RUTA CACAO S.R.L.

Chocolate Bar

Environmental Product Declaration,
In accordance with **ISO 14025:2006**.

- Malbec wine reduction in Grand Cru chocolate 80% cocoa.
- 70% cocoa with ginger and cardamom.

EPD®

Argentina EPD

CPC CODE
23660

SCOPE
Argentina

PUBLICATION DATE
date from: 2023/12/15
until: 2024/12/14

EPD® REGISTRATION NUMBER
S-P-07360

PROGRAM
The International EPD® System
www.environdec.com

PROGRAM OPERATOR
EPD® International AB

EPD® Program Information

Program: The International EPD® System.

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EPD Argentina EPD > https://epd.inti.gob.ar

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General Program Instructions for The International EPD® System AB GPI v4.0.

- Accountabilities for PCR, LCA and independent, third-party verification.
- PCR Under development - Food and beverage products (main PCR). The PCR is under development. & GPI 4.0.
- PCR review was conducted by:
- Life Cycle Assessment (LCA).
- LCA accountability: Elina Casañas, Luciana Bilbao, Sergio Del Castillo - INTI.

- Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☑ **EPD verification by individual verifier.**

- Third-party verifier: Javier Martin Echazarreta, Instituto Nacional de Tecnología Industrial (INTI).
- Approved by: The International EPD® System
- Procedure for follow-up of data during EPD validity involves third-party verifier: ☑ YES ☐ NO

The EPD® owner has the sole ownership, liability, and responsibility for the EPD®. EPDs® within the same product category but registered in different EPD® programmes may not be comparable. For two EPDs® to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see ISO 14025.

Value proposition and commitment

Ruta Cacao value proposition and our commitment to sustainability.

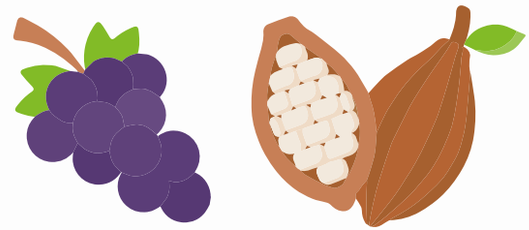
A QUALITY SENSORY JOURNEY

Each chocolate bar of Ruta Cacao takes you on an enticing journey throughout many lands of a unique quality and flavor.

The value proposition of Ruta Cacao is to have each of their chocolate bars take you on a trip to a different land with a chocolate that is unique in quality and flavor. We make carefully selected blends that are the result of research into the fruits and flavors of each different region of the planet.

NATURAL INGREDIENTS, NO CHEMICALS

We do not use chemicals or essences. Our flavors are the result of dehydrated fruits, spices, toasted dried fruits and wine reduction, dulce de leche and chocolate.



Value proposition and commitment

Ruta Cacao value proposition and our commitment to sustainability.

DESIGN AND ENGINEERING IN PACKAGING

The design and engineering used in packaging give added value to our products.

SOCIAL APPROACH AND FEMALE EMPOWERMENT

Ruta Cacao is an Argentine company created by women, who hold management and operational positions.

We are a company legally committed to the triple impact established in our statute. We select and train women from vulnerable sectors such as gender violence. They are our partners in the production and the daily use of good manufacturing practices.

Value proposition and commitment

Ruta Cacao value proposition and our commitment to sustainability.

COLLABORATION AND SHARED VALUE
CONCERN ABOUT ENVIRONMENTAL IMPACT

At Ruta Cacao we care about the impact of everything we do and how we do it.

· We create nutritious and healthy products.

· We work closely with cooperatives to identify and use chocolate from cocoa production that is free of slave labor.

· We use energy-efficient equipment.

· To ensure safety in our products, we follow processes under the standards of Good.

· Manufacturing Practices that are required for international certifications.

CHOCOLATE BAR WITH WINE MALBEC REDUCTION

Ingredients:

- Chocolate 80% cocoa Grand Cru
- Wine Malbec reduction

NUTRITIONAL INFORMATION

GUARDA PAMPA. Portion 25 g.

