BLEND
FOR BETTER
LAVAZZA GROUP COMMITMENT

CO2 EMISSIONS
OFFSET

Estimated carbon footprint of FIRMA Lavazza Capsules sold in 2022

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Introduction

Aware that not all emissions can be reduced, Lavazza Group embarked on an offsetting strategy by supporting projects that contribute to sustainable development and to the containment of greenhouse gas emissions.
In 2020, Lavazza Group began its journey towards Carbon Neutrality by offsetting Scope 1 and 2 emissions, i.e., direct greenhouse gas emissions (due, for example, to the burning of methane for heating) or those deriving from the generation of electricity that is then consumed.
In 2022, this process continues by introducing the offsetting of the whole amount of greenhouse gases emissions of FIRMA capsules sold in 2022. Each FIRMA capsule is single-dose and contains ground coffee stored in vacuum conditions. Two different types of capsules are currently on the market: traditional and compostable plastic. In addition to coffee, Lavazza FIRMA offers a full range of other soluble beverages, only sold in plastic caps. To assure to its customers that all the capsules, once bought, have already been compensated, an estimated Carbon Footprint (CFP) study was carried out. The calculation was based on the estimated sales for 2022 and on the CFP of 1 average blue capsules piece sold in 2021.
To ensure the accuracy of the estimated calculation, the 2022 carbon footprint will be recalculated when all 2022 final data is available. In case the estimated and the final calculation are not aligned, the difference will be compensated.

The purpose of this report is to explain the carbon footprint quantification for Blue capsules.

Carbon footprint assessment

The structure of this report follows the main steps of Life Cycle Assessment (LCA):

A. *Goal and scope definition*: defines the aim of the study, the reference unit, the processes included in the study and other important characteristics of the assessment;
B. *Inventory analysis:* describes which data are used;
C. *Impact assessment*: presents impact results obtained through the use of scientific models;
D. *Interpretation*: discussion of the results in order to formulate conclusions.

A. Goal and scope

Type of Carbon Footprint

This Carbon Footprint study is cradle to grave, since all the relevant life cycle stages are included in the LCA (i.e., raw material acquisition, production, distribution, use and end-of-life).
The LCA follows an attributional approach.

Functional unit

The studied functional unit is the expected 2022 sales of FIRMA capsules.

System boundaries

The Carbon footprint of 2022 FIRMA capsules considers the following life cycle processes:

- The upstream processes include green coffee production, its transport to suppliers, semifinished products and film production, packaging reel production (including printing, coupling and cutting) and its transport to the production plant. In particular, the following processes were considered: green coffee cultivation; green coffee processing and packaging at farm, green coffee transport to the third-party production plant.
- At the production plant the following core processes are performed: transport of green coffee blend, green coffee transformation into ground coffee, packet preforming, coffee dosing and filling, wrapping and palletization.
- Downstream processes include outbound distribution of the final product, coffee preparation and end-of-life stage of the packaging and of coffee dregs. In the use phase only water and electrical consumptions were evaluated.

Figure 1: LCA model

Norms of reference

The reported carbon footprint is based on the CFP study of FIRMA capsules sold in 2021[1] which is validated ISO 14067 compliant [2] and therefore in line with the existing PCR on espresso coffee [3].

Disclaimer CFP limitations

The most important limitations of this Carbon Footprint study are:

- Focus on a single environmental indicator: where information regarding CFPs is used to inform consumer decisions, consideration shall be given to the potential importance of other relevant environmental aspects.
- Limitations related to the methodology: because of limitations related to the underlying LCA report [1], the results of the CFP are often not a sound basis for comparison.
- The 2022 CFP of FIRMA capsules is based on the 2021 CFP study and on 2022 expected sales. For this reason, this estimated CFP will be revised when 2022 final data is available.

