



Environmental Product Declaration (EPD®) For “Bios” Extra Virgin Olive Oil Monini S.p.A.



Revision date: 2023/03/03 (rev. 6.0)

Publication date: 2014/12/10

Date of validity: 2026/02/14

Geographical area of production: Italy
Geographical area of distribution: World
CPC code: 21537
Registration Number: S-P-00647

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01 *The All-Italian Story of a Passion*

MONINI, ALL-ITALIAN STORY OF A PASSION

A passion for quality that dates back over a century

The Monini company is an Italian success story based on tradition and quality. The company was founded in 1920 by Zefferino Monini, who, following his entrepreneurial instinct, decided to establish a business in the town of Spoleto, in the Italian region of Umbria. Thanks to its hills covered with olive groves, from which an oil with an intense yet balanced flavour is obtained, the Spoleto area has always been dedicated to the production of Extra Virgin Olive Oil. The passion that Zefferino Monini Sr. developed for olives at an early age led him to dedicate himself to the production of Extra Virgin Olive Oil, whereby he founded the company "Zefferino Monini Olio di Oliva" in 1930. The knowledge and consumption of Extra Virgin Olive Oil at the time was limited and was locally

confined exclusively to its areas of production. Most Italians, above all in the larger cities, either out of habit or lack of knowledge, used almost exclusively regular olive oil, rather than the extra virgin variety. By deciding to market Extra Virgin Olive Oil beyond the confines of the Umbria region, Zefferino Monini launched a new trend in the oil industry. Thanks to his initiative and his passion for the natural product of his homeland, together with the exceptional quality of the oil obtained from the hills of Umbria, Zefferino Monini succeeded in writing the first page in the history of the Extra Virgin Olive Oil market. Once brought to the attention of a wider audience, Monini extra virgin olive oil became increasingly popular and began to be demanded by customers even further afield. The company ceased

operations

during the war as the product was subject to rationing. Once the distribution of foodstuffs was deregulated in 1945, however, the company's operations continued with renewed energy. It was at this time that Zefferino's sons, Giuseppe and Paolo, joined the company. Giuseppe and Nello flanked their father in his traditional laboratory, learning all the tricks of the trade.

At the time, shopkeepers sold the product in bulk. Anticipating the future needs of the market, however, the first glass bottles began flanking the traditional demijohns by the year 1950.



01 *The All-Italian Story of a Passion*

A historic oil in modern times.



Today Monini is one of the leading companies in the Extra Virgin sector with a 2021 turnover of 153 million Euros and more than 110 employees. Almost 96% of the total turnover is achieved with the Monini brand. The strategy started in the 1920's by the founder, confirmed and increased by his son Giuseppe, is still carried on by the founder's grandchildren, Zefferino and Maria Flora who, with the same passion, continue to spread the culture of Extra Virgin Olive Oil in an educational, serious and not only commercial way. For three generations, the Monini family has been selecting Extra

Virgin Olive Oils, choosing only mills where the hygiene conditions, processing facilities and storage of the olives and oil are of superior quality.

A company in the vanguard in terms of structures, technology and quality control, still animated by a passion for craftsmanship to offer its consumers superior quality.

Even today, Zefferino Monini personally tastes the oils to select those that will keep the promise of high quality, the same every time, just as his grandfather did.

02 *The Monini Group*

THE MONINI GROUP NORTH AMERICA, POLAND AND AUSTRALIA

A company that symbolizes the Italian Olive Oil Tradition

It is precisely this ability to spread the culture of Extra Virgin Olive Oil and to preserve the most authentic Italian oil art as a symbol of Made in Italy that has led the Umbrian company to become a point of reference for the sector outside Italy.

In 2000 Monini North America Inc. was founded with headquarters in Norwalk, Connecticut, and a turnover that today is around 6 million dollars.

In Europe it is present with Monini Polska, a subsidiary established in 2008 with headquarters in Poznan, Poland.



03 *The Company*

THE COMPANY

Environmental Policy

Today, Monini is a company that's on the cutting-edge in terms of facilities, technology and quality control, upholding the Italian olive oil tradition thanks to a responsible corporate management model based on environmental sustainability, business ethics and social awareness. Monini cares particularly to the environment, as evidenced by the activities that include the installation of a photovoltaic system at the production facility, the provision of energy from certified renewable sources, and the use of recycled glass packaging. Thanks to this policy, Monini has become the first large Italian company to obtain an Environmental Product Declaration (EPD®).

Monini's environmental policy is based on a simple philosophy: to never deprive

nature or the terrain of anything. Because it is precisely nature and the terrain that have provided this Spoleto-based company with its precious raw materials, allowing it to make a name for itself over the past 100 years. Monini has assumed this exemplary commitment to the environment and its natural fruits in order to ensure that they are preserved for generations to come. It's the best possible investment that the company could make in order to preserve the values underlying the Monini olive oil tradition over time.

