



# ENVIRONMENTAL PRODUCT DECLARATION

## ZEUS KIWI S.A. – Grapes



In accordance with ISO 14025: 2006

EPD Registration Number	Publication Date	Date of Validity	Revision Date	Program	Program operator	UN CPC
S-P-11012	2023-10-13	2028-10-13	2023-11-16 [Version 1.1]	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>	EPD International AB	0133 – Grapes

**Differences versus previous versions**  
**Editorial Change:** Aesthetic Improvement of the Document

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)





## CONTACT INFORMATION

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### PRODUCT CATEGORY RULES (PCR):

**PCR FRUITS AND NUTS; VERSION 1.0.2:  
2019-08-18**

### Product group classification:

UN CPC 0133

### PCR review was conducted by:

The Technical Committee of the International EPD® System.  
. A full list of members available on [www.environdec.com](http://www.environdec.com). The review panel may be contacted via [info@environdec.com](mailto:info@environdec.com)

### Independent third-party verification of the declaration and data in accordance with ISO 14025:2006

EPD verification by individual verifier  
Approved by: The International EPD® System

### Procedure for follow-up during EPD validity involves third party verifier

Yes  No



## COMPANY INFORMATION



ZEUS KIWI S.A. is a Producer Organization at the vanguard of production, maintenance and distribution of kiwi fruit and seedless grapes. Known and respected worldwide for its high quality and pleasant taste, the secret of excellence lies in the idyllic soil and climatic conditions of the area as well as sustainable growing practices. Zeus growers number more than 300 and their aim is to spearhead the expansion of their cultivation with new varieties of kiwi and the further cultivation of vines of the most coveted varieties.

ZEUS KIWI S.A. was founded in 1991. It was funded by 99 growers from the Pieria Prefecture who were its first shareholders. Located at the Municipal department of Karitsa in the Municipality of Dion, at the foothills of Mount Olympus, Zeus Kiwi is a vertical organization which grows, collects, maintains,

pack and exports fresh products. In 1997, Zeus Kiwi was the 1st Producer Organization in Greece to be recognized by the Ministry of Agriculture under the European Union Regulation 2200/96.





## QUALITY & ENVIRONMENTAL POLICY

**ZEUS KIWI S.A.** has applied advanced quality systems since 1993, being the first organization in Greece to be certified according to the rules of Integrated Crop Management by Agrocert (Agro 2.1-2.2) of the Greek Ministry of Agriculture. As Agro 2.1 is an adaption of ISO 14001 to Greek agriculture, ZEUS KIWI is implementing an Environmental Management System (EMS) which is specific to agriculture, with a strict policy oriented to adherence to legal obligations, to prevention and reduction of GHG emissions and pollutions, and to preserving biodiversity.

**ZEUS KIWI S.A.** environmental concerns and responsibility are expressed through the reduction of use of agrochemicals by means of Integrated Pest Management based on monitoring and continuous scouting through the orchards. They are also demonstrated by participating in local schemes for prevention of pollution through recycling of packaging material.

In fact, **ZEUS KIWI S.A.** actively contributed to formulating the protocol of ICM in these lines with Agrocert, for the Greek Ministry of Agriculture. In addition to the EMS, ZEUS KIWI implements: BRC, ISO 9001:2006, Globalgap, HACCP, and an effective traceability system with the use of bar code method.





## COMPANY INFORMATION

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**ZEUS KIWI S.A.** international presence and exports have always been strategic priority. During the last years, ZEUS KIWI has established a dynamic international presence in more than 18 countries globally.

The exports of the ZEUS KIWI S.A., which has managed to make significant growth steps, account for almost all of its turnover. In particular, its products are exported to 30 countries around the world, with the largest customers being England, the Netherlands, the USA and China. As regards grapes, a total of 80% of the company's production is directed to England. The company is moving towards expansion of its activities on a global scale. Namely, new markets especially third countries are of great interest for the company, as it is necessary to search for new markets in order to open new paths for Greek products and promote ZEUS KIWI S.A. business continuity.

## WHAT MAKES US DIFFERENT

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**ZEUS KIWI S.A.** adds value in local partnerships, making use of its products, equipment, know-how and expertise and contributing to initiatives related to its priorities, including public Health and Safety, education, environment and local infrastructure projects. ZEUS orchards contribute significantly through their operation to viable growth and to the economic and social development of local communities.

