ENVIRONMENTAL PRODUCT DECLARATION

Anchovy fillets in olive oil

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1. Introduction

The company

Delicius Rizzoli SpA is an Italian company that produces preserved fish products such as anchovies, sardines, mackerels, tuna, clams and shrimps. Delicius was born in 1974 in Parma, heart of the Italian canning tradition and UNESCO Creative Capital for Gastronomy.

Heir to a productive heritage of great tradition, to select the best raw material, Delicius has carried out a policy of multi plant strategy, which has allowed her over time to be present in 5 different Mediterranean countries with its own structures and staff.

On June 8, 2021 - World Oceans Day - Delicius decided to publish its 2020 Sustainability Report, a tool through which the company is committed to communicating its sustainability performance to stakeholders. The objective was to introduce into the processes a working method inspired by the SDGs of the UN 2030 Agenda that would be able to enhance the commitment, initiatives and internal and external comparison and lay the foundations for the identification of relevant reporting topics on which to measure themselves, setting increasingly ambitious goals.

Three pillars on which the action takes shape: sea, people and community. The commitment is expressed in fact on particularly challenging objectives such as the protection of the sea from levies and the protection of the marine environment, placing a particular focus on the plastic emergency.

Delicius Rizzoli SpA was the first Italian producer to obtain the ISO 22005 certification asking and obtaining from their fishermen a further effort to monitor and control all the parameters and all the steps. Certification is a guarantee of transparency and correctness, because only by tracing the steps along the entire chain, it is possible to intervene to improve the environmental impact.

And to offer the best production and structural standards, the company has obtained the following certifications:

The product

The products to be analysed are:

- Anchovy fillets in olive oil, in glass jar (90g);
- Anchovy fillets in olive oil, in aluminuim box (46g).

These products belong to the UN group CPC 2124 - *Fish, otherwise prepared or preserved; caviar and caviar substitutes.*

For anchovy preserves Delicius chooses only the Engraulis encrasicolus species. These anchovies swim in large free shoals in the Mediterranean Sea. They are fished in the period from April to September, respecting the sea and its depths. The company only processes anchovies caught "a lampara" - a traditional fishing boat with a low impact on the ecosystem. Fishing *a lampara* is a type of "traditional fishing" carried out with medium-sized boats and with a small crew, which operate along the coasts and who finish their work in the day: they go out in the evening and return the next day. This type of fishing adopts a limited number of technologies and uses traditional equipment, such as: purse seines and Lampare (lamps). Fishing in Lampara is carried out on dark nights (moonless nights) so as to make the equipment used even more "selective".

"Traditional fishing" differs from "industrial fishing", which refers to those fishing activities that are practiced in the open sea ("deep sea fishing" and "ocean fishing") with large boats, generally equipped with a large crew. This type of fishing adopts the most recent technological innovations and makes use of increasingly advanced fishing gear, such as trawl nets and dredges. All of these fishing gear are not "selective". This means that they don't only allow you to catch the species you actually want to fish. This specific characteristic of industrial fishing gear can lead to accidental and useless catches (fish caught that are of no interest or that cannot be sold, which are often also thrown back into the sea).

Fishing takes place in the following FAO areas:

- Fao Zone 27.8 - North East Atlantic (Cantabrian Sea Spain),
- Fao Zone 37.2.1 - Eastern Mediterranean (Adriatic Sea),
- Fao Zone 37.2.2 - Eastern Mediterranean (Ionian Sea),
- Fao Zone 37.1.3 - Western Mediterranean (Sea of Sardinia),

The best anchovies must be processed very fresh. Within 24 hours of fishing, they are put "to mature" in large salted barrels. The slower and more respectful the salting, the better the final result. After several months, the salted anchovies are filleted and placed - by hand - in jars or cans, covered with a good olive oil that will protect them in the months to come.

The caught fish is subjected to a first processing in which it is cleaned, salted and left to mature for a variable period between 6 and 24 months. The first processing plants for canned anchovies are located in Albania, Spain and Croatia, while a fourth plant located in Tunisia is also involved for anchovies preserved in glass jars..

Following this first processing, the anchovies are subjected to a second processing by Eurofish in Albania (for canned fillets and in glass jars) and by Mansoura in Tunisia (for fillets in glass jars). The second process consists in filling the boxes and glass jars with marinated anchovy fillets and olive oil. Finally, the packaging takes place with secondary packaging (plastic film and cardboard tray) and tertiary (plastic film and wooden pallets).

The products are then sent to the Parma site and subsequently transported to the various distribution platforms or end customers.

