CONSORZIO AGRARIO DEL NORDEST

PRODUCT ENVIRONMENTAL STATEMENT

Dried durum wheat semolina pasta – ***PATRIMONI D'ITALIA***

EPD®

PCR reference	***2010:01 Uncooked pasta, not stuffed or otherwise prepared – version 4.0, valid until 2024-11-24.***
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The declared validity must therefore always be registered and published at www.environdec.com. This environmental declaration has been prepared in accordance with ISO 14025:2006

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1 Description of the company and product

Sustaining Italian pasta production comes from the desire of the North east Agricultural Association to combine their farming experience and love of tradition to create quality pasta.

The North east Agricultural Association is a company created from the merger between Calv Group (Veneto Lombardy Agricultural Consortium) and the Consortium of Padua and Venice. The Consortium works while respecting the integrity and tradition of the territories in which it operates and at the same time, with the advanced methods, in terms of safety, environment and quality. This is why it chose to work in the production chain, so as to ensure that each part of the chain may contribute towards the final results and use them to the maximum.

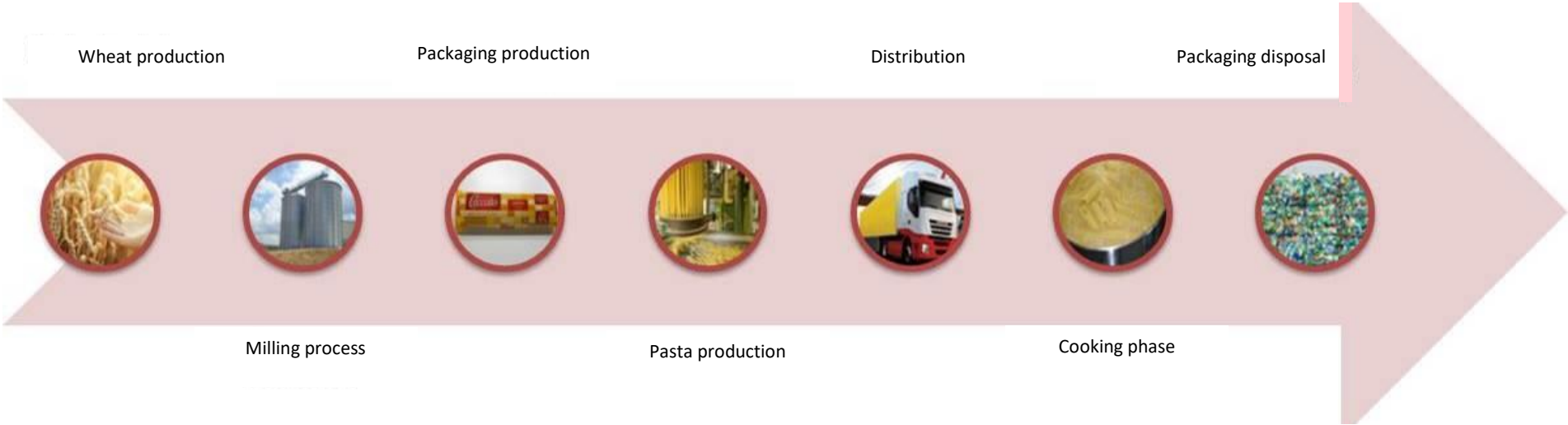
Patrimoni D'Italia pasta is produced in a modern facility structured to combine the most advanced food quality management and control principles with traditional Mediterranean values. Particular preference is given to processes that respect and value the product, and for this reason bronze dies are used. In 2019, the pasta was produced exclusively at the Pastificio Tamma Spa facility, which provided the primary data necessary to quantify the environmental impacts associated with Patrimoni D'Italia pasta production at its facility.

Table 1 **-** General information – Pastificio Tamma SpA

Pasta manufacturing plant registered name	*Francesco Tamma S.p.A.*
Legal office and plant	Corso del Mezzogiorno, 15 – 71122 Foggia – Italy
Telephone	+39 088 1308111

2 The process

The dry durum wheat semolina pasta is made from durum wheat and water and is either extruded or milled and then dried.
Drying is the most fragile part of the process as its outcome depends on chemical-physical and organoleptic properties of the finished product (colour, cooking resistance, etc). During this phase water is gradually lost from the extruded pasta, guaranteeing the interruption of any fermentative process and thus generating the finished products consistency.