## SPECIALIZATION

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The state-of-the-art equipment used at ZEUS KIWI, the highly trained and specialist work force, and the close supervision of production from the field to the retailer guarantee the top quality that even the most demanding of today's consumer rightly expects. We at ZEUS are at the vanguard in every facet of modern production, sorting and packing methods in our ultra modern facility.

Every year ZEUS KIWI invests in updating and training its professional workforce in all new developments relevant to our field of work. By participating in all major seminars and exhibitions in Greece and abroad, our managers have acquired the experience necessary for maintaining the high quality and safety of our products. The close co-operation with Universities, Institutes and Horticultural establishments all over the world enables ZEUS to constantly improve and develop our range of products.



# ZEUS GRAPES FRUIT



## PRODUCT DESCRIPTION

**ZEUS KIWI S.A.** grows seedless grapes of excellent quality, high in nutrients and benefits for human health. Grape plants are the fruit-bearing vines from the genus *Vitis* of the *Vitaceae* family. The edible, sweet and round-shaped part of the plant are what is commonly known as grapes and their color variety ranges from blue, red, and green to pink and amber. They form a rich source of antioxidants (known as polyphenols) and have anti-inflammatory properties. They boost heart health, prevent cancer obesity and constipation, while managing blood pressure levels.

1 cup of grapes (92gr) *	Value	1 cup of grapes (92gr) *	Value
Energy	62.00 kcal	Vitamin K	13.40mcg
Total Fat	0.10 gr	Vitamin A	4.60mcg
Saturated Fatty acids	0.10 gr	Potassium	175.70mg
Trans-unsaturated fatty acids	0.00gr	Phosphorus	9.20mg
Total Carbohydrates	16.00gr	Sodium	1.8mg
Dietary Fibers	1.00gr	Iron	0.30mg
Total Sugars	15.00gr	Calcium	12.90mg
Protein	0.60gr	Vitamin C	3.68mg



For further information, details and/or explanation, please contact [helpdesk@zeuskiwi.gr](mailto:helpdesk@zeuskiwi.gr).

ZEUS GRAPES FRUIT



## CONTENT DECLARATION

Characteristics	Description
Colour	Red or green (color intensity is based on growing conditions)
Shape	Rounded or elongated oval
Texture	Typically, firm and crispy
Taste	Sweet or neutral
Mass	4.0-7.5 gr
General Characteristics	Rich source of Vitamin C and Vitamin K

A pack of delivered grapes contains no material other than the grapes themselves and the packaging material which is considered to be approximately 8% of the gross pack weight, excluding the pallet used. Packaging consists mainly of corrugated cardboard. Some packs are additionally packed individually in paper or plastic holders or in a flow pack.

No substances included in the Candidate List of Substances of Very High Concern 2023 for authorization under the REACH Regulations that exceed 0.1% of the total weight are present in ZEUS Grapes. Also, no additional chemicals are used by ZEUS for post-harvest treatment of grapes.





# LIFE CYCLE ASSESSMENT INFORMATION

## DECLARED UNIT

This EPD uses a declared unit instead of a functional unit as all functional and qualitative aspects are not possible to capture in the same unit. These aspects should be taken into consideration when comparing EPDs.

The declared unit is **one (1) kg of grapes** eaten by the consumer, referring to an average grape product. Packaging material of the delivered grapes is included in the declared unit, but packaging weight is not considered within the 1kg of the declared unit.

*This EPD covers average values and represents an average product, not available for purchase on the market*

## SYSTEM BOUNDARIES

This EPD follows a “**Cradle-to-grave**” approach, meaning that all modules of the full product Life Cycle are taken into consideration and define the framework of the system boundaries. Thus, Life Cycle stages that include Upstream processes (from-cradle-to-gate), Core processes (from-gate-to-gate) and Downstream processes (from-gate-to-grave), are reported.

## REFERENCE PERIOD

This EPD refers to 2022 harvest.