In 2021 Monini has launched a carbon neutrality project involving its two best-selling extra virgin olive oils in Italy and abroad, the Classico and the Delicato



Monini, which together account for 67% of the bottles produced in a year by the company. This project represents a totally

voluntary commitment, which Monini has undertaken aware of the need to offer a concrete contribution to the fight against global warming.

The packaging plant

The Monini S.p.A. production site is located in Spoleto (Italy) SS Flaminia Km 129.

Monini S.p.A. packages over 30,000,000 litres per year, of which approximately 87% is Extra Virgin Olive Oil. 45% of the 2021 turnover comes from the export market, which involves more than 52 countries. The company covers an area of 22,000 square metres, of which 11,800 square metres are covered, where there are seven packaging lines that guarantee a maximum production capacity of 15,000 litres per hour in various formats and a filtering line for raw materials.

03 *The Company*

Supply chain control

Oils made from olives of different varieties, origins and maturity, and stored under different conditions and for different time frames, naturally possess different characteristics. For this reason, Zefferino Monini Jr., together with some of his closest expert collaborators, select the best oils in a special tasting room on a daily basis, recording the intensity and the different flavour and olfactory characteristics of each oil sampled. Approximately 15,000 oil tasting sessions are held each year during the selection and receipt of the raw materials, as well as before packaging. These control activities are not only limited to the raw materials themselves, but the quality of

the final product is also guaranteed by the loyalty, collaboration, and control activities performed by the entire supply chain.

Quality control

A state-of-the-art analytical laboratory monitors the quality and purity of each oil. These highly complex analyses are used to reveal the presence of any oils other than olive oil, as well as the presence of any undesired substances contained within the oils themselves due to treatments with agrochemicals (pesticides, herbicides or fungicides) or simply due to environmental pollution. Modern analytical techniques and

sophisticated equipment allow for contaminants to be detected in tenths of parts per billion: this means that it is possible to detect the presence of even just one gram of a contaminant dissolved in 10,000 tonnes of oil.

The Monini analysis laboratory performs approximately 20,000 sets of analysis per year, controlling approximately 90,000 parameters.

Most of the controls are performed upon the incoming product, thus allowing for non-compliant batches of oil to be rejected, while further controls are also carried out during the packaging stage. Subsequently, the quality levels of the oils destined for the national and international markets are sampled and monitored.

04 *Calculation of environmental performance*

CALCULATION OF ENVIRONMENTAL PERFORMANCE

Monini Bios Extra Virgin Olive Oil 0.75-litre and 0.5-litre bottles.



This EPD® refers to the product Bios Extra Virgin Olive Oil.

Bios is produced from 100% Italian olives grown and harvested in the Gargano area in Puglia and is milled and bottled at the SIO plant in Carpino (FG). The data used to calculate the environmental performance reported in this EPD® are updated to the olive production and oil extraction campaign of 2021.

Bios Extra Virgin Olive Oil is packaged in dark coloured glass bottles of 750 ml and 500 ml; the primary packaging consists of two

paper labels (front and back) applied to the bottle and an aluminium cap with a plastic pourer; the standard secondary packaging is a cardboard box, while the tertiary packaging is a pallet.

In this EPD®, the density of Extra Virgin Olive Oil is considered to be 0.913 kg/litre.

Functional unit

In accordance with PCR 2010:07, the functional unit for the life cycle refers to one (1) litre of Extra Virgin Olive Oil, including its packaging.

04 *Calculation of environmental performance*

GEOGRAPHICAL ORIGIN

Monini Bios Extra Virgin Olive Oil



Italy
Puglia.

04 *Calculation of environmental performance*

CHARACTERISTICS OF THE EXTRA VIRGIN OLIVE OIL

Monini Bios Extra Virgin Olive Oil

Monini is an Italian family that has been dedicated to the selection of high-quality oil for three generations.

Bios is guaranteed organic from start to finish, from the first olive to the last drop in the press.

Soil, olive groves, harvesting and oil extraction systems, everything complies with the principles of organic agriculture.

For cooking

Use raw for dressing fish, white meat, vegetables, and all delicate and balanced dishes.