Energetic value 107 Kcal (5%VD)	Trans fat 0 g
Carbohydrates 7,8 g (3%VD)	Dietary Fiber 2,4 g (10%VD)
Sugars 5,6 g	Sodium 8,3 mg (0%VD)
Proteins 2,1 g (3%VD)	Iron 4,4 mg (25%VD)
Total Fats 7,6 g (14%VD)	Potassium 271 mg
Saturated fats 4,5 g (21%VD)	Calcium 1,7 mg

*%Daily values based on a diet of 2,000 kcal or 8,400 kj.
Your daily values may be higher or lower depending on your energy needs.

CHOCOLATE BAR WITH GINGER AND HIT OF CARDAMOM

Ingredients:

- Chocolate 70% cocoa
- Dehydrated ginger and hit of cardamom

NUTRITIONAL INFORMATION

INDIA. Portion 25 g.

Energetic value 128 Kcal = 537,5 KJ (6,5%VD*)	Trans fat 0 g
Carbohydrates 11,5 g (4%VD)	Dietary fiber 2,2 g (9%VD)
Sugars 9 g	Sodium 8 mg (0,5%VD)
Proteins 2,1 g (3%VD)	Iron 1 mg (7%VD)
Total fat 8 g (15%VD)	Potassium 205,5 mg (6%VD)
Saturated fat 4,9 g (22,5%VD)	Calcium 2,3 mg (0%VD).

*%Daily values based on a diet of 2,000 kcal or 8,400 kj.
Your daily values may be higher or lower depending on your energy needs.

Content Statement · LCA Information

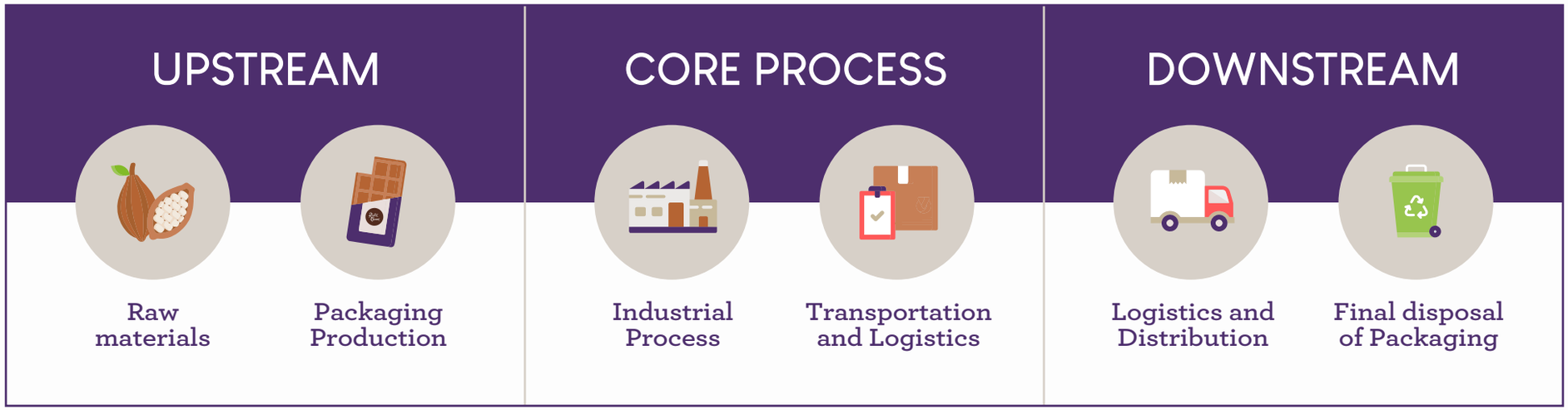
Functional Unit: The functional unit analyzed in this study is "1 kilogram of chocolate" and its packaging as it is presented to the consumer (the weight of the packaging is not included).

Allocation: Mass is the allocation method used for the product.

Period under evaluation: Regarding the temporal scope of the inventory, the information on the chocolate production system is January through December 2022.

Database and LCA software used: Ecoinvent V 3.8, database for **SIMAPRO® 9.4**. It is a study that has a scope from cradle to grave as defined in the ISO 14040 standard.

System Boundaries:



UPSTREAM	CORE PROCESS	DOWNSTREAM
Raw materials	Industrial Process	Logistics and Distribution
Packaging Production	Transportation and Logistics	Final disposal of Packaging

The UPSTREAM includes the processes of:
· Production of raw materials (pure chocolate, wine, ginger, cardamom).
· Packaging production.