The newly formed pasta still contains 30% water which is then eliminated throughout the process, with a duration depending on the drying technology used and the type of pasta to be made. The product is ventilated several times and in several stages with hot air and appropriate temperatures, so as to reduce the moisture evenly and homogeneously; This process is very delicate as an excessive drying speed could change the appearance and quality of the product. The process is continued until the final moisture content of the product does not exceed the legal limit of 12.5%.

3 The products

The product concerned is: dried durum wheat semolina pasta (*NACE Code: Division 10, Group 10.8, Class 10.73 - Manufacture of pasta, couscous and similar farinaceous products*)

3.1 Conventional products

The conventional products included in the analysis are the following sizes:

1 Lb Format (454 g) – Patrimoni D'Italia Brand

- Long pasta (e.g. spaghetti)
- Short pasta (e.g. sedani rigati)

10 Lb Format (4536 g) – Patrimoni D'Italia Brand

- Long pasta (e.g. spaghetti)
- Short pasta (e.g. sedani rigati)

Figure 1 **– Formats, some examples**

Given that the difference in impact between the 1L and 10L formats is more than 5%, the declaration states the impact corresponding to both formats.

3.2 Product content and nutritional values

Durum wheat semolina pasta, the subject of this statement, is made solely of durum wheat semolina and water, with a lower final moisture content of 12.5%, as required by Italian legislation for pasta. From a nutritional point of view, its main characteristics are shown in the table below.

Table 2 - **Main nutritional information**

BRAND	ENERGY VALUE	FATS % P.P.	OF WHICH SATURATES % P.P.	CARBOHYDRATES % P.P.	OF WHICH SUGARS % P.P.	FIBRE	PROTEINS (N*6,25) % P.P.	SALT (g)
Patrimoni d'Italia	200 kcal	1 g	0 g	42 g	2 g	2 g	7 g	0 g

EPD sizes cooking time is around 11 minutes.

4 Functional unit

The functional unit is equal to 1 kg of pasta as envisaged by the reference PCR (Product Specific Requirements) for this study. The packaging weight is not included in the functional unit.

The table below shows the reference bill of materials.

References	Packaging description	Material	Weight of individual package ref. to 1kg
1 POUND LONG PASTA	Primary packaging	LDPE	0.00855
	Secondary packaging	cardboard	0.0297
	Interlayer	cardboard	0.00359
	Pallet-wrapping stretch film	LDPE	0.000471
	Pallet	Wood	0.0127
1 POUND SHORT PASTA	Primary packaging	LDPE	0.0130
	Secondary packaging	cardboard	0.0297
	Interlayer	cardboard	0.00359
	Pallet-wrapping stretch film	LDPE	0.000471
	Pallet	Wood	0.0127
10 POUNDS LONG PASTA	Primary packaging	LDPE	0.00940
	Secondary packaging	cardboard	0.0415
	Interlayer	cardboard	0.00359
	Pallet-wrapping stretch film	LDPE	0.000303
	Pallet	Wood	0.00819
10 POUNDS SHORT PASTA	Primary packaging	36	0.00940

References	Packaging description	Material	Weight of individual package ref. to 1kg
	Secondary packaging	cardboard	0.0415
	Interlayer	cardboard	0.00359
	Pallet-wrapping stretch film	LDPE	0.000303
	Pallet	Wood	0.00819

5 Method

The method used for the calculation is the LCA - Life Cycle Assessment that, regulated by the International Standard ISO 14040 series, allows to determine the environmental impacts of a product or service in terms of resource consumption and emissions into the environment throughout the life cycle. For the research the following has also been considered:

- The EPD international system requirements are expressed in the "General Programme Instructions for the International EPD®" document – version 3.01, 2019.
- The Product Category Rules (PCR) requirements for pasta: PCR 2010:01 Uncooked pasta, not stuffed or otherwise prepared", Product Category Classification: UN CPC 2371, version 4.0, valid until: 2024-11-24

Therefore, the ACL allows to estimate the result of the impact resulting from all stages of the life cycle of the product, thus providing a comprehensive overview of the environmental characteristics of the product and a truer definition of the environmental data used when choosing between more products.

The information used in this study was divided into specific data and generic data. Specific data is derived from direct field surveys and collected from the pasta manufacturing plants; secondary data is derived from databases contained in the 9.1.1.1 SimaPro model.

The **Ecoinvent vs. 3.6** database was used. **Vs. 5 of the Agrifootprint database** was used only for the modelling of some processes related to the agricultural phase. The method used to assess impacts is EPD 2018 vs. 1.01.