NUTRITION DECLARATION for 100 ml

Energy	3404 KJ
	828 kcal
Fats	92 g
Of which	
Statured Fatty Acids	14 g
Monosaturated Fatty Acids	69 g
Polyunsaturated Fatty Acids	9 g
Carbohydrates	0 g
Of which Sugar	0 g
Fibres	0 g
Protein	0 g
Salt	0 g
Vitamin E	17 mg*

* 142% of nutrient reference values

04 *Calculation of environmental performance*

CHEMICAL AND PHYSICAL PROPERTIES

Monini Bios Extra Virgin Olive Oil

MONINI QUALITY SPECIFICATIONS	Monini values	Values provided by law	Reference standards
Free acidity (% express as oleic acid)	0.25	≤ 0.8	(1-2-3)
Peroxides	8.5	≤ 20	(1-2-3)
UV adsorption:			
K232	1.9	≤ 2.5	(1-3)
K270	0.11	≤ 0.22	(1-2-3)
ΔK	-0.002	≤ 0.01	(1-2-3)
Waxes (mg/kg)	65	≤ 150	(1-2-3)
Biophenols (mg/kg)	220		

(1) REG. (EEC) N.2568/91 on the characteristics of olive oil and relevant methods of analysis

(2) CODEX STAN 33-1981 Standards for olive oils and olive-pomace oils

(3) INTERNATIONAL OLIVE COUNCIL COI/T. 15/NC N.3/Rev. 12 Trade standard applying to olive oils and olive pomace oils

04 *Calculation of environmental performance*

CHEMICAL AND PHYSICAL PROPERTIES

Monini Bios Extra Virgin Olive Oil

MAIN CONTAMINANTS RESIDUES		Monini values	Values provided by law	Reference standards
PAH: Polycyclic Aromatic Hydrocarbons (mg/kg)	B(a)P	< standard limit values	≤2	Reg. 1881/2006/UE and further modifications
	B(a)P B(a)A B(b)F CHR	< standard limit values	≤10	
Phthalates (mg/kg)		<3.0 (sum) <1.0 (each compound)	-	Internal method
Pesticide residues (mg/kg)		< standard limit values	Values of the reference standard	Reg. 396/2005/UE and further modifications

04 *Calculation of environmental performance*

BOUNDARIES OF THE SYSTEM

Upstream, core e downstream processes

In accordance with PCR 2010:07, the life cycle of the Extra Virgin Olive Oil is divided into the Upstream, Core and Downstream phases.

The Upstream phase includes the following processes:

- The operations required for the establishment of the olive groves and the transformation of the terrain's use were not taken into consideration because the life cycle of an olive grove is greater than 25 years.

- The production of the olives used later in the Core process, involving the following processes:

- *Waste management.*
- *The use of the wood resulting from pruning or from the end of the olive trees' life cycle.*
- *The transportation of the inputs to the region and to the olive production sites.*
- *The extraction and use of the water.*

- *The auxiliary materials used to harvest the olives (nets, cages, detergents, etc.).*
- *The production of the fuel and electricity used at the plantations.*
- The production of packaging and auxiliary materials used for extracting oil at the oil mill and for filtration and fine filtering at the SIO plant.

04 *Calculation of environmental performance*

BOUNDARIES OF THE SYSTEM

Upstream, core e downstream processes

The Core phase includes the following processes:

- The transportation of the olives to the mill
- The extraction of the oil from the olives.
- Waste management.
- The preservation of the oil.
- Transportation to the packaging plant.
- Packaging of oil at SIO plant in Carpino (Foggia).
- The transportation of the raw materials and energy inputs to the Core process.

In accordance with the 2010 PCR: 07, the construction of machinery (more than three years old) and the factories were not included. In addition, the packaging of chemical products and auxiliary materials used during the cultivation, at the olive mill and in the packaging

The Downstream phase includes the following processes:

- Transportation from the final production/ storage site to a distribution platform.
- Transportation to the retailer.
- Waste management.
- The use of the product.
- The recycling or disposal of the packaging/materials after use.

stage, as well as the product labels and neck collar applied on the oil bottles, the shrink film and the adhesives applied to the pallet, they were not included for the cut-off rule (which excludes material flows of less than 1% of the total inventory).

04 Calculation of environmental performance

BOUNDARIES OF THE SYSTEM



04 *Calculation of environmental performance*

DATA QUALITY

The inventory analysis was carried out using specific data from Monini S.p.A. and from the companies involved in the study regarding the cultivation and harvesting of the olives, oil extraction and storage, transport to the bottling site, packaging stage and distribution of the product.

Selected generic data were used from:

- Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91.

- The Methodology of the FAO Study: "global food losses and food waste - extent, causes and prevention" - FAO, 2011 by SIK - Swedish Institute for Food and Biotechnology, 2013.

- Eurostat,
<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>

- International databases (in particular Ecoinvent 3.8) for the production processes of semi-finished products, packaging materials, electrical and thermal energy and means of transport, as well as for water supply and end-of-life.