PURE CHOCOLATE:

The **Grand Gru cocoa** originates from high quality cocoa beans from fine cocoa varieties that are grown in specific regions. The crop needs light, soil, water, and fertilizers for the plant to grow. Subsequent processes include fermentation, drying, polishing, washing, and grading.

MALBEC WINE:

An iconic grape variety in Argentina. It has a profile of aromas of black fruits, such as plums and blackberries, and notes of chocolate and spices. The transportation of the wine is carried out by 16-32 tkm truck.

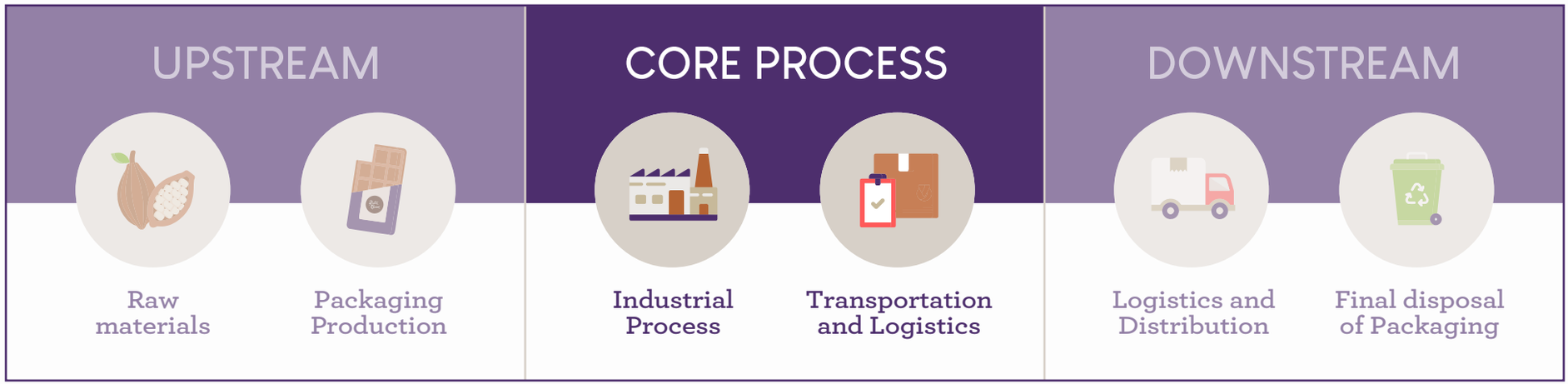
GINGER AND CARDAMOM:

India is one of the main producers. The combination of these spices with chocolate offers an interesting and superb fusion of flavors.

PACKAGING PRODUCTION:

The primary packaging is a sheet of aluminum foil that completely wraps the chocolate. It protects it from light and humidity. The secondary packaging is a cardboard box that protects the quality of the chocolate, and additionally, it is a nice and attractive presentation.

LCA: consumption was calculated using primary information and environmental profiles, and a well known international database.

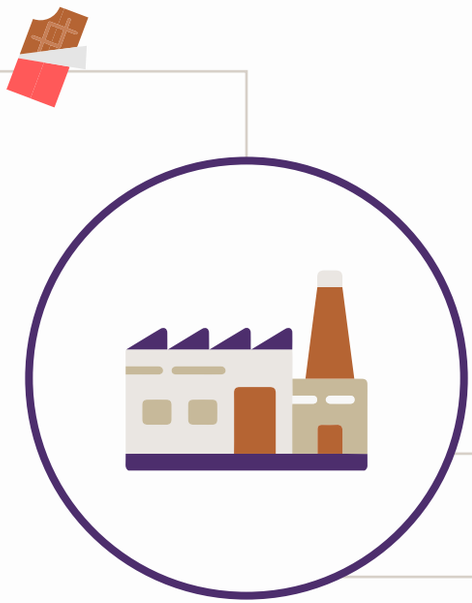


PRODUCTION OF CHOCOLATE BARS:

1. General information: the production plant is located in the City of Buenos Aires, Argentina. The tempering process is essential to ensure that the chocolate has a smooth texture and shine. The combination with the other ingredients and the molding produce a chocolate bar ready for packaging.