Growing phase: April 2022 – September 2022

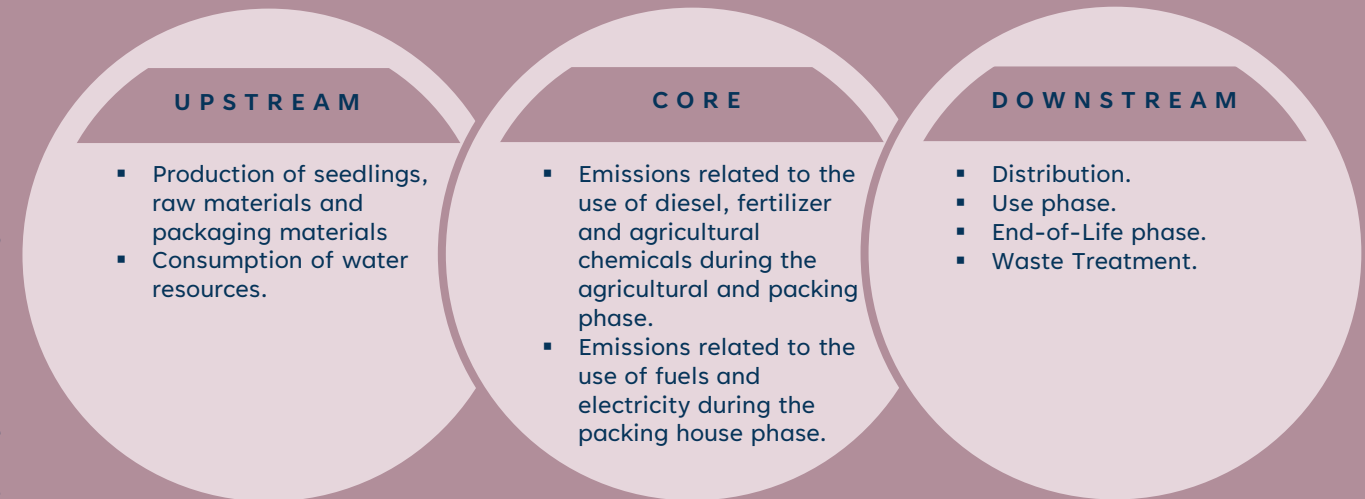
Production - Harvest phase: October 2022 – December 2022

