

Flora Plant B*tter Spreadable UK vs. dairy butter in the UK market

Life Cycle Assessment
Technical Summary

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Version 1

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FLORA PLANT B*TTER SPREADABLE UK 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 Upfield Flora Plant B*ttter Spreadable UK has been re-assessed and critically reviewed for the UK market.

This summary presents the results of the updated LCA study that can be used for comparative off pack and on pack claims for the UK market.

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 Flora Plant B*ttter Spreadable UK in a plastic tub compared with dairy butter wrapped in paper parchment sold on the UK 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 Flora Plant B*ttter Spreadable UK, 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 ($\text{m}^2\cdot\text{y}$), 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 tub of Flora Plant B*ttter Spreadable UK sold on the UK 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

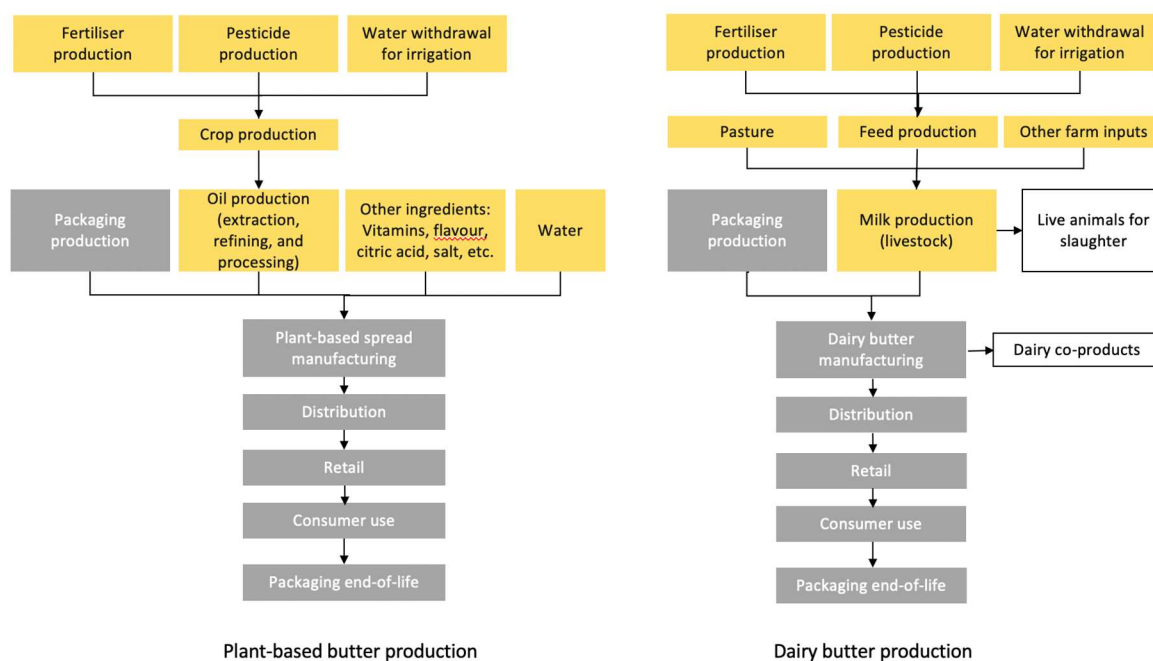


Figure 1. Schematic of the systems evaluated

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 Flora Plant B*ttter Spreadable UK were provided by Upfield.
- Dairy butter: data representative of average UK 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 Flora Plant B*tter Spreadable UK has significantly lower climate impacts than dairy butter. The climate change impact for 1 kg of Flora Plant B*tter Spreadable UK on the UK market is 5.1 kg CO₂-eq, whereas the impact for dairy butter is 18.1 kg CO₂-eq per kg of butter.

Climate change (kg CO ₂ -eq/kg product)		Calculated savings*	
Flora Plant B*tter Spreadable UK	Dairy butter	kg CO ₂ -eq / kg	%
5.1	18.1	13.0	-72%

Table 1. Climate change impacts for Flora Plant B*tter Spreadable UK and dairy butter on the UK market. Results are expressed in kg CO₂-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 Flora Plant B*tter Spreadable UK 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 the UK

LAND OCCUPATION

In terms of land occupation, Flora Plant B*tter Spreadable UK has a lower result compared to dairy butter (Table 2). Land occupation of Flora Plant B*tter Spreadable UK is 7.9 m².y per kg of product, whereas that of dairy butter is 16.9 m².y per kg of product.

Land occupation (m ² .y /kg product)		Calculated savings*	
Flora Plant B*tter Spreadable UK	Dairy butter	m ² .y /kg product	%
7.9	16.9	8.9	-53%

Table 2. Land occupation for Flora Plant B*tter Spreadable UK and dairy butter in the UK market. Results are expressed in m² 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, Flora Plant B*ttter Spreadable UK water consumption is driven by yield and irrigation of crops and orchards. Flora Plant B*ttter Spreadable UK has a lower water consumption than dairy butter in the UK market. The water consumption of 1 kg Flora Plant B*ttter Spreadable UK is 0.019 m³ of water per kg of product, whereas water consumption for dairy butter is 0.083 m³ of water per kg.

Water consumption (m ³ water /kg product)		Calculated savings*	
Flora Plant B*ttter Spreadable UK	Dairy butter	m ³ water /kg product	%
0.019	0.083	0.063	-77%

Table 3. Water consumption for Flora Plant B*ttter Spreadable UK and dairy butter in the UK market. Results are expressed in m³ of water per kg of product.

**Calculated savings are rounded down when making claims*

CONCLUSIONS AND OUTLOOK

This study shows that Flora Plant B*ttter Spreadable UK has lower climate impacts, water consumption and land occupation compared to dairy butter. The climate change impact for Flora Plant B*ttter Spreadable UK 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 Flora Plant B*ttter Spreadable UK and dairy butter to render the information more meaningful and understandable for a larger audience. The equivalencies were assessed by calculating the CO₂-eq savings between Flora Plant B*ttter Spreadable UK and dairy butter and then converting the savings amount into equivalencies of different daily activities such as CO₂-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 UK market.

GENERAL CLAIMS ON CLIMATE CHANGE SAVINGS¹

- The climate footprint of 1 kilogram of Flora Plant B*ttter Spreadable UK is 5.1 kg CO₂-eq per kg of product. For a 250 g tub, it is 1.28 kg CO₂-eq, for 100 g it is 0.51 kg CO₂-eq and for a single serving of 10 g it is 0.051 kg CO₂-eq.
- In the UK market, Flora Plant B*ttter Spreadable UK has 70% lower climate impacts, occupies half the land and uses 75% less water when compared to the same amount of dairy butter.
- Compared to 1 kg of dairy butter, the same amount of our Flora Plant B*ttter Spreadable UK on the average UK market emits 13 kg less carbon, uses 0.063 m³ less of water and occupies 8.9 m² less land per year
- 1 kg of Flora Plant B*ttter Spreadable UK saves 13 kg of CO₂-eq emissions compared to dairy butter.
- The same amount of Flora Plant B*ttter Spreadable UK saves 70% of greenhouse gas emissions compared to dairy butter.

¹NOTE: 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 (kg CO ₂ 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 a intercontinental flight	1 km	0.22	ecoinvent
Equivalency	Equivalency unit	Land occupation (m ² .y)	Source
Average size of a parking spot	m ²	17.7	Internet various sources
Premier League football pitch sizes	m ²	7'140	Internet various sources
Equivalency	Equivalency unit	Water consumption (m ³)	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/

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.

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