In accordance with the General Program Instructions of the International EPD® System, version 3.01 of 18/09/2019, the contribution of other generic data to the impact indicators is less than 10%.

In addition, transport distance data were calculated using the online Google Maps and Sea Rates calculator for land and sea transport distances respectively.

04 *Calculation of environmental performance*

DATA QUALITY

The Monini supply chain

The direct relationship with private or cooperative mills (sometimes through the figure of a mediator to coordinate the logistical and economic matters) does not contribute to easily obtain data concerning the olive farm. Nevertheless, compared to the previous version, this EPD® has considerably increased the number of suppliers (growers and mills) who actively participated in the collection of the requested data. A more representative sample has greatly improved the quality of the processed data which are probably very close to real values.

Comparison of EPDs® within the same product category

The oils included in this document are based on the PCR 2010:07 version 3.0 specification updated on 31/03/2020, developed in accordance with the General Program Instructions of the International EPD® System, version 3.01 dated 18/09/2019.

EPDs® within the same product category but from different programmes may not be comparable, nor are EPDs® within the same product category and programme but differing in packaging format.

04 *Calculation of environmental performance*

CULTIVATION AND COLLECTION OF THE OLIVES

Puglia, Italy

BIOS Extra Virgin Olive Oil is made in Puglia, Italy's leading olive oil producing region. Foggia, Bari, and Barletta-Andria-Trani are the region's most productive provinces. Across the Tavoliere plain and on the hills of Gargano, olive growing is a form of specialized farming with a regular line configuration, incorporating an irrigation system with the vase pruning system. Olives are harvested mainly using olive harvesters and shakers with collector wagons.

The sample farms considered in the study covered an average surface of 23 hectares. The cultivars are Ogliarola, Garganica, and Leccino grown in compliance with the specifications described in the regulations for organic production.

04 *Calculation of environmental performance*

EXTRACTION OF THE OIL FROM THE OLIVES

Washing, crushing and malaxation

BIOS Extra Virgin Olive Oil is usually milled at the SIO oil mill in Carpino (Foggia).

Washing and pressing

When the olives arrive at the mill they are immersed in a tank of water or, in modern plants, in special washing machines that maintain forced water movement in order to improve the results of the operation. After washing, the next step is the crushing, which in modern continuous-cycle facilities is carried out using a hammer crusher. With this system, the pulp is broken down by the impacts of high-speed rotary devices, and only in

part by the mechanical action of the pit's fragments.

The processing is performed within an extremely short time frame.

Malaxation

Malaxation or mixing is an operation that follows crushing, the purpose of which is to break down the emulsion between water and oil, thus allowing the micelles of oil to merge into larger droplets, which tend to separate spontaneously from the water. This is performed in machines called mixers or maloxers.

The technical reference parameters during the mixing stage are the temperature and the duration. The

temperature is critical for the yield in the subsequent extraction process and is closely related to the stability of the water-oil emulsion. With a low degree of emulsification, malaxation can be performed at temperatures slightly higher than the ambient temperature (from 22-24°C to 27°C); this is referred to as malaxation or cold extraction. With more stable emulsions, a more aggressive heating of the paste is required, with temperatures ranging from 27°C to 30°C. The yield of the extraction increases with the temperature of the malaxation, but the quality of the paste decreases once the temperature of 30°C is reached.

04 *Calculation of environmental performance*

EXTRACTION OF THE OIL FROM THE OLIVES

From malaxation to centrifugation

Centrifugation

The olive paste resulting from the malaxation process is subjected to centrifugation in a rotating conical drum, with a horizontal axis commonly referred to as a decanter.

Due to the different specific weights of water, oil, and olive pulp, the centrifugation separates them over 2 to 3 phases. The 3-phase decanter is the most consolidated and utilized type found in Italy.

In this case, three parts are separated by centrifugation:

- the olive pomace;
- the oil must, containing a small amount of water;
- the vegetation water, containing a small amount of oil.

This system requires the oil paste to be diluted in advance with mains water.

The oil must, obtained from the extraction, always contains a residual amount of water, which is separated by the effect of the different densities of the two liquids through decanting or centrifugation. Vertical centrifugation is the system used in all plants to separate the oil from the water. In this process, which is performed in vertical centrifugal separators, both the oil must and the vegetation water obtained from the horizontal centrifugation are processed.

04 *Calculation of environmental performance*

PACKAGING OF THE OIL

From storage to shipping

Storage

The SIO plant has approximately 68 storage tanks (for a total capacity of 621,000 litres, all made of stainless steel).

Filtering

Just before packaging, BIOS extra virgin olive oil is not filtered but

decanted (for as long as possible) and then lightly filtered through card filters. This light filtering does not alter the quality and nutritional properties of the oil; to the contrary, it ensures better preservation over time.