## GEOGRAPHICAL SCOPE

Name – location of production site: ZEUS KIWI S.A. Pieria, Greece

Market: Global

## PHASES OF GRAPES PRODUCTION



### EPD TYPE



Specific, only for ZEUS Grapes

### SOFTWARE



GaBi ts version 10.6.0.110

### DATABASE

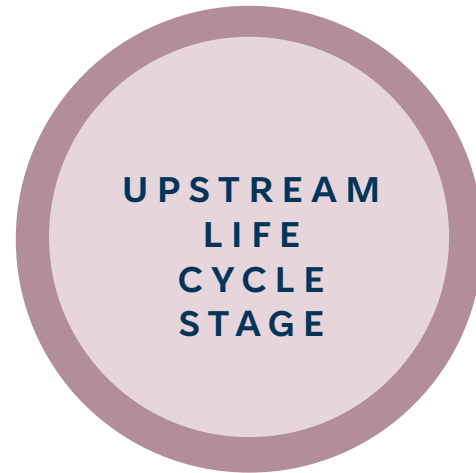


Ecoinvent 3.8 & Sphera Professional 2021





# LIFE CYCLE ASSESSMENT INFORMATION



UPSTREAM  
LIFE  
CYCLE  
STAGE



Grape Seedlings Production



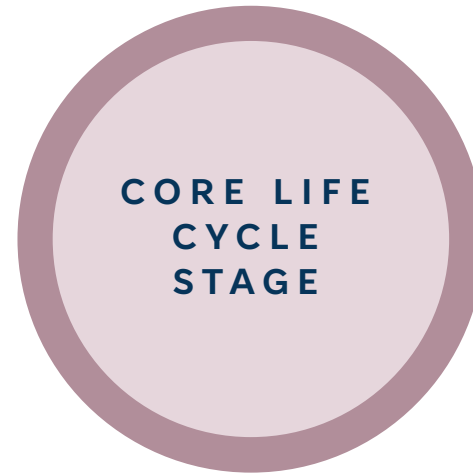
Fertilizers Production



PPP Production



Packaging Materials Production



CORE LIFE  
CYCLE  
STAGE



Transport of fertilizers & PPP



Use of fertilizers & PPP



Pruning, Mowing, Irrigation & Harvesting



Electricity & Fuels Production



Transport of packaging materials



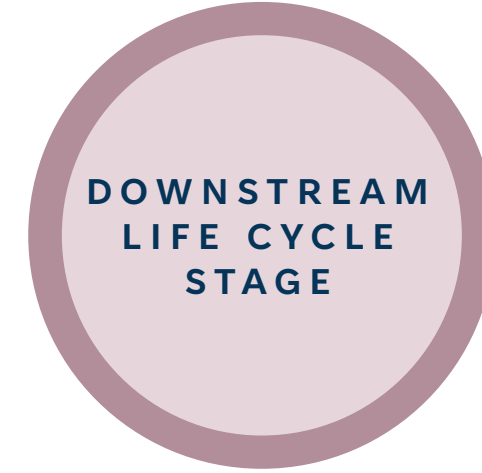
Storage, Cooling and packaging of final products



Transport of grapes from vineyards to the packing house



Treatment of packing house generated waste



DOWNSTREAM  
LIFE CYCLE  
STAGE



Transportation of grapes to retailers



Shelf Life



Consumer use phase



Treatment of packaging waste



Organic waste treatment



# LIFE CYCLE ASSESSMENT INFORMATION

## CUT-OFF CRITERIA

Life Cycle Inventory data for a minimum of 99% of total inflows (mass and energy) to the upstream, core and downstream module are being included. It is assumed that the combined overlooked input streams constitute a fraction significantly lower than 1% of the overall energy and mass. All relevant details for the associated procedures are established and simulated using generic information, supplemented by real data as needed, sourced from the integrated GaBi databases (Professional 2021, Ecoinvent v.3.8). The primary flows not considered in the modeling of the analyzed system are:

- Production of cultivation materials, agricultural tools and insect traps.
- Manufacturing and upkeep of irrigation systems.
- Processes regarding land levelling, soil loosening, ridge formation, transportation of seedlings, and formation of trellis
- Waste management of the empty containers of plant protection products.
- Wastewater treatment post grapes consumption.
- Production of rain and anti-cracking systems will be excluded, since they are considered as capital goods.

## BACKGROUND DATA AND DATA QUALITY

Primary data for all processes was obtained from ZEUS KIWI SA ERP system. Information pertaining to material and energy flows within the specified system was sourced from the organization responsible for EPD development, while data concerning the life cycle impacts was derived from calculations using databases and characterization factors.

The inventory and impact assessment calculations were conducted using GaBi ts version 10.6.0.110 software, utilizing the data input from the constructed model. This process relied on a combination of Ecoinvent v.3.8 and Professional 2021 databases, all of which are no more than a decade old.

The Core Life Cycle stage benefitted from robust data coverage, primarily because a significant portion of the data was meticulously collected through collaborative efforts between ZEUS KIWI S.A. and its affiliated growers.

## ASSUMPTIONS, ALLOCATION, AND APPROXIMATIONS


- Regarding the exclusion of product life cycle stages and processes, the use, end-of-life, and reuse stage have not been accounted for.
- ZEUS KIWI S.A. grapes production and marketing renders no co-products. Thus, there is no need for allocation in this specific process.
- Since vineyards require re-establishment every 25 to 30 years following their initial installation, this LCA study does not encompass the life cycle stage related to vineyard installation.
- The allocation of agricultural machinery operation was distributed to grape production in accordance with its usage in the vineyard. Consequently, the usage of agricultural machinery on other crops was not considered in this allocation.
- No potential repacking at the retailing outlets or grocery stores is occurred.
- Waste from packaging materials (associated with packed grapes, agrochemicals, and fertilizers) will be sorted, shredded, and transported to recycling facilities. As for the waste originating from the inedible parts of grapes, it is treated as biodegradable waste and directed to an incineration plant.
- The use of electricity at the packing house for October and November is allocated according to grapes occupation volumes at the cooling chambers.
- Road transports are carried out by Euro-6 trucks with a total gross weight 12-14 tons and an average payload capacity of 9.3 metric tons, and sea transport employs vessels with an average payload of 3,500 metric tons.
- The distance of waste treatment facilities from the packing house, the vineyard or the retailing store is assumed to be 100km.