The steps in question are:

1) Grain production.
2) Grain transport.
3) Milling.
4) Production of primary, secondary and tertiary packaging.
5) The production of pasta.
6) The distribution of pasta.
7) Cooking the pasta.
8) The disposal of the packaging.

6 Boundaries of the system

The processes that make up the analysed system are of the "from cradle to grave" type and were detailed and subdivided into three groups, in line with the requirements of the EPD system and the PCR of reference.

The "upstream" processes include:

- Emissions into the air and water that result from the use of fertilizers and from work in the field with agricultural machines that use oil as fuel.
- The production of seeds for cultivation.
- The production of fertilizers, herbicides and pesticides used in agriculture.
- The production of fuel (diesel) used by agricultural machinery.
- The production of primary packaging of the agricultural input.
- The production of primary, secondary and tertiary packaging of the finished product.
- The grain transport to the mill and the production of fuel for the transport means.
- The milling of wheat and production of semolina: production of electrical energy and water consumption.

Other processes have not been considered as the researched product is only made with durum wheat semolina and water.

The "core" processes include:

- The production of pasta
- Production of electrical energy used during the production of pasta considering the Italian electrical mix
- Production of thermal energy (understood as the consumption of natural gas) during the production of pasta
- Use of cleaning products
- The consumption of drinking water used as an ingredient in the production of pasta.
- The transport of durum wheat semolina from the mill to the pasta manufacturing plant
- The transport of primary and secondary packaging from the production facility to the pasta manufacturing plant
- The transport of waste to the disposal site and its treatment
- The transport of detergents and products for maintenance from the production site to the pasta manufacturing plant.

The “downstream” processes include:

- The transport of the pasta from the production facility to a distributor or “medium” distribution centre, within defined geographical boundaries
- Step: cooking the pasta
- End of life of the primary, secondary and tertiary packaging after use

The construction operations and infrastructure of the company, the production of the company's machinery, as well as the transport of employees have not been considered.

7 General assumptions

Agricultural Phase – The environmental performance associated with cultivating the durum wheat used to produce Patrimoni D'Italia pasta was evaluated considering the primary data from 2019 (yield, moisture, fertilizer consumption, pesticide consumption, seed consumption) from the ISTAT website and the guidelines for integrated production. The durum wheat used is exclusively of Italian origin and comes mainly from Puglia and Le Marche.

Grinding phase - The environmental performance associated with the grinding phase was calculated considering the yield, the energy and water consumption for the mill that provides the semolina to the pasta manufacturing plant. Primary data (year 2019) were used for the amounts of energy and water, secondary data were used for the environmental aspects associated with energy and water production. For the co-products destined for the livestock sector, the impact was not calculated, and the transport to the final customer was considered. The table indicates the quantities of resource consumption.

Packaging production phase - The environmental performance associated with the packing production stage was evaluated considering the primary packaging in plastic film and the secondary packaging in cardboard. Primary data is used for packaging quantities and transport from the supplier to the pasta manufacturing plant. Secondary data for the packaging production and processing. The study also considered tertiary packaging: stretch film and pallets.

Pasta production stage – Environmental performance was evaluated considering energy, water, and waste consumption in 2019. Secondary data was used for the environmental aspects associated with energy and water production. Part of the environmental impact associated with pasta production was not allocated to the co-products/scraps destined for the livestock sector. Only transport to the final customer was considered.

The table indicates the quantities of resource consumption.

Distribution phase - The environmental performance was evaluated considering the transport of the pasta from the production facility to a distributor or "medium" distribution centre, within defined geographical boundaries. In the year of reference, the product was distributed only in the American market.

Cooking stage - Impacts are closely linked to consumer habits. It is assumed that electrical energy is used to cook the pasta. The impacts can be estimated considering the situations set out in the PCR regarding the pasta (boiling phase: 0.18 kWh per Kg of water - cooking phase: 0.05Wh per minute of cooking, salting of water: 10 g of salt per 100 g of pasta). 11 minutes are considered.

Packaging end-of-life stage - Impacts were hypothesised considering the Italian waste disposal context described in the ISPRA (Italian Institute for Environmental Protection and Research) 2019 "Urban waste report".

The Italian residual energy mix for 2019 was used for the modelling of electricity consumption, as required by the PCR.