2. Environmental information

Declared Unit

The unit declared under investigation is 1 kg of anchovy fillets in olive oil, plus packaging weight. The weight of the storage liquid (olive oil), being edible, contributes to the weight of the declared unit. The environmental impact is also presented per sales unit (unit declared additional). The composition of primary, secondary and tertiary products and packaging is shown in Tables 1 and 2 both per unit of sale and per unit declared. For fillets and olive oil, the nominal quantities declared on the label were used.

		**Anchovy fillets, 1kg** *(declared unit)*	**Anchovy fillets, 46g** *(additional declared unit)*	
		Peso (kg)	**Peso (kg)**	**%**
Loose product	Drained anchovy fillets	0.543	0.025	54.0
	Olive Oil	0.457	0.021	46.0
	Anchovy fillets with oil	**1.000**	**0.046**	**100**
Primary packaging	Virgin aluminum, box	0.169	0.008	75.4
	Post consumer recycled aluminum, box	0.055	0.002	24.6
	Total primary packaging	**0.224**	**0.010**	**100**
Secondary packaging (tray 18 pc)	Paperboard tray	0.054	0.003	86.0
	LDPE film	0.009	<0.001	14.0
	Total secondary packaging	**0.063**	**0.003**	**100**
Tertiary packaging (fraction per 1 pc)	Wood pallet	3.559	0.164	98.8
	Stretch PE film	0.035	0.002	1.0
	Cover PE film	0.007	<0.001	0.2
	Total tertiary packaging	**3.601**	**0.166**	**100**

Table 1: Composition by sales unit and declared unit of fillets of anchovies in olive oil of 46 g, aluminum box.

		Anchovy fillets, 1kg *(declared unit)*	Anchovy fillets, 90g *(additional declared unit)*	
		Peso (kg)	**Peso (kg)**	**%**
Loose product	Drained anchovy fillets	0.567	0.051	56.7
	Olive Oil	0.433	0.039	43.3
	Anchovy fillets with oil	**1.000**	**0.090**	**100**
Primary packaging	Virgin glass, jar	0.789	0.071	75.3
	Post consumer recycled glass, jar	0.233	0.021	22.3
	PP label	0.003	<0.001	0.3
	Virgin aluminum, lid	0.017	0.002	1.6
	Post consumer recycled aluminum, lid	0.005	<0.001	0.5
	Total primary packaging	**1.048**	**0.094**	**100**
Secondary packaging (tray 12 pc)	Paperboard tray	0.029	0.003	81.0
	LDPE film	0.007	<0.001	19.0
	Total secondary packaging	**0.036**	**0.003**	**100**
Tertiary packaging (fraction per 1 pc)	Wood pallet	1.819	0.164	98.8
	Stretch PE film	0.018	0.002	1.0
	Cover PE film	0.003	<0.001	0.2
	Total tertiary packaging	**1.840**	**0.166**	**100**

Table 2: Composition by sales unit and declared unit of anchovy fillets in olive oil of 90 g in jar.

System boundaries

The present LCA study is a "from cradle to grave" analysis, therefore the boundaries of the LCA system of anchovies in oil include fish supply, the production of packaging materials, their transport, the production phase of the semi-finished products and the final product, the packaging in the sales units, the commercial distribution and the end of life of the product and its packaging.

The 2019 PCR:09 v1.01 identifies the following stages for the life cycle of a product: *Upstream*, *Core* and *Downstream*. The system boundaries and processes considered are illustrated in Figure 1.