# ENVIRONMENTAL PERFORMANCE INDICATORS

## PARAMETERS DESCRIBING THE ENVIRONMENTAL IMPACTS


The following tables display the environmental impact potentials for different parameters, associated with various parameters, including material flows, waste, and other outputs. The results refer to **1 kg of ZEUS KIWI Grapes**.

ENVIRONMENTAL IMPACT CATEGORIES 	IMPACT/ 1 KG ZEUS KIWI GRAPES					
			UPSTREAM	CORE	DOWNSTREAM	TOTAL
Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	0.1952	0.712	0.0136	<b>0.921</b>
	Biogenic	kg CO <sub>2</sub> eq.	-0.0496	8.89E-04	0.0202	<b>-0.0285</b>
	Land use and land transformation	kg CO <sub>2</sub> eq.	6.46E-04	3.54E-04	9.78E-05	<b>0.0011</b>
	<b>TOTAL</b>	kg CO <sub>2</sub> eq.	0.1463	0.7132	0.0339	<b>0.893</b>
Acidification potential (AP)		kg SO <sub>2</sub> eq.	0.00138	0.00367	4.52E-05	<b>0.0051</b>
Eutrophication potential (EP)		kg PO <sub>4</sub> <sup>-3</sup> eq.	2.55E-04	6.46E-06	6.11E-06	<b>2.68E-04</b>
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	6.52E-04	0.0105	2.96E-05	<b>0.00173</b>
Abiotic depletion potential - Elements		kg Sb eq.	6.29E-06	1.03E-07	6.66E-09	<b>6.40E-06</b>
Abiotic depletion potential - Fossil fuels		MJ net calorific value	3.66	8.18	0.287	<b>12.132</b>
Water deprivation potential (WDP)		m <sup>3</sup> eq.	10.309	0.172	0.00436	<b>10.486</b>



# ENVIRONMENTAL PERFORMANCE INDICATORS




USE OF RESOURCES 			IMPACT/ 1 KG ZEUS GRAPES			
			UPSTREAM	CORE	DOWNSTREAM	TOTAL
Primary energy resources - Renewable	Use as energy carrier Used as raw materials	MJ, net calorific value	1.395	3.826	0.042	<b>5.263</b>
	Use as energy carrier Used as raw materials	MJ, net calorific value	-	-	-	-
	<b>TOTAL</b>	MJ, net calorific value	1.395	3.826	0.042	<b>5.263</b>
Primary energy resources - Non-renewable	Use as energy carrier Used as raw materials	MJ, net calorific value	3.653	8.193	0.287	<b>12.133</b>
	Use as energy carrier Used as raw materials	MJ, net calorific value	-	-	-	-
	<b>TOTAL</b>	MJ, net calorific value	3.653	8.193	0.287	<b>12.133</b>
Secondary material		kg	-	-	-	-
Renewable secondary fuels		MJ, net calorific value	-	-	-	-
Net use of fresh water		m <sup>3</sup>	0.24	0.00398	0.042	<b>0.286</b>






# ENVIRONMENTAL PERFORMANCE INDICATORS

WASTE PRODUCTION 		IMPACT/ 1 KG ZEUS GRAPES			
		UPSTREAM	CORE	DOWNSTREAM	TOTAL
Hazardous waste disposed	kg	1.38E-08	7.00E-09	2.76E-11	<b>2.09E-08</b>
Non-hazardous waste disposed	kg	0.0674	0.00393	5.79E-05	<b>0.0714</b>
Radioactive waste disposed	kg	9.56E-06	4.77E-05	1.02E-06	<b>5.83E-05</b>