8 Data quality

The data can be specific, generic or “proxy data”. A quality analysis was implemented on the basis of the time, geographical and technological representativeness for the year 2019. The *Upstream process* module data are based on secondary data for the agricultural stage and on primary data for the milling stage, provided by a mill that supplies the pasta plant with durum wheat semolina. For the production of primary and secondary packaging data, sheets from the supplier were acquired and the weights were calculated at the pasta manufacturing plant, while for the modelling of the production of plastic material the Ecoinvent 3.6 database was used. The mix of electricity used by the pasta manufacturing plant is Italian (in the LCA study the Italian residual energy mix in 2019 was used). For reconstruction of the distances of transport (from supplying companies to the pasta manufacturing plant and then from the pasta manufacturing plant to the disposal centres and from the pasta manufacturing plant to the end users) the current transportation model in database Ecoinvent 3.6. was used. Distances have been based on actual data provided by the pasta manufacturing plant. The Downstream process end-of-life data are based on the Italian context and, as such, refer to generic selected data. The “proxy data” used does not exceed the 10% portion of each impact category.

9 Changes to the previous EPD version

The changes made are shown with bullet points compared to the previous version:

Certificate field of application – No change.
Geographical scope - No changes.
Agricultural stage - The origin of the wheat and the corresponding data were updated based on information from the mills and sector reports (ISTAT, production guidelines).
Grinding phase - Updated data based of the data supplied by the mill.
Package production stage – No changes. Impacts regarding tertiary packaging (stretch film and pallets) were also calculated.
Pasta production phase – Update based the data provided by Pastificio Tamma SpA.
Distribution phase - Updated data on American market distribution. The Patrimoni d'Italia pasta was not sold on the Italian market in 2019.
Cooking phase - No changes.
End of life packaging stage - The latest available data published by the ISPRA (Italian Institute for Environmental Protection and Research) were considered.

10 Environmental performance

The environmental performance of the system concerned is covered in this section.

10.1 Consumption of resources and impacts, Patrimoni d'Italia pasta, 1 L

The impacts and resource consumption reported in the tables below refer to the Patrimoni d'Italia pasta. The reference is the functional unit: 1 Kg of long pasta and short pasta. The results refer to the 1L reference.

Consumption of resources	Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
		Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Renewable energy resources not used as raw materials	*MJ*	1.782	0.061	0.467	0.485	0.1242	0.1242	0.0285	0.0286	0.000173	0.000184	0.000263	0.000185	2.463	2.481	1.472
Renewable energy resources Used as raw materials	*MJ*	0.371	0.029	0.528	0.539	0.0594	0.0594	0.0107	0.0107	0.0000504	0.0000596	0.0000767	0.0000600	0.998	1.009	0.725
Total renewable energy resources	*MJ*	2.152	0.0897	0.995	1.024	0.184	0.184	0.0392	0.0393	0.000223	0.000244	0.000340	0.000245	3.460	3.490	2.197
Non-renewable energy resources not used as raw materials	*MJ*	1.479	-	-	-	-	-	-	-	-	-	-	-	1.479	1.479	-
Non-renewable energy resources Used as raw materials	*MJ*	10.313	1.502	1.179	1.530	3.426	3.428	3.879	3.895	0.003	0.00846	0.00483	0.00850	20.311	20.682	22.793
Total non-renewable energy resources	*MJ*	11.793	1.502	1.179	1.530	3.426	3.428	3.879	3.895	0.00318	0.00846	0.00483	0.00850	21.791	22.161	22.793
Secondary materials	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable secondary fuels	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-renewable secondary fuels	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Consumption of fresh water	*m3*	0.0602	0.00529	0.00452	0.00564	0.0125	0.0125	0.00185	0.00186	0.0000168	0.0000150	0.0000255	0.0000150	0.0844	0.0855	0.130

There is zero consumption of secondary resources since these were not used at any point during the life cycle of the product.

The waste generated during the life cycle of the product is indicated in the table.

Waste	Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
		Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Hazardous waste	*kg*	0.000197	-	-	-	0.000255	0.000255	-	-	-	-	-	-	0.000452	0.000452	-
Non hazardous waste	*kg*	0.185	-	-	-	0.00162	0.00162	-	-	0.00462	0.0111	0.00703	0.0111	0.202	0.205	-
Radioactive waste	*kg*	0.000148	-	-	-	-	-	-	-	-	-	-	-	0.000148	0.000148	-

The indicators of the system's output flows are shown in the table.

Output flows	Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
		Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Output flows for animal feed or similar	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Components for reuse	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material for recycling	*kg*	0.00160	-	-	-	0.00384	0.00384	-	-	0.0037	0.0348	0.00563	0.0348	0.0439	0.0459	-
Materials for energy recovery	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exported energy, electricity	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exported energy, thermal	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The environmental impacts associated with production of the functional unit are indicated in the table: 1 Kg of long pasta and short pasta, 1 Lb format.