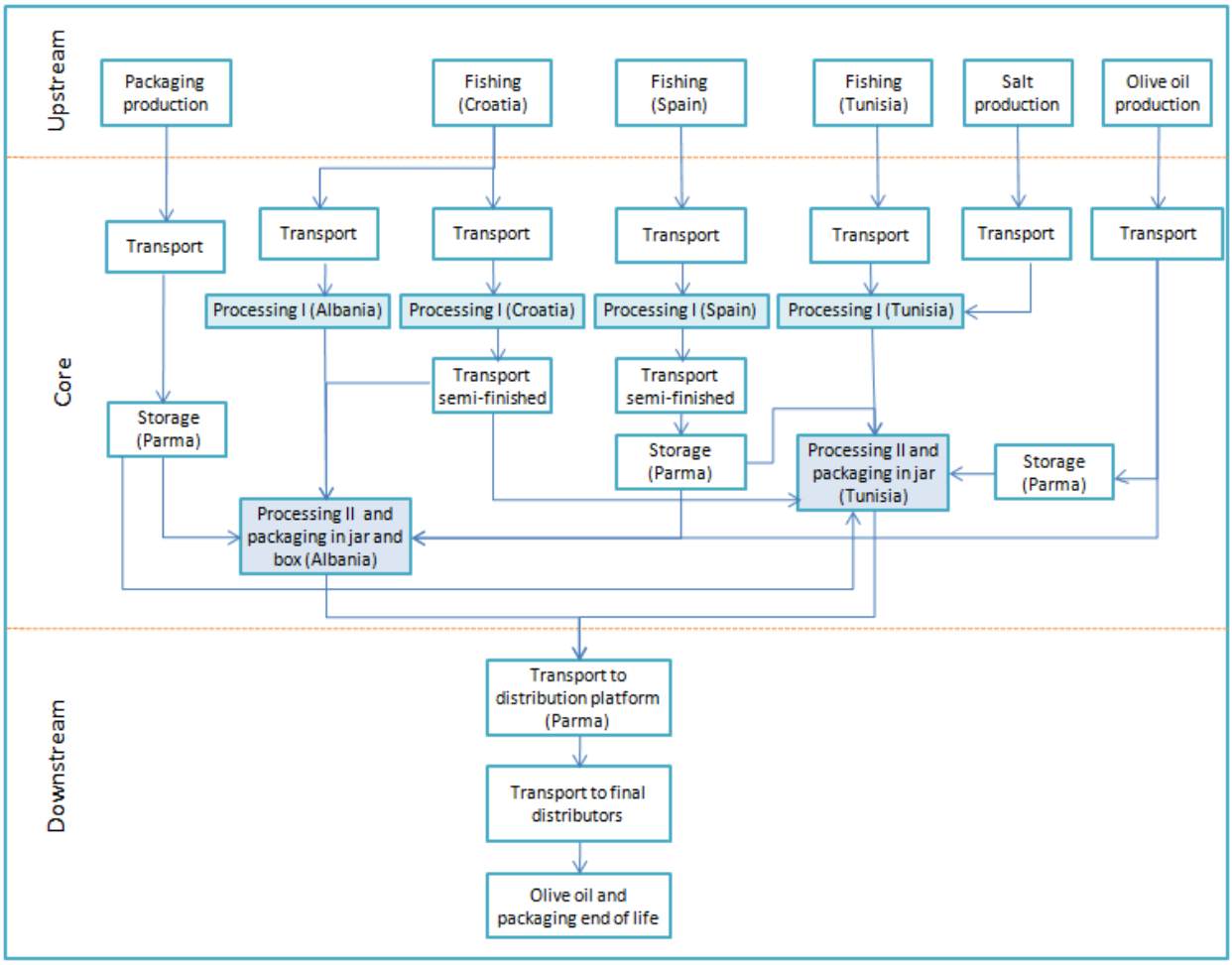

Figure 1: Flow diagram of the processes included in the life cycle of the analyzed products.

Upstream processes include: fishing; production of other ingredients used in the Core process (olive oil, salt); production of primary and secondary packaging; impacts due to the production of energy and fuels used in the upstream phase (energy for refrigeration, boat fuels, etc.); management of waste generated in upstream processes.

There is no consumption on board for the selection and refrigeration or freezing of fish.

Core processes include: first processing (cleaning, cooking, salting, etc.); transport outside the Core processes of fish (including the storage phase in Parma of the drums from Spain before reaching the second processing plants), packaging, other ingredients and materials used at this stage; preparation of the final product (e.g. jar filling, packing, etc.) ; maintenance (e.g. of machinery); treatment of waste generated during processing; impacts due to the production of energy and fuels used in core processes; transport of packaged products from the processing plants to the Delicius company.

Downstream processes include: transportation from Delicius company to retailers; end-of-life processes of waste generated by the use of the product; end-of-life processes of packaging.

The use of the product was not considered as its consumption does not require cooking or refrigeration.

Geographical and temporal representativeness

The primary data, relating to the fishing and production phases of anchovy fillets, are provided by Delicius and refer to the different countries in which these processes take place, for the year 2019.

Compared to the reference year, anchovies packaged in glass jars are sold in Italy, while canned anchovies are sold both in Italy and abroad. Since the product is sold both in Italy and abroad, the distribution and end-of-life scenario takes into account the sales of the reference year.

Secondary data on the life cycle of materials and energy entering the analyzed system are derived from the database ecoinvent v3.6 Allocation, cut-off by classification.

Boundaries with environment and other systems

The analysis shall include air emissions, waste water treatment, transport and waste treatment from the production process.

Data quality

The primary data used in this study were collected through a questionnaire filled out by the company and through e-mail communications. Secondary data comes from ecoinvent v3.6 database and literature data.