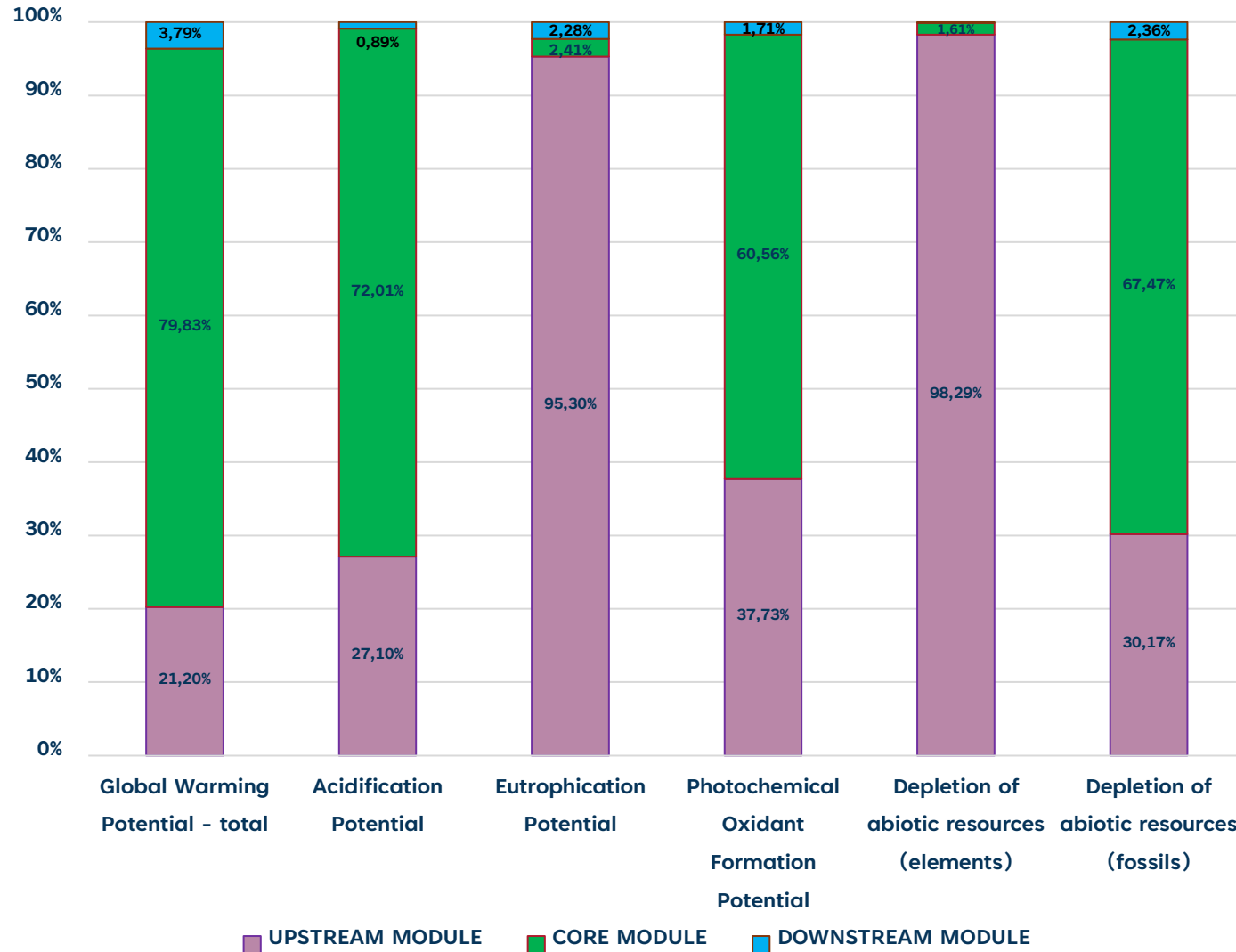
  

OUTPUT FLOWS 					
		UPSTREAM	CORE	DOWNSTREAM	TOTAL
Components for re-use	kg	-	-	-	-
Materials for recycling	kg	-	-	0.027	0.027
Materials for energy recovery	kg	-	-	-	-
Exported energy, electricity	MJ per energy carrier	-	-	-	-
Exported energy, thermal	MJ per energy carrier	-	-	-	-