Impact category		Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
			Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Global warming	Fossil	kg CO2 eq	1.508	0.0926	0.0516	0.0622	0.209	0.209	0.275	0.276	0.00856	0.00095	0.0127	0.000952	**2.145**	**2.161**	1.416
	Biogenic	kg CO2 eq	0.000586	0.000116	0.000888	0.000913	0.000253	0.000253	0.0000596	0.0000598	0.000000273	0.000282	0.000282	0.000282	**0.00218**	**0.00249**	0.00292
	Land use and transformation	kg CO2 eq	0.00435	0.0000205	0.000500	0.000541	0.0000196	0.0000196	0.000180	0.000181	0.000000184	0.000000206	0.000000280	0.000000207	**0.00507**	**0.00511**	0.000173
	TOTAL	**kg CO2 eq**	**1.513**	**0.0928**	**0.0530**	**0.0636**	**0.209**	**0.209**	**0.275**	**0.276**	**0.00856**	**0.00123**	**0.0130**	**0.00123**	2.152	2.169	1.419
Acidification		kg SO2 eq	0.0111	0.000376	0.000210	0.000247	0.000506	0.000507	0.00686	0.00688	0.00000254	0.000003294	0.00000386	0.000003384	**0.0191**	**0.0192**	0.00523
Eutrophication		kg PO4--- eq	0.0105	0.0000918	0.000111	0.000126	0.0001399	0.0001400	0.000738	0.000741	0.00000687	0.0000129	0.00001044	0.0000130	**0.0116**	**0.0117**	0.00154
Photochemical oxidation		kg NMVOC	0.00619	0.000342	0.000208	0.000252	0.000352	0.000352	0.00578	0.00580	0.00000298	0.000004196	0.00000454	0.000004336	**0.0129**	**0.0129**	0.00313
Depletion of resources - Elements		kg Sb eq	4,29E-05	1,22E-06	6,41E-07	7,48E-07	2,85E-07	2,88E-07	2,74E-06	2,75E-06	4,24E-09	1,17E-08	6,45E-09	1,17E-08	**4,78E-05**	**4,80E-05**	3,77E-06
Depletion of resources - Fossil fuels		MJ	10.1324	1.295	1.048	1.367	2.994	2.996	3.593	3.608	0.00267	0.00771	0.00407	0.00774	**19.073**	**19.410**	18.544
Water scarcity		m3 eq	0.927	0.0116	0.0361	0.0484	0.0518	0.0518	0.00635	0.00637	0.000104	0.00005989	0.000158	0.00006094	**1.033**	**1.045**	0.252
Depletion of the ozone layer		kg CFC-11 eq	1,01E-07	1,38E-08	4,55E-09	5,00E-09	2,57E-08	2,57E-08	4,49E-08	4,51E-08	7,24E-11	1,07E-10	1,10E-10	1,08E-10	**1,91E-07**	**1,91E-07**	1,70E-07

10.2 Consumption of resources and impacts, Patrimoni d'Italia pasta, 10 L

The impacts and resource consumption reported in the tables below refer to the Patrimoni d'Italia pasta. The reference is the functional unit: 1 Kg of long pasta and short pasta. The results refer to the 10 L reference.

Consumption of resources	Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
		Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Renewable energy resources not used as raw materials	*MJ*	1.782	0.061	1.301	5.716	0.1244	0.1244	0.0287	0.0287	0.000190	0.000200	0.000190	0.000200	3.297	7.712	1.472
Renewable energy resources Used as raw materials	*MJ*	0.371	0.029	1.668	7.970	0.05943	0.05943	0.0107	0.0107	0.0000554	0.0000662	0.0000554	0.0000662	2.137	8.439	0.725
Total renewable energy resources	*MJ*	2.152	0.090	2.969	13.686	0.1838	0.1838	0.0394	0.0394	0.000245	0.000266	0.000245	0.000266	5.434	16.152	2.197
Non-renewable energy resources not used as raw materials	*MJ*	1.479	-	-	-	-	-	-	-	-	-	-	-	1.479	1.479	-
Non-renewable energy resources Used as raw materials	*MJ*	10.313	1.502	1.630	2.589	3.439	3.439	3.905	3.905	0.00349	0.00942	0.00349	0.00942	20.802	21.761	22.793
Total non-renewable energy resources	*MJ*	11.793	1.502	1.630	2.589	3.439	3.439	3.905	3.905	0.00349	0.00942	0.00349	0.00942	22.282	23.240	22.793
Secondary materials	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable secondary fuels	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-renewable secondary fuels	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Consumption of fresh water	*m3*	0.060	0.00529	0.00548	0.00873	0.00187	0.00873	0.00187	0.00187	0.0000185	0.0000175	0.0000185	0.0000175	0.0747	0.0848	0.130

There is zero consumption of secondary resources since these were not used at any point during the life cycle of the product.