The analysis is carried out using the SimaPro v9.1.1 life cycle analysis software and the rules indicated by the 2019 PCR:09 v1.01 have been applied for the evaluation of data quality.

Exclusions and Cut-off

As expressed by PCR 2019:09 v1.01, the following processes are excluded in the LCA: manufacturing of production equipment, buildings and other capital goods; personnel travel; research and development activity, including the production and manufacture of laboratory equipment; maintenance activities.

Infrastructures, when present, such as processes derived from the ecoinvent database, have not been excluded.

Trays and buckets used in factories during processing and in boxes for the transport of fish were not considered because they were reused during subsequent production cycles.

The PCR 2019:09 v1.01 indicate the possibility of applying the cut-off rule, which consists in omitting from the inventory analysis processes whose contribution is less than 1% of the total impact of the analyzed system.

Given the number of final customers, a cut-off of 1% was applied compared to the mass of product sold for the selection of customers in the distribution phase of the products. A sensitivity analysis is conducted to demonstrate the robustness of the cut-off applied, the results are reported in the LCA report.

Allocation rules and LCA approach

Allocation is the allocation procedure whereby the inputs and outputs of the system are divided between the different products in order to reflect the underlying physical relationships. Processes affecting the environmental profile of the product during its life cycle shall be allocated within the life cycle module in which the process takes place. In this way the sum of the allocated inflows and outflows corresponds to the

sum of the inflows and outflows: double counting is avoided and no omissions of inflows and outflows occur.

Virgin resources include raw materials and production processes. No allocation is made for materials subject to recycling. The recycling process is included for the input of recycled resources. Recycling outputs are considered inputs for the next life cycle. The approach used to conduct this LCA is attributive. The product life cycle attributive model represents the assessment of the actual, average or estimated supply chain specifically. The existing or estimated system is placed in a static technological context.

Environmental impact indicators

In assessing the impact of the product, the information obtained from the inventory analysis is aggregated according to the effects of different environmental issues. The environmental indicators indicated by 2019:09 v1.01 shall consist of:

- Impact categories: global warming (total, excluding biogenic carbon), global warming (fossil fuels), global warming (biogenic carbon), global warming (soil use) , acidification potential, eutrophication potential, photochemical oxidant formation potential, abiotic resource depletion - elements, abiotic resource depletion - fossil fuels;
- Resource use indicators: consumption of resources (renewable and non-renewable) and fresh water;
- Waste indicators: hazardous, non-hazardous and radioactive waste.

The impact categories come from the baseline and non-baseline CML methods, Recipe H/A 2016 and AWARE.

The indicators are divided into the contribution of the processes to the different product phases: upstream, core and downstream.

In addition to the indicators given in the previous tables, PCR 2019:09 v1.01 requires reporting of the state of fish stocks with reference to the species of interest and the global total catches, including data sources (e.g. FAO).

Inventory

The inventory shall collect the input and output data necessary for life cycle analysis. The data was collected through the compilation of questionnaires and communications via e-mail.

This analysis was carried out using primary data for fish processing and final product assembly. For all processes where no primary data are available, secondary data from the literature ecoinvent database has been used, modified if necessary to make them more representative of the analysed system.

The use of generic data has been avoided.

The ecoinvent process *Landed anchovy by-catch, fresh {ES}| anchovy, capture by steel purse seiner and landing whole was used for the modeling of the anchovy fishing process, fresh | Cut-off, U* considered representative for Spanish, Croatian and Tunisian fisheries.

No waste is produced during fishing.

Between first and second processing there is a time difference of 6-24 months necessary for the maturation of the fillets, so the quantities of ingredients and the consumption of the second processing plants in the year 2019 refer to the anchovies that have undergone the first processing in the year 2018.

Secondary data of ecoinvent were used for the production of salt, while the production of olive oil of Spanish origin, used as a preservative liquid for anchovy fillets, has been modeled using the ecoinvent olive growing process in Spain, integrating literature data on the production of olive oil in Italy.

For the aluminum box *Aluminium, cast alloy {GLO}| market for* ecoinvent processes is used. The glass has a recycled material content of 23%, so the ecoinvent processes *Packaging glass, white {RER}| production* has been modified on the basis of primary data, adopting a precautionary approach respect to the default recycled content of 60.5% of the ecoinvent database.

Representative processes of ecoinvent have been used for the production of secondary and tertiary packaging; in particular pallets are reused and undergo an annual turn-over of blank pallets equal to 10% of the total.

Temporary packaging used to store fish was also considered for packaging.