2. Water: the city municipal water network is drinking water, and is used mainly for cleaning.

3. Energy: electricity comes from the national energy matrix and is used in the process of tempering equipment and refrigerated areas.



4. Effluents: the effluents are low and correspond to the cleaning drain that ends up in the city's sewage network.

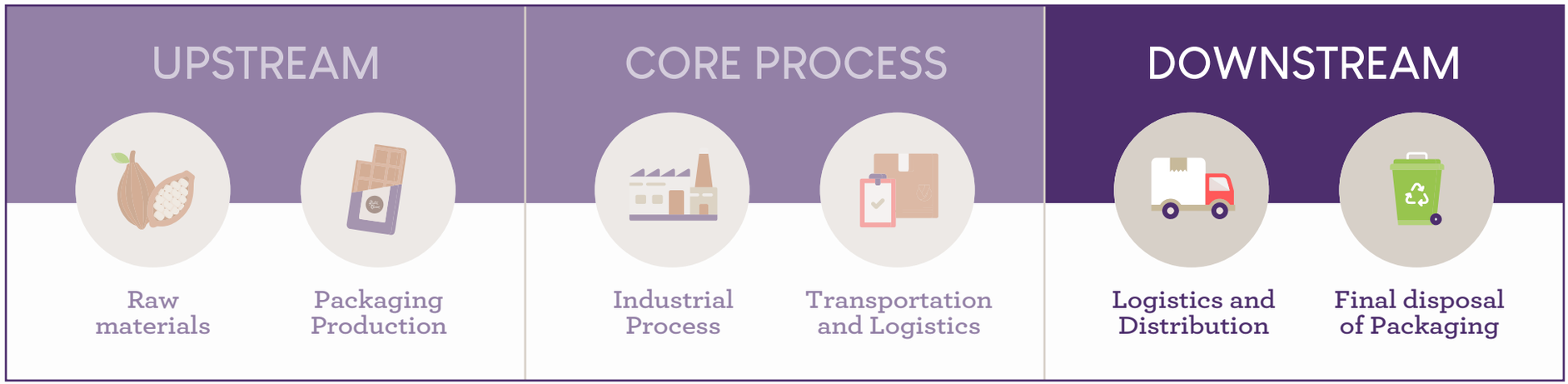
5. Gas: Natural gas is from the city network and is basically used to heat the water for the cleaning of the molds.

6. Waste: The solid waste comparable to urban waste is 23.4% and it goes to the municipal landfills; the remaining 76.6% goes to the municipal recycling plant.

LOGISTICS:

The transportation of raw materials was associated with that of pure chocolate by ship. The wine transportation was estimated by truck 16-32 tkm. In the case of ginger and cardamom, the transportation was carried out by a partner for 1 tkm.

LCA: consumption was calculated using primary information and environmental profiles, and a well known international database.



DISTRIBUTION LOGISTICS:

This part of the distribution process is essential to guarantee that the bars reach consumers in a proper manner. It is distributed by motorcycle from the plant headquarters in the capital city to the entire Buenos Aires province. As for the provinces, the distribution is carried out with transport of 16-32 tkm.

FINAL DISPOSAL OF PACKAGING:

The packaging is discarded in household waste. They are disposed of at an estimated distance of 10 km, in its final destination at the municipal landfill in the city of Buenos Aires and surrounding areas. In other locations, the packaging is discarded at an estimated distance of 40 km, by a transport of 3.5-7.5 tkm.

LCA: the distances were calculated by primary information and a database was used to assess the profiles of the means of transportation.

EPD® validity: This document is a pre-certified EPD, it is valid to Argentina and expires on 2024-12-XX as stated in the EPD®.