The waste generated during the life cycle of the product is indicated in the table.

Waste	Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
		Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Hazardous waste	*kg*	0.000197	-	4,69E-18	-	0.000255	0.000255	-	-	-	-	-	-	0.000452	0.000452	-
Non hazardous waste	*kg*	0.185	-	9,94E-18	-	0.00162	0.00162	-	-	0.00508	0.0115	0.00508	0.0115	0.203	0.203	-
Radioactive waste	*kg*	0.000148	-	-	-	-	-	-	-	-	-	-	-	0.000148	0.000148	-

The indicators of the system's output flows are shown in the table.

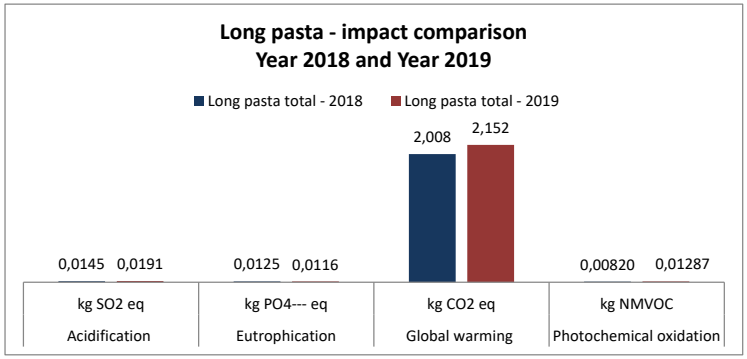
Output flows	Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
		Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Output flows for animal feed or similar	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Components for reuse	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material for recycling	*kg*	0.00160	-	-	-	0.00384	0.00384	-	-	0.00407	0.0413	0.00407	0.0413	0.0508	0.0508	-
Materials for energy recovery	*kg*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exported energy, electricity	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exported energy, thermal	*MJ*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The environmental impacts associated with production of the functional unit are indicated in the table: 1 Kg of long pasta and short pasta, 10 Lb format.

Impact category		Units	UPSTREAM				CORE		DOWNSTREM						RESULTS		Phase of use
			Agricultural phase	Milling phase	Long pasta packaging	Short pasta packaging	Long pasta production phase	Short pasta production phase	Long pasta distribution	Short pasta distribution	Long pasta end of life - Primary packaging	Long pasta end of life - Secondary and tertiary packaging	Short pasta end of life - Primary packaging	Short pasta end of life - Secondary and tertiary packaging	Long pasta total	Short pasta total	
Global warming	Fossil	kg CO2 eq	1.508	0.0926	0.0743	0.1239	0.210	0.210	0.276	0.276	0.00942	0.000754	0.009417	0.000754	**2.171**	**2.221**	1.416
	Biogenic	kg CO2 eq	0.000586	0.000116	0.000888	0.000913	0.000253	0.000253	0.0000596	0.0000598	0.000000273	0.000282	0.000000416	0.000282	**0.00218**	**0.00221**	0.00292
	Land use and transformation	kg CO2 eq	0.00435	0.0000205	0.000500	0.000541	0.0000196	0.0000196	0.000180	0.000181	0.000000184	0.000000206	0.000000280	0.000000207	**0.00507**	**0.00511**	0.000173
	TOTAL	**kg CO2 eq**	**1.513**	**0.0928**	**0.0757**	**0.125**	**0.210**	**0.210**	**0.277**	**0.277**	**0.00942**	**0.00104**	**0.00942**	**0.00104**	2.178	2.228	1.419
Acidification		kg SO2 eq	0.0111	0.000376	0.000318	0.000587	0.000510	0.000510	0.00690	0.00690	0.00000279	0.000003822	0.00000279	0.000003822	**0.0193**	**0.0195**	0.00523
Eutrophication		kg PO4--- eq	0.0105	0.0000918	0.000160	0.000250	0.0001407	0.0001407	0.000743	0.000743	0.00000754	0.0000092	0.00000754	0.0000092	**0.0117**	**0.0118**	0.00154
Photochemical oxidation		kg NMVOC	0.00619	0.000342	0.000316	0.000715	0.000356	0.000356	0.00581	0.00581	0.00000328	0.000004909	0.00000328	0.000004909	**0.0130**	**0.0134**	0.00313
Depletion of resources - Elements		kg Sb eq	4,29E-05	1,22E-06	3,41E-06	1,88E-06	3,07E-07	3,07E-07	2,76E-06	2,76E-06	4,66E-09	1,34E-08	4,66E-09	1,34E-08	**5,07E-05**	**4,91E-05**	3,77E-06
Depletion of resources - Fossil fuels		MJ	10.132	1.295	1.440	2.246	3.006	3.006	3.616	3.616	0.00294	0.00856	0.00294	0.00856	**19.502**	**20.308**	18.544
Water scarcity		m3 eq	0.927	0.0116	0.0554	0.0600	0.0518	0.0518	0.00639	0.00639	0.000114	0.00007135	0.000114	0.00007135	**1.052**	**1.057**	0.252
Depletion of the ozone layer		kg CFC-11 eq	1,01E-07	1,38E-08	8,71E-09	1,18E-08	2,58E-08	2,58E-08	4,52E-08	4,52E-08	7,97E-11	1,21E-10	7,97E-11	1,21E-10	**1,95E-07**	**1,98E-07**	1,70E-07