Exclusions

- Capital goods (e.g., equipment and buildings) already available in LCA databases (i.e., ecoinvent v3.7.1 [4]) were included in the LCA. Other capital goods have been excluded from the LCA, since it was assumed that they do not contribute significantly to the overall LCA results.
- The coffee machine life cycle was not assessed.
- Transport of coffee from the selling point to the consumer and coffee distribution transport not directly controlled by Lavazza were excluded.

Biogenic CO2 emissions and trapping

- For CO2 emissions originating from biogenic materials, the carbon neutrality approach was adopted. With this approach, we assumed that all the CO2 emissions absorbed by plants and derivative materials will be released back into the atmosphere during the end-of life stage. Essentially, neither emissions nor trapping of CO2 related to biological materials were evaluated, assuming a carbon net exchange equal to zero. It is important to highlight that biogenic methane release is evaluated under the global warming indicator.
- In accordance with the ISO norm, atmospheric CO2 stored in bio-based materials was reported separately in the LCA report. The Global Warming Potential (GWP) results do not consider biogenic carbon emissions.

Land Use Change

Land use change (LUC) impacts were considered as reported in WFLDB datasets for green coffee. Datasets are aligned with the ISO norm request on land use change. LUC emissions are reported separately in the LCA report.

Time and geographical boundaries

Temporal data regarding average piece of FIRMA capsules are reported in Table 1, according to the relative categories. Secondary data were found in the ecoinvent v3.7.1 database [4], and from WFLDB[5], both published in 2020.
The plant responsible for producing FIRMA capsules products is in Europe. Raw materials are extracted from all over the world, as well as the destination of the final product.

B. Inventory

This report uses data and results from the 2021 CFP study [1]. The only additional data used in this study is the estimation of the whole amount of capsules sold in 2022. The full LCI is available in the 2021 CFP study.

Data for categories	
Quantity sold	2022 data
Green coffee	Specific blend for system, data 2021 purchases
Transport green coffee	Data 2021+ Sustainability Report 2020 [6]assumption
Packaging Pack supply	Main supplier data, 2021
Final product production	Supplier data, 2021
Distribution and end of life coffee	Data 2020, Sustainability Report 2020 [6]assumption
Use of energy and H2O	Sustainability Report 2020 [6] distribution mix for energy used and consumption of competitor machine

Table 1: Inventory table

C. Impact Assessment: Carbon footprint for 2022 estimated sales

The method used to assess the environmental impact of the FIRMA capsules is the global warming potential of atmospheric emissions, evaluated through Intergovernmental Panel on Climate Change (IPCC) method [7].
Table 1, 2, 3, 4 and 5 show the carbon footprint of the life cycle of the expected 2022 sales of Lavazza FIRMA capsules related to each typology of beverage.
The 2022 Carbon footprint was evaluated by multiplying the average value for a single piece of FIRMA capsules sold in 2021 by the expected sales for 2022, in order to obtain the 2022 CFP prevision for FIRMA capsules (Table 6).
Results are presented divided into coffee life cycle (coffee cultivation and processing in the Country of origin, transportation, transformation into ground coffee, packing, coffee dregs disposal), packaging life cycle (raw material extraction, processing, packaging end of life), distribution and use.

LCIA results related to the whole expected sales of 2022 – Coffee

Impact category	Unit	Total	LC coffee		LC Packaging		Distribution		Use		Lavazza processing	
IPCC GWP 100a (neutral approach)	t CO_2 eq	32151	24867	77%	6347	20%	87	0%	347	1,07%	503	2%
GHG LUC emissions and removals	t CO_2 eq	7595	7595	100%	14	0%	0	0%	0	0,00%	0	0%
CH_4 biogenic	t CO_2 eq	1883	1859	99%	24	1%	0	0%	0	0,04%	0	0%
IPCC GWP 100a- no LUC no CH4	t CO_2 eq	22648	15399	68%	6312	28%	87	0%	347	1,52%	503	2%
Impact category	**Unit**	**Total**	**LC coffee**		**LC Packaging**		**Distribution**		**Use**		**Lavazza processing**	
*GHG biogenic (CO2, CH4)	t CO_2 eq	-94	662	-713%	-777	833%	0	0	0	-16%	0	-3%