Results of the Environment performance indicators

IMPACT CATEGORY INDICATORS			UPSTREAM		CORE PROCESS		DOWNSTREAM		
PARAMETER		Unit	Raw materials	Packaging production	Industrial process	Transportation and logistics	Logistics and distribution	Final disposal of packaging	TOTAL
Global Warming Potential (GWP)	Fossil	kg CO2 eq.	9,59E-01	2,93E-01	2,93E-01	1,52E-01	1,15E-01	2,95E-02	**1,84E+00**
	Biogenic	kg CO2 eq.	5,71E-01	2,06E-01	1,32E-02	7,61E-04	5,73E-05	1,97E-01	**9,88E-01**
	Land use and land transformation	kg CO2 eq.	1,32E+00	1,60E-03	9,79E-03	1,00E-04	4,90E-05	6,14E-07	**1,33E+00**
	TOTAL	kg CO2 eq	2,85E+00	5,00E-01	3,16E-01	1,53E-01	1,16E-01	2,27E-01	**4,16E+00**
Ozone layer depletion (OPD)		kg CFC 11eq	1,30E-07	2,05E-08	2,97E-08	3,11E-08	2,59E-08	2,48E-10	**2,38E-07**
Adification potential (AP)		mol H^+ eq	1,04E-02	1,62E-03	8,06E-04	2,63E-03	7,90E-04	1,26E-04	**1,64E-02**
Eutrophication potential (EP)	Aquatic freshwater	kg P eq	2,22E-04	1,07E-04	3,08E-05	1,29E-05	8,78E-06	1,21E-05	**3,94E-04**
	Aquatic marine	kg N eq	9,35E-03	4,81E-04	1,60E-04	6,94E-04	3,03E-04	1,96E-04	**1,12E-02**
	Aquatic terrestrial	mol N eq	3,75E-02	3,98E-03	1,54E-03	7,69E-03	3,31E-03	6,23E-04	**5,46E-02**
Photochemical oxidant creation potential (POCP)		kg NMVOC eq	1,92E-01	1,00E-03	5,00E-04	2,07E-03	9,11E-04	2,73E-04	**1,96E-01**
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq	1,16E-05	1,41E-06	1,703E-06	1,02E-06	3,97E-07	3,59E-09	**1,62E-05**
	Fossil resources	MJ, net valorific value	7,58E+00	3,78E+00	5,18E+00	2,12E+00	1,73E+00	1,78E-02	**2,04E+01**
Water deprivation potential (WDP)*		m^3 world eq. deprived	5,13E+00	1,16E-01	4,19E-01	7,38E-03	5,95E-03	5,02E-04	**5,68E+00**

***Disclaimer:** The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Results of the Environment performance indicators

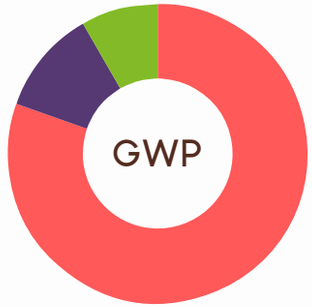
RESOURCE USE INDICATORS			UPSTREAM		CORE PROCESS		DOWNSTREAM		
PARAMETER		Unit	Raw materials	Packaging production	Industrial process	Transportation and logistics	Logistics and distribution	Final disposal of packaging	TOTAL
Primary energy resources RENEWABLE	Use as energy carrier	MJ, net calorific value	2,04E-01	2,14E-01	9,82E-01	2,35E-02	1,40E-02	2,14E-04	**1,44E+00**
	Used as raw materials	MJ, net calorific value	1,73E+01	3,34E+00	1,17-01	7,10E-03	5,78E-03	8,90E-05	**2,08E+01**
	TOTAL	MJ, net calorific value	1,75+01	3,55E+00	1,10E+00	3,06E-02	1,98E-02	3,03E-04	**2,22E+01**
Primary energy resources NON RENEWABLE	Used as energy carrier	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
	Used as raw materials	MJ, net calorific value	7,96E-03	2,12E-03	4,10-03	1,21E-04	7,31E-05	1,53EE-06	**1,44E-02**
	TOTAL	MJ, net calorific value	7,96E-03	2,12E-03	4,10E-03	1,21E-04	7,31E-05	1,53E-06	**1,44E-02**