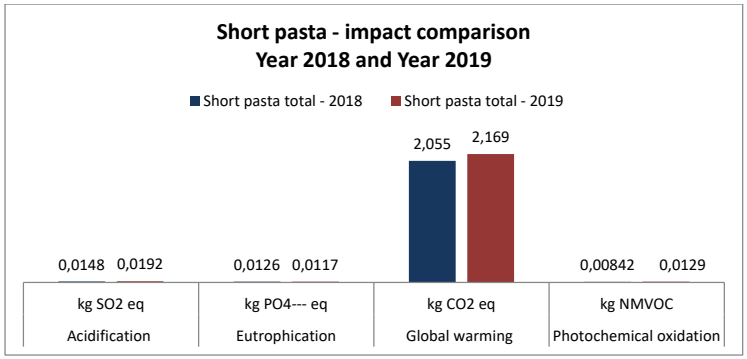
11 Comparison of 2018 and 2019 impact results

The graphs below compare the impacts calculated with the 2018 data and those obtained when updating the study. For the categories of eutrophication, global warming and photochemical oxidation, there is an increase in impact ascribed to the fact that the distance of distribution of the product by sea was greater in 2019. This is because it was decided, as a precautionary measure, to consider the ship route that was longest. It is also noted that in the transition from 2018 to 2019, there was an update to the calculation software and databases used for the study that affected the results obtained.



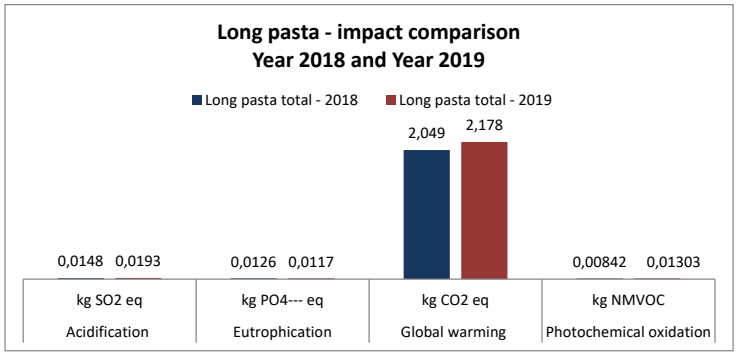
For long pasta in the 1 L format, comparing the results obtained with 2019 data to the previous year showed:

- A 32% increase in acidification.
- A 7% reduction in eutrophication.
- A 7% increase in global warming.
- A 57% increase in photochemical oxidation.



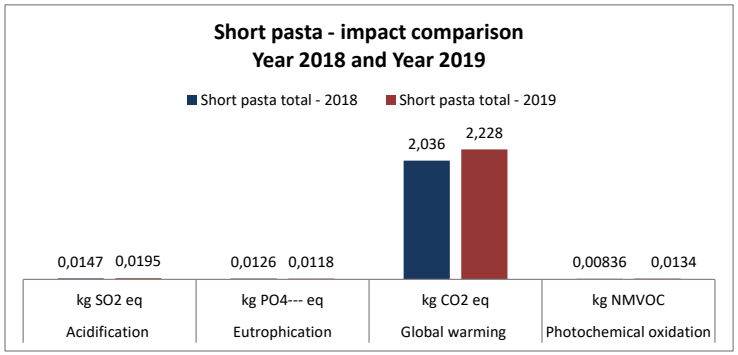
For short pasta in the 1 L format, comparing the results obtained with 2019 data to the previous year showed:

- A 30% increase in acidification.
- A 7% reduction in eutrophication.
- A 6% increase in global warming.
- A 54% increase in photochemical oxidation.