For the energy consumption of the plants, the mixes present in ecoinvent have been adapted on the basis of the country-specific residual mix. As indicated in the 2019 PCR:09 v1.01 for European countries, reference was made to the AIB (Association of Issuing Bodies) statistics and for non-European countries to the IEA (International Energy Agency) statistics.

The first and second processing plants work, in addition to the products being analysed, further products. The energy and water consumption of the various production plants were then allocated according to the quantity of products processed in the same year, for each plant.

The energy consumption of second processing (year 2019) refers to the processing of the fillets matured during the previous year (2018).

For the distribution phase, sales figures in the main destination countries were used up to an estimated 99% of anchovy fillets sold in both versions. Depending on the country of destination, transport by road (ecoinvent database process: *Transport, freight, lorry >32 metric ton, euro4 {RER}*) and/or transport by ship (*Transport, freight, sea, container ship {GLO}|*).

The use of the product was not considered as its consumption does not require cooking or refrigeration. It is assumed that, once the package is opened, the fillet is entirely consumed while the oil is managed at the end of life.

For the start at the end of life of the product (conservation oil) and packaging (primary, secondary and tertiary) is assumed a transport on rubber (*Transport, freight, lorry 16-32 metric ton, EURO5 {RER*}) 100 km. For the end-of-life scenario, national average data referring to the countries where the product is sold were used. The data for defining the product disposal scenarios and its total packaging (primary, secondary and tertiary) come from the 2018 ISPRA report for Italy and the OECD report for abroad.

3. Environmental impact assessment

In assessing the impact of the product, the information obtained from the inventory analysis is aggregated according to the effects of different environmental issues. For the assessment of the environmental performance of products, the method defined by PCR 2019:09 v1.01 "Fish, otherwise prepared or Preserved; caviar and caviar substitutes" shall be used.

In the following tables are available the environmental impact indicators of the life cycle of 1kg of anchovy fillets (in 46g aluminum packaging and 90g glass packaging).

The environmental impact is also presented per sales unit (unit declared additional).

The indicators are divided into the contribution of upstream, core and downstream phases.

1kg of anchovy fillets packed in 46g aluminum box		Unit	Total	Upstream	Core	Downstream
Environmental impact categories	Global warming, fossil fuels	kg CO_2 eq	7.42E+00	6.06E+00	6.45E-01	7.10E-01
	Global warming, biogenic	kg CO_2 eq	4.72E-01	7.34E-02	3.37E-01	6.22E-02
	Riscaldamento globale, uso del suolo	kg CO_2 eq	4.07E-05	3.85E-05	1.10E-06	1.09E-06
	Global warming, land use	kg CO_2 eq	7.89E+00	6.14E+00	9.82E-01	7.72E-01
	Acidification	kg SO_2 eq	1.11E-01	1.04E-01	3.53E-03	3.79E-03
	Eutrophication	kg PO_4^{3-}	3.61E-02	3.04E-02	2.68E-03	3.01E-03
	Photochemical oxidation	kg NMVOC	9.88E-02	9.09E-02	3.54E-03	4.34E-03
	Abiotic depletion	Kg Sb eq	9.60E-04	9.36E-04	1.14E-05	1.24E-05
	Abiotic depletion, fossil fuels	MJ	9.42E+01	7.46E+01	9.04E+00	1.05E+01
	Water use	m^3 eq	1.62E+01	1.63E+01	-6.09E-02	4.39E-02
Resource use	Renewable resources, energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Renewable resources, materials	MJ	4.12E+01	3.75E+01	3.54E+00	1.64E-01
	Renewable resources, total	MJ	4.12E+01	3.75E+01	3.54E+00	1.64E-01
	Non-renewable resources, energy	MJ	9.81E+01	7.73E+01	1.01E+01	1.08E+01
	Non-renewable resources, materials	MJ	6.31E-03	5.95E-03	1.79E-04	1.78E-04
	Non-renewable resources, total	MJ	9.81E+01	7.73E+01	1.01E+01	1.08E+01
	Use of secondary material	kg	5.51E-02	5.51E-02	0.00E+00	0.00E+00
	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total consumption of water	m^3	2.29E-01	2.25E-01	1.41E-03	1.87E-03
Waste	Hazardous waste	kg	6.93E-02	2.91E-02	1.64E-03	3.85E-02
	Non-hazardous waste	kg	3.73E+00	1.05E+00	1.08E+00	1.59E+00
	Radioactive waste	kg	5.32E-04	4.02E-04	6.36E-05	6.59E-05
Other environmental indicators	Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Recycled materials	kg	2.27E+00	0.00E+00	0.00E+00	2.27E+00
	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Electricity exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Thermal energy exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 3: Results of characterization of 1kg of anchovy fillets in 46g aluminum box.

