredients' production and distribution to consumer markets. 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 thoroughly and accurately assess their product supply chains. When moving towards more sustainable 100% plant-based and blend alternatives, a key factor would be to reduce impact related to the product distribution and the embodied environmental impacts from oilseed ingredients through better understanding and improvements in supply chain sourcing, farm level agricultural practices, and product recipe design.

CALCULATION OF EQUIVALENCIES

Equivalencies are used to put into perspective the results of the climate impacts of Upfield 100% plant-based and blend cream alternatives and dairy creams to render the information more meaningful and understandable for a larger audience. The equivalencies were assessed by calculating the CO₂-eq savings between Upfield 100% plant-based and blend alternatives and dairy creams and then converting the savings amount into equivalencies of different daily restaurant activities such as CO₂-eq emissions of using a combi oven, a commercial fridge or running an industrial dish washer. Table 3. on page 10 shows the data sources and units used for the equivalencies calculated. The following charts show examples of equivalencies for Upfield 100% plant-based and blend cream alternatives in Europe.

GENERAL CLAIMS ON CLIMATE SAVINGS – 100% PLANT-BASED CREAM ALTERNATIVES IN EUROPE

100% plant-based cream alternative (15% fat) carbon footprint (per kg)	1.2 kg CO ₂ eq
dairy cream (15% fat) carbon footprint (per kg)	3.3 kg CO ₂ eq

Kg of CO ₂ eq saved per Kg of product when switching from dairy cream to 100% plant-based alternatives (15% fat)	2.1 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to 100% plant-based cream alternatives (15% fat) per restaurant using 1 kg of cream each day for a year in Europe	743 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to 100% plant-based cream alternatives (15% fat) per restaurant using 10 kg of cream each day for a year in Europe	7426 CO ₂ eq
100% plant-based cream alternative (31% fat) carbon footprint (per kg)	2 kg CO ₂ eq
100% dairy cream (31% fat) carbon footprint (per kg)	6.3 kg CO ₂ eq
Kg of CO ₂ eq saved per Kg of product when switching from dairy cream to 100% plant-based alternatives (31% fat)	4.3 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to 100% plant-based cream alternatives (31% fat) per restaurant using 1 kg of cream each day for a year in Europe	1589 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to 100% plant-based cream alternatives (31% fat) per restaurant using 10 kg of each day for a year in Europe	17250 CO ₂ eq
100% plant-based cream alternative (35% fat) carbon footprint (per kg)	2.2 kg CO ₂ eq
dairy cream (35% fat) carbon footprint (per kg)	6.9 kg CO ₂ eq
Kg of CO ₂ eq saved per Kg of product when switching from dairy cream to 100% plant-based alternatives (35% fat)	4.7 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to 100% plant-based cream alternatives (35% fat) per restaurant using 1 kg of cream each day for a year in Europe	1725 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to 100% plant-based cream alternatives (35% fat) per restaurant using 10 kg of cream each day for a year in Europe	17250 CO ₂ eq

Table 3. General claims on climate savings – 100% plant-based cream alternatives in Europe

100% fat plant-based cream alternatives (15% fat)

- In Europe, our 100% plant-based cream alternatives (15% fat) have a 60% lower climate impact and occupy half the land when compared to the same amount of dairy cream.
- Compared to 1 kg of dairy cream, the same amount of our 100% plant-based cream alternatives (15% fat) in Europe emit 2 kg less carbon dioxide equivalent, and occupy 1.7 m² less land per year

100% fat plant-based cream alternatives (31% fat)

- In Europe, our 100% plant-based cream alternatives (31% fat) have a 65% lower climate impact and occupy 1/3rds of land when compared to same amount of dairy cream.
- Compared with 1 kg of dairy cream, the same amount of our 100% plant-based cream alternatives (31% fat) in Europe emit 4.3 kg less carbon dioxide equivalent, and occupy 4.6 m² less land per year

100% fat plant-based cream alternatives (35% fat)

- In Europe, our 100% plant-based cream alternatives (35% fat) have a 65% lower climate impact and occupy one third (1/3) of land when compared to same amount of dairy cream.
- Compared with 1 kg of dairy cream, the same amount of our 100% plant-based cream alternatives (35% fat) in Europe emit 4.7 kg less carbon dioxide equivalent, and occupy 5 m² less land per year

GENERAL CLAIMS ON CLIMATE SAVINGS– BLEND CREAM ALTERNATIVES IN EUROPE

blend cream alternatives (31% fat) carbon footprint (per kg)	3.5 kg CO ₂ eq
dairy cream (31% fat) carbon footprint (per kg)	6.3 kg CO ₂ eq
Kg of CO ₂ eq saved per Kg of product when switching from dairy cream to blend alternatives (31% fat)	2.9 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to blend cream alternatives (31% fat) per restaurant using 1 kg of cream each day for a year in Europe	1053 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to blend cream alternatives (31% fat) per restaurant using 10 kg of cream each day for a year in Europe	10531 CO ₂ eq
blend cream alternative (35% fat) carbon footprint (per kg)	3.7 kg CO ₂ eq
dairy cream (35% fat) carbon footprint (per kg)	6.9 kg CO ₂ eq
Kg of CO ₂ eq saved per Kg of product when switching from dairy cream to blend cream alternatives (35% fat)	3.3 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to blend cream alternatives (35% fat) per restaurant using 1 kg of cream each day for a year in Europe	1188 kg CO ₂ eq
Potential CO ₂ eq savings by switching from dairy cream to blend cream alternatives (35% fat) per restaurant using 10 kg of cream each day for a year in Europe	11884 CO ₂ eq

Table 4. General claims on climate savings – blend cream alternatives in Europe

Blend cream alternatives (31% fat)

- In Europe, our blend cream alternatives (31% fat) have a 45% lower climate impact and occupy one third (1/3) of land when compared to same amount of dairy cream.
- Compared with 1kg of dairy cream, the same amount of our blend cream alternatives (31% fat) in Europe emit 2.9 kg less carbon, and occupy 4.1 m² less land per year

Blend cream alternatives (35% fat)

- In Europe, our blend cream alternatives (35% fat) have a 45% lower climate impact and occupy 1/3rds of land than the same amount of dairy cream.
- Compared with 1kg of dairy cream, the same amount of our blend cream alternatives (35% fat) in Europe emit 3.3 kg less carbon, and occupy 4.5 m² less land per year

EQUIVALENCIES DATA SOURCE

Equivalency	Equivalency Unit	Global warming Potential (CO ₂ eq)	Source
3 combi oven	daily	15	https://doi.org/10.1093/ijlct/ctt068
Commercial fridge	daily	19,5	https://www.energy.gov/eere/femp/purchasing-energy-efficient-commercial-refrigerators-and-freezers
Industrial dishwasher	daily	5	https://www.energy.gov/eere/femp/purchasing-energy-efficient-commercial-dishwashers
kitchen aid	Hourly	0,2	https://www.kasa.cz/document/9/8/4/doc_2182489.pdf
Equivalency	Equivalency Unit	Water consumption (m3)	Source
Cucumbers fields	1 Hectare	10000	-
average size restaurant kitchens	1 restaurant	98	https://yourbusiness.azcentral.com/national-average-size-restaurant-kitchen-29446.html

Table 3. Equivalencies units and data source

ABOUT QUANTIS

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.

With offices in the US, France, Switzerland, Germany, Italy and Colombia and clients around the world, Quantis is a key partner in inspiring sustainable change on a global scale.

Discover Quantis at www.quantis-intl.com

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