For long pasta in the 10 L format, comparing the results obtained with 2019 data to the previous year showed:

- A 30% increase in acidification.
- A 7% reduction in eutrophication.
- A 6% increase in global warming.
- A 55% increase in photochemical oxidation.



For short pasta in the 10 L format, comparing the results obtained with 2019 data to the previous year showed:

- A 33% increase in acidification.
- A 6% reduction in eutrophication.
- A 9% increase in global warming.
- A 61% increase in photochemical oxidation.

12 Main terms glossary

Acidification - Kg SO_2eq
A phenomenon caused by the emission of acids or gases into the air which, in contact with humidity in the air, are deposited on land and in water, causing the deterioration of forests and the acidification of lakes and streams.

Eutrophication Kg PO_4^{-3} eq
A phenomenon caused by the excessive growth of vegetation in aquatic ecosystems, as a result of high concentrations of nutrients such as nitrogen and phosphorus from sewage and fertilised agricultural land. The deterioration of organic material consumes oxygen causing oxygen deficiency and, in some cases, fish mortality.

Global warming Kg CO_2eq
Ability of a greenhouse gas to influence changes in global average air temperature at ground level and subsequent changes in various climatic parameters and their effects (expressed in units of CO_2 - equivalent and in a specific time frame: 100 years).

Photochemical oxidation Kg C_2H_4eq
A phenomenon caused by the production of compounds which, by the action of light, cause an oxidation reaction that leads to the production of tropospheric ozone.

Abiotic resource depletion – Elements Kg Sb eq
Depletion of non-renewable abiotic natural resources such as minerals and metals.

Abiotic resource depletion – MJ fossil fuels
Depletion of non-renewable fossil natural resources for energy use such as methane, coal, oil.

Water scarcity m^3eq
Use of m^3 of water related to local water scarcity. The main causes of this phenomenon are: conversion of land for infrastructure development; increased use of water to produce food/agriculture and consumption; decreased river flows to produce hydroelectric power; degradation of water quality due to use of pollutants (pesticides, fertilizers

Depletion of the ozone layer kg of CFC-11 eq
Ozone depletion is caused by interaction with chlorine oxides contained in gases such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs), which are used in equipment, in sprays, or, for example, in the construction of thermal insulation.

13 Programme information and compulsory declarations

The document has been developed in accordance with the International EPD® system.
The operator of the program is:
EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden
E-mail: info@environdec.com

This environmental statement is reviewed every 5 years.
Environmental statements published within the same product category but from different programmes may not be comparable. For more information about this statement, please refer to the website www.environdec.com

The EPD holder has sole ownership and responsibility over this EPD.

The EPD described herein was prepared according to PCR 2010:01 Uncooked pasta, not stuffed or otherwise prepared - version 4.0, valid until 2024-11-24.

Product Specific Requirements (PCR) reference: PCR 2010:01 Uncooked pasta, not stuffed or otherwise prepared – version 4.0, Product category classification: UN CPC 2371, valid until 2024-11-24 Validity period of EPD: valid until 15/09/2025
PCR review conducted by: Technical Committee of the International EPD® System. E-mail: info@environdec.com”
Independent verification of the statement and data in accordance with ISO 14025:2006: □ Internal X External
Third Party Verifier: CSQA Certificazioni S.r.l. Accredited by: Accredia”
The procedure for data follow-up during validity of the EPD involves a third-party auditor: X Yes □ No

14 Contacts

Contacts
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This EPD and the relative LCA study, has been developed with the collaboration and support of Alimenta Srl. – **www.alimentaonline.it**

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ISTAT - National Institute of Statistics, Area (hectares) and production (quintals): durum wheat. Detail of Puglia Region, 2019

ISTAT - National Institute of Statistics, plant health, durum wheat. Detail of Italy, 2019

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UNI EN ISO 14044 (2018) - Assessment of the life cycle, Principles and Framework.

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PCR 2010:01 Uncooked pasta, not stuffed or otherwise prepared – version 4.0, valid until 2024-11-24

PCR 2013:05 Arable crops, Product Category Classification: UN CPC 011, 014, 017, 019, version 2.01, valid until 2020-12-15