1kg of anchovy fillets packed in 90g glass jar		Unit	Total	Upstream	Core	Downstream
Environmental impact categories	Global warming, fossil fuels	kg CO_2 eq	8.24E+00	5.99E+00	2.04E+00	2.17E-01
	Global warming, biogenic	kg CO_2 eq	3.76E-01	7.15E-02	2.77E-01	2.76E-02
	Riscaldamento globale, uso del suolo	kg CO_2 eq	4.30E-05	4.01E-05	2.55E-06	2.88E-07
	Global warming, land use	kg CO_2 eq	8.62E+00	6.06E+00	2.32E+00	2.45E-01
	Acidification	kg SO_2 eq	1.18E-01	1.10E-01	6.19E-03	9.16E-04
	Eutrophication	kg PO_4^{3-}	2.97E-02	2.53E-02	3.04E-03	1.29E-03
	Photochemical oxidation	kg NMVOC	1.05E-01	9.70E-02	6.67E-03	1.08E-03
	Abiotic depletion	Kg Sb eq	3.86E-04	3.51E-04	3.04E-05	4.36E-06
	Abiotic depletion, fossil fuels	MJ	1.12E+02	7.69E+01	3.22E+01	3.27E+00
	Water use	m^3 eq	1.53E+01	1.53E+01	-1.23E-02	1.88E-02
Resource use	Renewable resources, energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Renewable resources, materials	MJ	3.34E+01	3.18E+01	1.53E+00	7.29E-02
	Renewable resources, total	MJ	3.34E+01	3.18E+01	1.53E+00	7.29E-02
	Non-renewable resources, energy	MJ	1.16E+02	7.98E+01	3.32E+01	3.37E+00
	Non-renewable resources, materials	MJ	6.65E-03	6.19E-03	4.08E-04	4.87E-05
	Non-renewable resources, total	MJ	1.16E+02	7.98E+01	3.32E+01	3.37E+00
	Use of secondary material	kg	2.38E-01	2.38E-01	0.00E+00	0.00E+00
	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total consumption of water	m^3	2.13E-01	2.09E-01	3.39E-03	9.39E-04
Waste	Hazardous waste	kg	1.35E-01	2.00E-02	1.98E-03	1.13E-01
	Non-hazardous waste	kg	2.80E+00	8.56E-01	1.29E+00	6.50E-01
	Radioactive waste	kg	5.84E-04	4.54E-04	1.14E-04	1.65E-05
Other environmental indicators	Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Recycled materials	kg	1.44E+00	2.37E-01	0.00E+00	1.20E+00
	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Electricity exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Thermal energy exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 4: Results of characterization of 1kg of anchovy fillets in 90g glass jar.

1 sale unit of anchovies in aluminum box of 46g		Unit	Total	Upstream	Core	Downstream
Environmental impact categories	Global warming, fossil fuels	kg CO_2 eq	3.41E-01	2.79E-01	2.97E-02	3.26E-02
	Global warming, biogenic	kg CO_2 eq	2.17E-02	3.38E-03	1.55E-02	2.86E-03
	Riscaldamento globale, uso del suolo	kg CO_2 eq	1.87E-06	1.77E-06	5.04E-08	5.03E-08
	Global warming, land use	kg CO_2 eq	3.63E-01	2.82E-01	4.52E-02	3.55E-02
	Acidification	kg SO_2 eq	5.10E-03	4.77E-03	1.62E-04	1.74E-04
	Eutrophication	kg PO_4^{3-}	1.66E-03	1.40E-03	1.23E-04	1.38E-04
	Photochemical oxidation	kg NMVOC	4.54E-03	4.18E-03	1.63E-04	2.00E-04
	Abiotic depletion	Kg Sb eq	4.42E-05	4.31E-05	5.25E-07	5.72E-07
	Abiotic depletion, fossil fuels	MJ	4.33E+00	3.43E+00	4.16E-01	4.85E-01
	Water use	m^3 eq	7.47E-01	7.48E-01	-2.80E-03	2.02E-03
Resource use	Renewable resources, energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Renewable resources, materials	MJ	1.89E+00	1.72E+00	1.63E-01	7.56E-03
	Renewable resources, total	MJ	1.89E+00	1.72E+00	1.63E-01	7.56E-03
	Non-renewable resources, energy	MJ	4.51E+00	3.55E+00	4.64E-01	4.95E-01
	Non-renewable resources, materials	MJ	2.90E-04	2.74E-04	8.25E-06	8.18E-06
	Non-renewable resources, total	MJ	4.51E+00	3.55E+00	4.64E-01	4.95E-01
	Use of secondary material	kg	2.14E-03	2.14E-03	0.00E+00	0.00E+00
	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total consumption of water	m^3	1.05E-02	1.04E-02	6.47E-05	8.62E-05
Waste	Hazardous waste	kg	3.19E-03	1.34E-03	7.52E-05	1.77E-03
	Non-hazardous waste	kg	1.71E-01	4.84E-02	4.98E-02	7.32E-02
	Radioactive waste	kg	2.45E-05	1.85E-05	2.93E-06	3.03E-06
Other environmental indicators	Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Recycled materials	kg	1.04E-01	0.00E+00	0.00E+00	1.04E-01
	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Electricity exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Thermal energy exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 5: Results of characterization of packaging of anchovy fillets in 46g aluminum box.