Packaging

The SIO plant has two modern packaging lines (with a daily average bottling capacity of 50,000 litres over

24 hours). One of these lines is dedicated to bottling BIOS and P.D.O. Dauno Gargano Monini extra virgin olive oil. Once packaged, BIOS extra virgin olive oil is transported to the Monini plant in Spoleto where is stored in the warehouse before being distributed.

04 *Calculation of environmental performance*

DISTRIBUTION AND USE PHASE

The final stages of the product's life cycle

Distribution

The product is distributed across Italy and the world. The transport distance was calculated based on the specific distance-weighted average for each bottle size.

Use phase

Monini BIOS olive oil is recommended for raw use; therefore, it has been assumed that the entire product is consumed during use.

End of life of packaging and oil

The end-of-life scenario for packaging was modelled using official statistical data from ISPRA (2021) and Eurostat (referring to 2020) according to the recovery, incineration and landfill disposal processes for the individual packaging materials. The waste disposal processes of landfill and incineration were taken from the Ecoinvent database and are specific to the packaging material; for the recycling process, only the assumed transport of 100 km with lorries with a capacity between 16 and 32 tonnes was considered.

04 *Calculation of environmental performance*

ENVIRONMENTAL PERFORMANCE

List of the impact categories/1

The environmental performance of Monini products, as indicated below, is based on the Life Cycle Assessment (LCA) methodology and was calculated in accordance with the ISO 14040 and 14044 standards, the international EPD® system and PCR 2010:07. The management and updating of the environmental data concerning the EPD® products are regulated by a special procedure within the Manual for the Monini management systems.

Environmental impact indicators

The purpose of the impact assessment is to highlight the extent of the environmental changes that occur due to the atmospheric emissions and resource consumption associated with the production activities. The fundamental objective is to attribute the consumption

and emission levels obtained during inventory to specific impact categories.

The list of impact categories is provided below:

Consumption of resources

Calculation of the amounts of energy resources used throughout the entire life cycle of the products.

These are divided into primary (renewable and non-renewable) and secondary energy sources, as well as water consumption.

Global warming

This is caused by the presence of greenhouse gases in the atmosphere, which absorb the infrared radiation emitted by the earth, thus resulting in an average temperature increase. The anthropogenic greenhouse gas which causes most concern is CO₂. The method

for characterizing the impacts of greenhouse substances is based on that of the Intergovernmental Panel on Climate Change (IPCC), which uses kilograms of equivalent CO₂ over a time frame of 100 years (GWP 100 years, Global Warming Potential) as an impact indicator. GWP is based on a relative scale that compares the gas in question to an equal mass of CO₂, whose GWP is by definition equal to 1. Fossil, biogenic and land-use change emissions are reported separately.

04 *Calculation of environmental performance*

ENVIRONMENTAL PERFORMANCE

List of the impact categories/2

Formation of photochemical smog

This is a phenomenon typical of peak hours in big cities, which is quite pronounced in the summertime, when the sun's rays cause the unburned hydrocarbons and nitrogen oxides present in the exhaust fumes to react, thus resulting in harmful ozone. The method for characterizing the impact of photo-chemical smog is based on that of the United Nations Economic Commission for Europe (UNECE), which uses kg of NMVOC equivalent, POFP (Photo-chemical Ozone Formation Potential).

POFP is based on a relative scale, which compares the substance in question to an equal mass of equivalent NMVOC, the POFP of which is by definition equal to 1.

Acidification

The acidification indicator is linked to the emission of certain acidifying substances into the atmosphere, such as nitrogen oxides and sulphur oxides, which cause the pH of lakes, forests and oceans to decrease.

The method for characterizing acidification impacts is based on statements of Seppälä et al. 2006, Posch et al. 2008 using the moles of H⁺ equivalent (AP, Acidification Potential) as an impact indicator. AP is based on a relative scale which compares the substance in question to an equal mass of equivalent H⁺ eq, whose AP is by definition equal to 1.

Eutrophication

Indicates a condition of accumulation of nutrients within a given environment.

Specifically, an over-abundance of nitrates and phosphates in an aquatic environment, which causes the proliferation of microscopic algae and, in turn, increased bacterial activity; the consequent lowering of oxygen in surface waters and in the soil causes a degradation of the environment which has become asphyxiated and, in the long term, results in the death of fish. The results report three indicators of potential eutrophication: terrestrial, marine and freshwater.

Use of the soil.

This category concerns the effects following the conversion or occupation of land. The impact is expressed in m² per year.