Table 2 - GHG emissions according to IPCC 2013 100a for FIRMA 2022 estimated sales of coffee

LCIA results related to the whole expected sales of 2022 - Ginseng

Impact category	Unit	Total	LC soluble ingredients		LC Packaging		Distribution		Use	
IPCC GWP 100a (neutral approach)	t CO_2 eq	240	129	53%	99	42%	2	1%	9	4%
GHG LUC emissions and removals	t CO_2 eq	33	33	99%	0	1%	0	0%	0	0%
CH_4 biogenic	t CO_2 eq	8	6	80%	1	20%	0	0%	0	0%
IPCC GWP 100a- no LUC no CH_4	t CO_2 eq	199	89	45%	98	49%	2	1%	9	5%
Impact category	**Unit**	**Total**	**LC soluble ingredients**		**LC Packaging**		**Distribution**		**Use**	
*GHG biogenic (CO_2, CH_4)	t CO_2 eq	-65	-56	85%	-10	16%	0	0%	1	1%

Table 3 - GHG emissions according to IPCC 2013 100a for FIRMA 2022 estimated sales of ginseng

LCIA results related to the whole expected sales of 2022 - Barley

Impact category	Unit	Total	LC soluble ingredients		LC Packaging		Distribution		Use	
IPCC GWP 100a (neutral approach)	t CO_2 eq	158	60	50%	93	47%	1	47%	5	2%
GHG LUC emissions and removals	t CO_2 eq	8	8	99%	0	1%	0	1%	0	0%
CH_4 biogenic	t CO_2 eq	1	0	92%	0	8%	0	8%	0	0%
IPCC GWP 100a- no LUC no CH_4	t CO_2 eq	149	52	41%	92	55%	1	55%	5	3%
Impact category	**Unit**	**Total**	**LC soluble ingredients**		**LC Packaging**		**Distribution**		**Use**	
*GHG biogenic (CO_2, CH_4)	t CO_2 eq	-28	-16	78%	-13	23%	0	0%	0	0%

Table 4 - GHG emissions according to IPCC 2013 100a for FIRMA 2022 estimated sales of barley

LCIA results related to the whole expected sales of 2022 - Tea

Impact category	Unit	Total	LC soluble ingredients		LC Packaging		Distribution		Use	
IPCC GWP 100a (neutral approach)	t CO_2 eq	215	48	22%	156	73%	2	1%	8	4%
GHG LUC emissions and removals	t CO_2 eq	1	0	36%	0	63%	0	0%	0	4%
CH_4 biogenic	t CO_2 eq	1	0	18%	1	80%	0	0%	0	2%
IPCC GWP 100a- no LUC no CH_4	t CO_2 eq	213	48	22%	155	73%	2	1%	8	4%
Impact category	**Unit**	**Total**	**LC soluble ingredients**		**LC Packaging**		**Distribution**		**Use**	
*GHG biogenic (CO_2, CH_4)	t CO_2 eq	-126	-104	83%	-21	17%	0	0%	0	0%

Table 5 - GHG emissions according to IPCC 2013 100a for FIRMA 2022 estimated sales of tea

LCIA results related to the whole expected sales of 2022 - TOTAL

Impact category	Unit	Total	LC coffee/ beverage		LC Packaging		Distribution		Use		Lavazza processing	
IPCC GWP 100a (neutral approach)	t CO_2 eq	32978	25204	76,4%	6809	20,65%	92	0,28%	371	1,12%	503	1,53%
GHG LUC emissions and removals	t CO_2 eq	7663	7662	100%	15	0%	0	0%	0	0%	0	0%
CH_4 biogenic	t CO_2 eq	1896	1870	99%	26	1%	0	0%	0	0%	0	0%
IPCC GWP 100a- no LUC no CH_4	t CO_2 eq	23393	15658	67%	6769	29%	92	0%	370	2%	503	2%
Impact category	**Unit**	**Total**	**LC coffee/ beverage**		**LC Packaging**		**Distribution**		**Use**		**Lavazza processing**	
*GHG biogenic (CO_2, CH_4)	t CO_2 eq	-375	443	-118%	-840	224%	0	0%	15	-4%	3	-1%