# INTERPRETATION

**% CHARACTERIZED RESULTS OF GRAPE FRUITS**



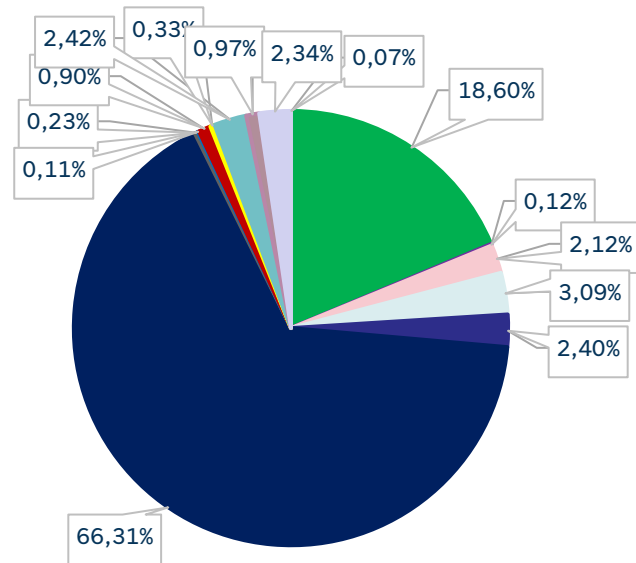
- ❑ Most of the environmental impact categories are primarily influenced by the Core Module, while Eutrophication potential and Depletion of abiotic resources - elements are significantly affected by the Upstream Module. This can be attributed to the production and application of fertilizers and Plant Protection Products (PPP) used in the vineyards where grapes are cultivated.
- ❑ Considering the production of fertilizers and PPP and their use during agricultural phase, Acidification Potential (AP) is mostly influenced the Core Module, which contributes to more than 72% of the total associated emissions. In terms of the remaining modules, the Upstream Module contributes to over 27% of the impact, while Downstream Module influences minimally the total impact indicator (0.89%).
- ❑ A similar pattern is observed in the case of Photochemical Oxidant Formation Potential (POFP). The Upstream Module accounts for 37.73% of the overall impact, while the Core Module remains the primary driver, making a substantial contribution of 60.56%.



# INTERPRETATION

## ZEUS KIWI GRAPES

### PROCESS CONTRIBUTION TO GLOBAL WARMING POTENTIAL - TOTAL



- Grapes Seedlings Production
- Fertilizers Production and Application
- Mowing
- PPP Production
- Packaging Materials Production
- Extraction and usage of water
- Electricity Production
- Heat Production
- Harvesting
- Self Life
- Diesel & Gasoline consumption
- Incineration of organic waste
- Treatment of packaging waste
- Others

- Because the Greek residual electricity mix relies less on renewable sources, the environmental impact of electricity has risen compared to previous years, significantly impacting the formation of various impact categories.
- Electricity production and use contributes to more than 66% of the total emissions associated with the Global Warming Potential.
- Production and application of fertilizers impacts significantly the potential environmental impacts from the production of 1kg ZEUS KIWI grapes, accounting for almost 19% of the Global Warming Potential – total emissions.
- The production of packaging materials has a modest effect on the total Global Warming Potential, contributing to 3.09%, while the impact of all other processes is negligible.





- International EPD® System, General Program Instructions for the International EPD System, version 4
- International EPD® System, PCR Fruits and Nuts 2019:01, version 1.0.2
- International Organization for Standardization (ISO), Environmental labels and declarations – Type III environmental declarations – Principles and procedures. ISO 14025:2006
- International Organization for Standardization (ISO), Environmental management – Life Cycle assessment – Principles and framework. ISO 14040:2006
- International Organization for Standardization (ISO), Environmental management – Life Cycle assessment – Requirements and guidelines. ISO 14044:2006
- The International EPD® System – The International EPD System is a program for type III environmental declarations, maintaining a system to verify and register EPDs as well as keeping a library of EPDs and PCRs in accordance with ISO 14025. [www.environdec.com](http://www.environdec.com)
- EN ISO 14001 – Environmental Management Systems – Requirements
- ISO 14020 – Environmental Labels and Declarations – General Principles
- Sphera – GaBi Product Sustainability software – [www.sphera.com](http://www.sphera.com)
- United Nations Central Product Classification system, version 2.1, CPC Code 0133 – Grapes
- Life Cycle Assessment (LCA) applied to the grapes growing and distribution chain by members in ZEUS KIWI.