04 *Calculation of environmental performance*

ENVIRONMENTAL PERFORMANCE

Monini Bios Extra Virgin Olive Oil

EVALUATION METHOD

The calculation method adopted for the LCA study underlying this EPD® is the one described by PCR 2010:07, CPC Division 21537: Virgin olive oil and its fractions; version 3.0.1.







The characterisation factors, used to convert the data from the life cycle inventory analysis into impact categories, are listed on the International EPD® System website.

It is emphasised that the results of environmental impact indicators on resource use and water scarcity should be used with caution, as the uncertainties of the results are high and experience with these indicators is limited.

04 Calculation of environmental performance

ENVIRONMENTAL PERFORMANCE

Monini Bios Extra Virgin Olive Oil 0.75-litre glass bottle







PARAMETERS Environmental impacts		UPSTREAM		CORE		DOWNSTREAM		LIFE CYCLE
		 Olive cultivation	 Packaging & other materials production	 Olive oil extraction	 Filtration brightening and packaging	 Distribution	 End of life	
	Unit							
GWP, fossil	kg CO ₂ eq	1,3539	0,2943	0,0515	0,1371	0,4291	0,0055	2,2714
GWP, biogenic	kg CO ₂ eq	0,0002	0,0035	0,0002	0,00129	0,00002	0,0047	0,00997
GWP, Land use and land transformation	kg CO ₂ eq	2,37E-05	2,16E-03	1,78E-06	4,18E-06	5,42E-06	8,48E-08	0,0022
TOTAL Global Warming Potential	kg CO₂ eq	1,35414	0,30003	0,05172	0,13835	0,42912	0,01022	2,28
Ozone layer depletion	kg CFC-11 eq	2,84E-07	5,53E-08	7,96E-09	2,57E-08	9,54E-08	1,32E-09	4,69E-07
Acidification potential	mol H ⁺ eq	0,01166	0,00124	0,00017	0,00070	0,00906	0,00004	0,02286
Freshwater eutrophication	kg P eq	0,00019	0,00007	0,00001	0,00002	0,00005	0,000007	0,00036
Marine eutrophication	kg N eq	0,00480	0,00041	0,00003	0,00024	0,00234	0,00002	0,00784
Terrestrial eutrophication	mol N eq	0,05257	0,00327	0,00037	0,00258	0,02600	0,00017	0,08496
Photochemical ozone formation	kg NMVOC eq	0,01355	0,00109	0,00011	0,00068	0,00663	0,00005	0,02210
Abiotic depletion potential – Elements	g Sb eq	4,77E-08	2,56E-06	4,59E-10	3,54E-09	1,10E-08	2,52E-10	0,000003
Abiotic depletion potential – Fossil fuels	MJ	19,29821	5,35825	0,79762	1,95950	5,80548	0,07868	33,30
Water scarcity potential	m3	0,8221	0,1191	0,0328	0,0456	-0,0010	0,00000	1,02

Environmental impact in reference to the functional unit of the 0.75-litre bottle of Bios Extra Virgin Olive Oil and its packaging

04 Calculation of environmental performance

ENVIRONMENTAL PERFORMANCE

Monini Bios Extra Virgin Olive Oil 0.75-litre glass bottle







PARAMETERS Use of resources	Unit	UPSTREAM			CORE	DOWNSTREAM		LIFE CYCLE
		 Olive cultivation	 Packaging & other materials production	 Olive oil extraction	 Filtration brightening and packaging	 Distribution	 End of life	
Primary energy resources –Renewable Used as energy carriers	MJ	0,2318	0,4285	0,0252	0,1566	0,0068	0,0004	0,849
Primary energy resources –Renewable Used as raw materials	MJ	0,0704	0,3360	0,0065	0,0084	0,0015	0,0001	0,423
Primary energy resources –Renewable TOTAL	MJ	0,3022	0,7645	0,0317	0,1650	0,0083	0,0005	1,272
Primary energy resources –Non-renewable Used as energy carriers	MJ	20,542	5,756	0,866	2,104	6,164	0,084	35,516
Primary energy resources –Non-renewable Used as raw materials	MJ	0,015	0,094	0,000005	0,000011	0,000039	0,000002	0,108
Primary energy resources –Non-renewable TOTAL	MJ	20,557	5,850	0,866	2,104	6,164	0,084	35,62
Land use	m ² a	8,973	0,076	0,010	0,022	0,0004	0,0001	9,08
By-product	kg	0	0	6,290	0	0	0	6,290

Environmental impact in reference to the functional unit of the 0.75-litre bottle of Bios Extra Virgin Olive Oil and its packaging