Results of the Environment performance indicators

Global Warming Potential

- UPSTREAM: 80,4%
- CORE: 11,3%
- DOWNSTREAM: 8,3%

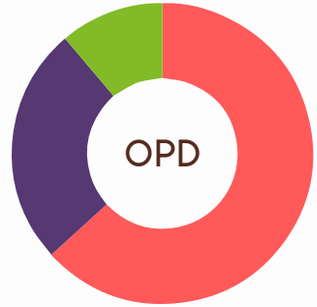
4,16E+00 kg CO2 eq



Ozone Layer Depletion

- UPSTREAM: 863,3%
- CORE: 25,6%
- DOWNSTREAM: 11,2%

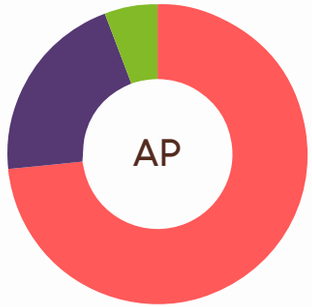
2,380E-07 kg CFC 11 eq



Acidification Potential

- UPSTREAM: 73,4%
- CORE: 20,9%
- DOWNSTREAM: 5,7%

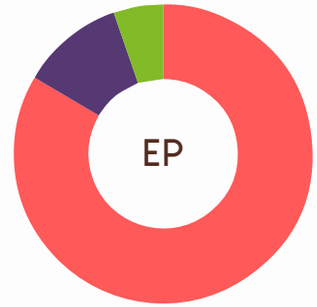
1,639E-02 mol H+ eq



Eutrofication Potential
Aquatic freshwater

- UPSTREAM: 83,6%
- CORE: 11,1%
- DOWNSTREAM: 5,4%

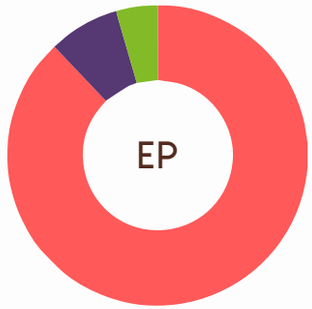
3,940E-04 kg P eq



Eutrofication Potential
Aquatic marine

- UPSTREAM: 87,9%
- CORE: 7,6%
- DOWNSTREAM: 4,5%

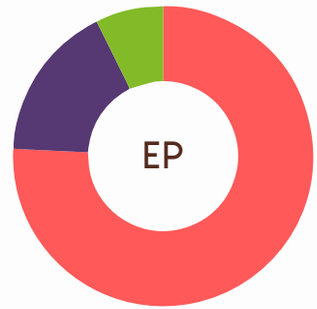
1,119E-02 kg N eq



Eutrofication Potential
Aquatic terrestrial

- UPSTREAM: 75,8%
- CORE: 16,9%
- DOWNSTREAM: 7,3%

5,466E-02 mol N eq

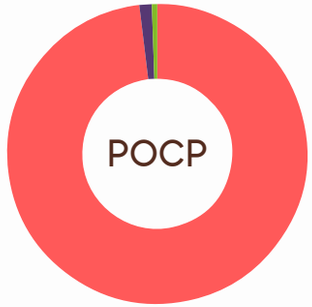


Results of the Environment performance indicators

Photochemical Oxidant Creation Potential

- UPSTREAM: 98,1%
- CORE: 1,3%
- DOWNSTREAM: 0,6%

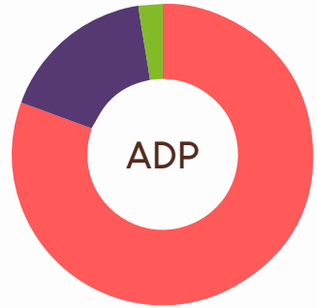
1,963E-01 kg NMVOC eq



Abiotic Depletion Potential
Metals and Minerals

- UPSTREAM: 80,6%
- CORE: 16,8%
- DOWNSTREAM: 2,6%

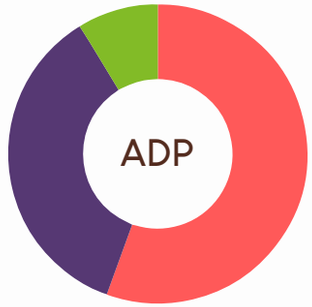
1,617E-05 kg Sb eq



Abiotic Depletion Potential
Fossil Resources

- UPSTREAM: 55,5%
- CORE: 35,7%
- DOWNSTREAM: 8,7%

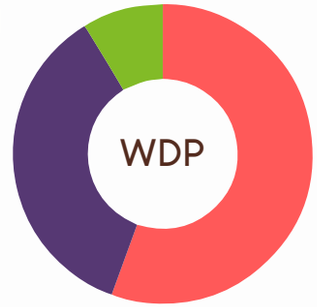
2,044E+01 MJ, net calorific value



Water Deprivation Potential

- UPSTREAM: 92,4%
- CORE: 7,5%
- DOWNSTREAM: 0,1%

5,680E+00 m3 world eq deprived



CHOCOLATE BAR	UNIT	UPSTREAM		CORE PROCESS		DOWNSTREAM		TOTAL
		Raw materials	Packaging production	Industrial process	Transportation and logistics	Logistics and distribution	Final disposal of packaging	
Carbon Footprint	kg CO2 eq	2,850	0,500	0,316	0,153	0,116	0,227	**4,16**
Water deprivation potencial	m^3	5,13	0,116	0,419	0,00738	0,00595	0,000502	**5,68**

REFERENCES

GENERAL PROGRAM INSTRUCTIONS FOR THE INTERNATIONAL EPD® SYSTEM. GPI | versiOn 4.0.

ISO 14025:
Environmental labels and declarations.
Type III environmental declarations. Principles and procedures.

ISO 14040:
Environmental management. Life cycle assessment.
Principles and framework.

ISO 14043:
Environmental management. Life cycle analysis.
Interpretation of the life cycle.

ISO 14044:
Environmental management. Life cycle assessment.
Requirements and guidelines.

ISO 14046:
Environmental management. Water footprint.
Principles, requirements and guidelines.

ISO 14067:
Greenhouse gas. Carbon footprint of the products.
Requirements and guidelines for its quantification.

Website EPD® International System
https://www.environdec.com

GLOSSARY

POTENTIAL ACIDIFICATION - (AP):