1 sale unit of anchovies in glass jar of 90g		Unit	Total	Upstream	Core	Downstream
Environmental impact categories	Global warming, fossil fuels	kg CO_2 eq	7.42E-01	5.39E-01	1.84E-01	1.96E-02
	Global warming, biogenic	kg CO_2 eq	3.38E-02	6.44E-03	2.49E-02	2.48E-03
	Riscaldamento globale, uso del suolo	kg CO_2 eq	3.87E-06	3.61E-06	2.29E-07	2.59E-08
	Global warming, land use	kg CO_2 eq	7.76E-01	5.45E-01	2.08E-01	2.20E-02
	Acidification	kg SO_2 eq	1.06E-02	9.94E-03	5.57E-04	8.25E-05
	Eutrophication	kg PO_4^{3-}	2.67E-03	2.28E-03	2.73E-04	1.16E-04
	Photochemical oxidation	kg NMVOC	9.43E-03	8.73E-03	6.00E-04	9.68E-05
	Abiotic depletion	Kg Sb eq	3.48E-05	3.16E-05	2.74E-06	3.93E-07
	Abiotic depletion, fossil fuels	MJ	1.01E+01	6.92E+00	2.89E+00	2.95E-01
	Water use	m^3 eq	1.38E+00	1.38E+00	-1.10E-03	1.69E-03
Resource use	Renewable resources, energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Renewable resources, materials	MJ	3.00E+00	2.86E+00	1.38E-01	6.56E-03
	Renewable resources, total	MJ	3.00E+00	2.86E+00	1.38E-01	6.56E-03
	Non-renewable resources, energy	MJ	1.05E+01	7.18E+00	2.99E+00	3.04E-01
	Non-renewable resources, materials	MJ	5.99E-04	5.58E-04	3.67E-05	4.38E-06
	Non-renewable resources, total	MJ	1.05E+01	7.18E+00	2.99E+00	3.04E-01
	Use of secondary material	kg	2.17E-02	2.17E-02	0.00E+00	0.00E+00
	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total consumption of water	m^3	1.92E-02	1.88E-02	3.05E-04	8.45E-05
Waste	Hazardous waste	kg	1.21E-02	1.80E-03	1.78E-04	1.01E-02
	Non-hazardous waste	kg	2.52E-01	7.71E-02	1.17E-01	5.85E-02
	Radioactive waste	kg	5.26E-05	4.08E-05	1.03E-05	1.49E-06
Other environmental indicators	Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Recycled materials	kg	1.30E-01	2.14E-02	0.00E+00	1.08E-01
	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Electricity exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Thermal energy exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 6: Results of characterization of packaging of anchovy fillets in 90g glass jar.

Additional environmental information

One of the main purposes of the Scientific Advisory Committee (SAC) of the GFCM is to assess the status of exploited populations of fish and other marine living resources in the Mediterranean and the Black Sea and provide management advice to ensure the sustainable exploitation of these resources.

Management advice is provided based on both the assessment of the status of the stock and the reference points used for this assessment.

Suitable indicators for biomass can be either Total Biomass or Spawning Stock Biomass, while suitable indicators for exploitation can be either Fishing mortality or Exploitation rate (ratio between fishing mortality and total mortality). In all cases, reference points should be defined in relation to the indicator used. For simplification, in this document the acronym “B” refers to any biomass indicator, while the acronym “F” refers to any indicator of exploitation.

For statistical reporting and management purposes, the GFCM breaks the Mediterranean and the Black Sea down into 30 different regions, called Geographical Subareas (GSAs).