04 *Calculation of environmental performance*

ENVIRONMENTAL PERFORMANCE

Monini Bios Extra Virgin Olive Oil 0.5-litre glass bottle







PARAMETERS Environmental impacts		UPSTREAM		CORE		DOWNSTREAM		LIFE CYCLE
		 Olive cultivation	 Packaging & other materials production	 Olive oil extraction	 Filtration brightening and packaging	 Distribution	 End of life	
	Unit							
GWP, fossil	kg CO ₂ eq	1,3538	0,3736	0,0515	0,1543	0,4677	0,0062	2,4071
GWP, biogenic	kg CO ₂ eq	0,0002	0,0042	0,0002	0,00129	0,00003	0,0030	0,00897
GWP, Land use and land transformation	kg CO ₂ eq	2,37E-05	2,37E-03	1,78E-06	4,32E-06	5,69E-06	8,44E-08	0,0024
TOTAL Global Warming Potential	kg CO₂ eq	1,35404	0,38017	0,05172	0,15557	0,46769	0,00924	2,42
Ozone layer depletion	kg CFC-11 eq	2,84E-07	6,70E-08	7,96E-09	2,98E-08	1,05E-07	1,48E-09	4,95E-07
Acidification potential	mol H ⁺ eq	0,01166	0,00155	0,00017	0,00077	0,00926	0,00004	0,02345
Freshwater eutrophication	kg P eq	0,00019	0,00009	0,00001	0,00002	0,00006	0,000005	0,00038
Marine eutrophication	kg N eq	0,00480	0,00048	0,00003	0,00027	0,00247	0,00002	0,00807
Terrestrial eutrophication	mol N eq	0,05256	0,00400	0,00037	0,00289	0,02736	0,00019	0,08737
Photochemical ozone formation	kg NMVOC eq	0,01355	0,00130	0,00011	0,00076	0,00698	0,00005	0,02274
Abiotic depletion potential – Elements	g Sb eq	4,77E-08	3,46E-06	4,59E-10	4,30E-09	1,29E-08	2,81E-10	0,000004
Abiotic depletion potential – Fossil fuels	MJ	19,29680	6,71036	0,79756	2,20575	6,36661	0,08863	35,47
Water scarcity potential	m3	0,8220	0,1548	0,0328	0,0455	-0,0011	0,00000	1,05

Environmental impact in reference to the functional unit of the 0.5 litre bottle of Bios Extra Virgin Olive Oil and its packaging

04 Calculation of environmental performance

ENVIRONMENTAL PERFORMANCE

Monini Bios Extra Virgin Olive Oil 0.5-litre glass bottle

PARAMETERS Use of resources	Unit	UPSTREAM			CORE	DOWNSTREAM		LIFE CYCLE
		 Olive cultivation	 Packaging & other materials production	 Olive oil extraction	 Filtration brightening and packaging	 Distribution	 End of life	
Primary energy resources –Renewable Used as energy carriers	MJ	0,2318	0,5252	0,0252	0,1569	0,0075	0,0003	0,947
Primary energy resources –Renewable Used as raw materials	MJ	0,0704	0,3697	0,0065	0,0085	0,0016	0,0001	0,457
Primary energy resources –Renewable TOTAL	MJ	0,3022	0,8949	0,0317	0,1653	0,0092	0,0004	1,404
Primary energy resources –Non-renewable Used as energy carriers	MJ	20,541	7,154	0,866	2,366	6,759	0,094	37,780
Primary energy resources –Non-renewable Used as raw materials	MJ	0,015	0,170	0,000005	0,000013	0,000044	0,000002	0,185
Primary energy resources –Non-renewable TOTAL	MJ	20,555	7,325	0,866	2,366	6,759	0,094	37,97
Land use	m²a	8,973	0,084	0,010	0,022	0,0004	0,0001	9,09
By-product	kg	0	0	6,290	0	0	0	6,290

Environmental impact in reference to the functional unit of the 0.5 litre bottle of Bios Extra Virgin Olive Oil and its packaging.

05 *Changes compared to the previous version*

CHANGES COMPARED TO THE PREVIOUS VERSION










A number of improvements have been made to the LCA study of olive oil, which have led to the updating of the values of the various impact indicators analysed; for example, water extraction and emission has been regionalised according to the countries where olive growing and oil extraction take place.

First of all, the Ecoinvent database has been updated from version 3.7.1 used previously to version 3.8; furthermore, the specific calculation of the emissions from fertiliser application takes into account the characteristic fluctuations of cultivation operations. Compared to the previous year, most of the comparable impact indicators show a slight decrease.

Particular changes were made to the packaging data: updated primary data were collected from all suppliers of the heaviest components of the product packaging, as well as an increased refinement of the configurations shipped in the reporting year. Finally, the distribution data were supplemented with the addition of transports between the Monini factory and a warehouse outside the factory.












06 Additional Information

CERTIFICATIONS Monini S.p.A.