Table 6 - GHG emissions according to IPCC 2013 100a for total FIRMA 2022 estimated sales

*In accordance with Article L229-68 (1) in Article 12 of French Law No. 2021-1104, for each typology of beverage the balance of direct and indirect emissions is reported (as defined by ISO 14064-1:2019 standard), with regard to 2022 sales estimates and based on the carbon footprint of 1 average piece of product: **coffee** 1% direct emissions (393 t CO2 eq) and 99% indirect emissions (31,756 t CO2 eq); **ginseng** 0% direct emissions and 100% indirect emissions (455 t CO2 eq); **barley** 0% direct emissions and 100% indirect emissions (158 t CO2 eq); **tea** 0% direct emissions and 100% indirect emissions (215 t CO2 eq).*

D. Interpretation and conclusion

According to the results obtained with the IPCC method, calculated with the described assumptions and limitations, the expected 2022 sales of FIRMA capsules is potentially responsible for approximately 32978 tons of CO_2 eq.

Reduction plan

For several years, the Lavazza Group has been committed to developing reduction plans for various emission categories, which aim to have a better energetic efficiency, use renewable energy sources, and optimize packaging and logistics.
The benefits in terms of reducing the environmental impact of the above plans involving FIRMA capsules will be reported for the year 2022.

Offsetting activity

In 2020 we achieved carbon neutrality for all the emissions related to Scope 1 and 2 of the Lavazza Group as the first step of our commitment. On the other hand, at product level, the Lavazza FIRMA capsules will be among the Lavazza products to be CO2-neutral; this means we offset all our annual carbon emissions related to the sold volumes. The neutrality of these capsules includes the offsetting of emissions throughout the life cycle of the product, from the cultivation of coffee to its end of life, passing through all stages of production, transport and disposal. Several reforestations, community protection and renewable energy implementation projects were selected by Lavazza to offset the Lavazza FIRMA capsules starting in 2021. The projects are certified by internationally recognized standards (VCS, CCB and CDM) to ensure the high quality and robustness of the projects. In addition, our climate partners in charge of all carbon offsetting transactions, ensure compliance with offsetting best practices from project selection to credit withdrawal on behalf of Lavazza.

References

[1] Lavazza, Carbon footprint of Lavazza FIRMA Capsules - December,10th 2021 – Lavazza, 2B srl Capsule 2021, Confidential report, October 2021.

[2] ISO/ TS 14067, 2018: Greenhouse gases- Carbon footprint of product- Requirements and guidelines for quantification and communication.ISO, ISO/ TS 14067, 2018 (www.iso.org).

[3] PCR 2018:03, v 1.01: Espresso coffee Product Category Rules UN CPC 23912 v 1.01, The International EPD® System, 2018 (www.environdec.com)

[4] ecoinvent, 2021: Database ecoinvent version 3.7.1 Swiss Centre for Life Cycle Inventories (www.ecoinvent.ch)

[5] Quantis, 2020, WORLD FOOD LCA DATABASE version 3.5 (quantis-intl.com).

[6] Luigi Lavazza (2021), Lavazza Sustainability Report 2020, Available on: https://www.lavazzagroup.com/it/come-lavoriamo/il-bilancio-di-sostenibilita.html

[7] IPCC 100a 2013: Climate Change 2013, IPCC Fifth Assessment Report (www.ipcc.ch)

[8] Environment section of Company website (The Environment | Lavazza Group)