The most recent stocks status assessment in the Mediterranean and Black Sea (FAO statistical Area 37) shows that for sardine and anchovy most stocks were found to be fully exploited. About 30 percent of the stocks were assessed to be overexploited, with those of both sardine and anchovy in the Gulf of Lions and the stock of anchovy in the Strait of Sicily considered to be in particularly poor condition. In the Gulf of Lions, this situation was associated with previous overexploitation and a current state of very low productivity. In contrast, excessive current fishing pressure is considered to be the main cause of low catch for the stock of anchovy in the Strait of Sicily. The GFCM Small Pelagics Working Group (GFCM, 2011c) analysed the global variations of several small pelagic stocks and fisheries across the Mediterranean. It concluded that there were signs of some synchronous variations that suggested an environmental effect overlaying the effect of fisheries on the stocks. The Working Group suggested that this effect needed to be further investigated.

The state of FAO zone 27 anchovy stock by International Council for exploration of the sea (ICES) shows that the SSB in 2020 is estimated to be 44% larger than that in 2019. The advised catch for 2021, however, is only 3.5% larger than the advised catch for 2020 because it corresponds to the maximum TAC level allowed in the management strategy.

4. Contacts and other information

Delicius contacts

The LCA and EPD have been produced by Delicius, in collaboration with 2B Srl (www.to-be.it). The company references are:

Stefano Valenti

Delicius Rizzoli SpA, the EPD owner has the sole ownership, liability and responsibility of the EPD

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web-site: www.delicius.it

Verification and registration

Address of programme operator: EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

Product category rules (PCR): PCR 2019:09 v1.01 "Fish, otherwise prepared or preserved; caviar and caviar substitutes" UN CPC 21242 - *Fish, otherwise prepared or preserved*.
PCR review was conducted by: The Technical Committee of the International EPD® System. Review chair: Filippo Sessa. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ■ External □ Internal covering □ EPD process certification ■ EPD verification
Third party verifier: SGS Italia S.p.A. *In case of certification bodies:* Accredited by: Accredia *Registration number of SGS Italia*: N° accreditamento 006H.
Procedure for follow-up during EPD validity involves third party verifier: ■ Yes □ No

According to ISO 14025, EPDs within the same product category but from different programmes may not be comparable.

5. Bibliography

- Delicius Rizzoli SpA (https://www.delicius.it/)
- 2B e Delicius, Report LCA di 1 kg di filetti di alici in olio di oliva, 2021.
- ISO 14040, 2021: Environmental management – Life cycle assessment – Principles and framework. CEN, EN ISO 14040:2021 (www.iso.org).
- ISO 14044, 2021: Environmental management – Life cycle assessment – Requirements and guidelines. CEN, EN ISO 14044:2021 (www.iso.org).
- ISO 14025:2006. Environmental labels and declarations, type 3 environmental declarations, principles and procedures (www.iso.org).
- Product category rules according to ISO 14025. Product category classification: UN CPC 2124 - Fish, otherwise prepared or preserved; caviar and caviar substitutes, PCR 2019:09 v1.01 "Fish, otherwise prepared or preserved; caviar and caviar substitutes" (www.environdec.com).
- EPD International, 2019. General Programme Instructions of the International EPD® System. Version 3.01, dated 2019-09-18 (www.environdec.com).
- Ecoinvent, 2019. Swiss Centre for Life Cycle Assessment, v3.6 (www.ecoinvent.ch).
- PRé, 2020: Software LCA SimaPro 9.1.1. PRé Consultants, Olanda (www.pre.nl).
- Leiden University,2016. CML-IA Characterisation Factors v.4.7, Center of Environmental Science (CML). https://www.universiteitleiden.nl/.
- Goedkoop M.J., Heijungs R., Huijbregts M., De Schryver A., Struijs J., Van Zelm R., 2009. ReCiPe 2008. A life cycle impact assessment method which comprises harmonised category indicators at the midpoint and the endpoint level; First edition, Report I: characterization.
- WULCA, AWARE method v.1.02. http://www.wulca-waterlca.org.
- Iraldo F., Testa F. and Bartolozzi I., 2013. An application of Life Cycle Assessment (LCA) as a green marketing tool for agricultural products: the case of extra-virgin olive oil in Val di Cornia, Italy, Journal of Environmental Planning and Management, DOI:10.1080/09640568.2012.735991
- International Energy Agency (IEA) statistics on electricity generation mixes (www.iea.org/statistics/).
- Association of Issuing Bodies (AIB). (www.aib-net.org).
- http://www.fao.org/fishery/statistics/GFCM-capture-production/query/en.
- ICES Advice on fishing opportunities, catch, and effort Bay of Biscay and the Iberian Coast ecoregion, 18 December 2020.
- FIRMS (Fisheries and Resources Monitoring System), Marine resources - Mediterranean and Black Sea, Review of the state of world marine fishery resources 2011 (FAO Statistical area 37).