Site	Typology		Certifying body	Year of issue
Production unit	ORTHODOX UNION	Kosher Certification		1992
Production unit	DOP	Production and packaging DOP Umbria		1998
Production unit	ISO 9001:2015	Standard for the management of Quality Systems		1999
Production unit	REG. EU 2018/848 organic production and labelling of organic products	production and packaging of organic products		2001
Production unit	British Retail Consortium	hygienic and sanitary safety of private label food products		2004
Production unit	International Food Standard	hygienic and sanitary safety of private label food products		2006
Production unit	ISO 22000:2018	Food Safety Management Systems		2010
Monini products	EPD: Monini Extra Virgin Oil "Granfruttato"; "Classico" "Delicato"	Environmental Declaration of Product (EPD®)		2012
Monini "Bios" chain	Organic Products Certificate of Conformity IBD-Brazil	Production of raw materials and packaging of organic products		2012

06 Additional Information

CERTIFICATIONS Monini S.p.A.

Site	Typology		Certifying body	Year of issue
Production unit	HALAL	Standard: HIA-01, HAS 23201 AND MS 1500 HALAL GUIDELINES & STANDARDS		2013
Monini products	EPD: Monini Extra Virgin Oil "BIOS" "DOP Umbria"	Environmental Declaration of Product (EPD®)		2014
Production unit	JAS Organic Products Certificate of Conformity - Japan	Organic manufacturing and packaging		2016
Monini "Bios" chain	Certificate of Conformity of organic products OFDC-China	Organic manufacturing and packaging		2016
Production unit	HALAL	Standard: GSO 2055-1 – MUIS-HC-S001 Thailand		2018
Production unit	ISO 45001:2018	Occupational health and safety management systems		2018
Monini products	ISO 22005:2008	Traceability system in agri-food chains		2020
Monini products	Extra virgin Consortium Of Quality "CEQ"	Traceability system in agri-food chains Technical Product Specification "Extra Virgin Olive Oil Quality CEQ".		2020
Production unit	BRCGS Global Standard Food Safety Issue 8	Module 13 - FSMA Preventive Controls Preparedness		2021
Monini products	EPD: Monini Extra Virgin Oil "Nettare"	Environmental Declaration of Product (EPD®)		2022
Organisation	"Responsability Award"	Responsible management of corporate values		2022

06 *Additional Information*

ADDITIONAL ENVIRONMENTAL INFORMATION

The packaging used by Monini for BIOS Extra Virgin Olive Oil is recyclable. In addition, bottles contain an average of 62% recycled glass.

06 *Additional Information*

INFORMAZIONI

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Contract management for EPD® validation:

Bureau Veritas Italia S.p.A.

For further information

Monini S.p.A.

www.monini.com

International EPD® system

www.environdec.com

06 *Additional Information*

VERIFICATION

Product Category Rules (PCR): PCR 2010:07, CPC Division 21537: Virgin olive oil and its fractions; version 3.0.1
PCR review conducted by: The Technical Committee of the International EPD® System Chair: Adriana del Borghi, info@environdec.com
Independent third-party verification of declaration and data, in accordance with ISO 14025:2006 <input type="checkbox"/> EPD® process certification <input checked="" type="checkbox"/> EPD® verification
Third-party verifier: Bureau Veritas Italia Approved by: The Technical Committee of the International EPD® System
The procedure of data follow-up during the validity of the EPD includes the third-party verifier: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

EPDs within the same product category but from different programmes may not be comparable, nor are EPDs within the same product category and programme but differing in packaging format.

The holder of the EPD® has exclusive ownership, obligations and responsibilities regarding the EPD® itself.

06 *Additional Information*

REFERENCES

1. ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework
2. ISO 14044:2018 Environmental management - Life cycle assessment - Requirements and guidance
3. General Programme Instructions for Environmental Product Declarations, version 3.01 of 2013-09-19
4. Gustavsson et al., The methodology of the FAO study: "Global Food Losses and Food Waste - extent, causes and prevention"- FAO, 2011 From SIK - The Swedish Institute for Food and Biotechnology, 2013
5. PCR 2010:07, CPC Division 21537: Virgin olive oil and its fractions; version 3.0.1
6. COUNCIL REGULATION (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91
7. Life cycle assessment of Monini Extra Virgin Olive Oil - LCA report; Ambiente Italia S.r.l. updated in March 2023
8. ISPRA waste report 2022 - 2021 data
9. CONAI, General programme for the prevention and management of packaging and packaging waste - Final general report 2017
10. Association of Issuing Bodies, European residual mixes 2021

More information: website: International Olive Oil Council.

Eurostat (2020 data on packaging end-of-life)

www.environdec.com