Acidifying compounds emissions into the atmosphere produce acid rain, and a decrease in the pH of the soil, lakes, forests, causing harmful effects on living organisms.

OZONE LAYER DEPLETION - (OLD):
It is an indicator associated with the depletion process that occurs when the rate of ozone destruction is greater than its generation. This may happen due to fugitive losses of anthropogenic substances in the atmosphere.

DEPLETION OF ABIOTIC RESOURCES - MINERALS AND METALS - (ADP MINERALS & METALS):
It is an indicator associated with the reduction of mineral stock, which is quantified in kg of antimony equivalent per kg of extraction, or kg of antimony equivalent per MJ for energy carriers.

DEPLETION OF ABIOTIC RESOURCES - FOSSIL FUELS - (ADP-FOSSIL):
It is an indicator associated with the reduction of fossil fuels, based on obtaining energy from their consumption.

LIFE CYCLE ANALYSIS (LCA):
Collection and evaluation of inputs, outputs and potential environmental impacts throughout the product life cycle in accordance with ISO 14040.

TOTAL CLIMATE CHANGE - (GWP):
It is a relative measure of how much heat can be trapped by certain greenhouse gasses (GHG) that are accumulated in the atmosphere. It is expressed in kg of CO2 equivalent.

WATER CONSUMPTION:
It is an indicator that represents the remaining relative available water by area in a basin, after the demand of humans and aquatic ecosystems has been met. It is expressed in m3 global.

POTENTIAL EUTROPHICATION - (PE):
It is the enrichment of aquatic ecosystems due to excess nutrients (nitrogen, phosphorus or degradable organic substances), due to pollution with inorganic fertilizers and urban effluents, among others, with the reduction of dissolved oxygen levels in aquatic environments that produce the collapse of fish and other aquatic species.

PHOTOCHEMICAL OZONE FORMATION - (POCP):
It is an indicator associated with the photochemical development of ozone caused by the degradation of volatile organic compounds (NOx, VOCs) in the presence of sunlight. This formation process is more intense in the summer, and it usually occurs in sunny cities with little movement of air masses.

FUNCTIONAL UNIT:
It is a measure of the function of the system studied and it provides a reference for all results presented in the EPD. This allows for the comparison of the data presented in two or more EPDs of same category products.

USE OF RENEWABLE AND NON-RENEWABLE PRIMARY ENERGY RESOURCES:
It is a measure of the environmental impacts related to the consumption of primary energy resources that are renewable (water, biomass, geothermal, solar, wind) and non-renewable (coal, natural gas, oil and fissile materials), and are used as an energy carrier and as raw material.

Ruta Cacao®

EPD®

Argentina EPD

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