Ref. Ares(2023)8903903 - 29/12/2023

.

HORIZON-WIDERA-2022-ACCESS-04-01

(Excellence Hubs)

"Excellence hub in green technologies: Introducing innovation ecosystems in the Mediterranean food value chain

EXCEL4MED

Report on consumers' acceptance and identification of potential market segments

Deliverable number: D2.1

Version 1.2

Project Acronym:	EXCEL4MED
Project Full Title:	Excellence hub in green technologies: Introducing innovation ecosystems in the Mediterranean food value chain
Call:	HORIZON WIDERA 2023
Topic:	HORIZON-WIDERA-2022-ACCESS-04-01
Type of Action:	HORIZON-CSA
Grant Number:	101087147
Project URL:	https://excel4med.eu/

Editor:	Amalia Altinou, E.K.PI.ZO
Deliverable nature:	Document, Report (R)
Dissemination level:	Public (PU)
Contractual Delivery Date:	31/12/2023
Actual Delivery Date :	29/12/2023
Number of pages:	143
Keywords:	Consumer survey, questionnaire, willingness to pay, novel foods
Authors:	Amalia Altinou, E.K.PI.ZO Aybike Bayraktar, CIHEAM-IAMM Caralampo Fokas, E.K.PI.ZO
Peer review:	Georgios Kleftodimos, CIHEAM-IAMM Emma Cutajar, MAFA Josephine Schembri, MAFA Roufou Styliani, NKUA Vasilis Valdramidis, NKUA

Table of Contents

List of Tables

List of Figures

List of Abbreviations

EU	European Union
GA	Grant Agreement
DoA	Description of Action
WP	Work package
WTP	Willingness to Pay
NKUA	ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON
ELGO - DIMITRA	ELLINIKOS GEORGIKOS ORGANISMOS - DIMITRA
SEVT	SYNDESMOS ELLINIKON VIOMICHANION TROFIMON SOMATEIO
UM	UNIVERSITA TA MALTA
MFLTD	MGARR FARMING CO LTD
MAFA	MINISTRY FOR AGRICULTURE, FISHERIES, AND ANIMAL RIGHTS
TMC	THE MALTA CHAMBER OF COMMERCE AND ENTERPRISE ASSOCIATION
KM	KOPERATTIVI MALTA
CIHEAM-IAMM	CENTRE INTERNATIONAL DE HAUTES ETUDES AGRONOMIQUES MEDITERRANEENNES

Abstract

This report is part of the EXCEL4MED project and its aim is to present the consumers' views on the novel value-added food products being produced with the use of new technologies and the main socio-cultural aspects which determine consumers' choices towards these products. For the completion of the purpose, a consumer survey was conducted simultaneously in Greece, Malta and France during October 2023. The survey results identify the obstacles regarding consumer acceptance of the suggested novel products and will contribute to the assessment on the factors that will affect the development of a common "market-oriented" strategy between Greece, Malta and France, on strengthening the Mediterranean food added-value chains.

The design of the survey has taken place in collaboration between EKPIZO, CIHEAM-IAMM, MAFA, the partners responsible for the implementation of the survey in the three aforementioned countries. In this context, several meetings between the project partners took place online and in person, feedback was collected from consumers and stakeholders who participated in the living labs that were conducted in Malta and Greece, until we reached the final draft of the consumer survey questionnaire. The report provides a summary of the steps followed to design the survey, the methodology used, as well as the main conclusions that emerged from the data analysis.

Consumers in all three countries highly valued food to be "natural" local and healthy, especially so in Greece. Generally, consumers were not enthused by the prospect of enriching their foods with additives. Yet the survey results show that in all three countries, there is a significant interest in trying out new food products. Nonetheless, they were generally not willing to pay extra for such enhancements.

Introduction

Food waste has become a big global challenge and along with the climate change dominates public discourse. Every day, huge amounts of food waste are produced. The European Union alone is estimated to have wasted 58,512,559 tons of food (Eurostat 2020 data). According to the UN Food and Agriculture Organization (FAO), "about one third of all food produced around the globe is lost or wasted at some point in the food supply chain" (*Reducing food loss and food waste,* European Council, Council of the European Union, 2023/10/2).

Taking these challenges in mind, and in the context of the fight against food waste and climate change, EXCEL4MED aims to valorise food industrial side-streams that would otherwise end up in landfills and produce nutritious food products. In the spirit of circular economy, the Excel4med project will promote "the transition to a sustainable fruit supply value chain in the eastern Mediterranean that will create a positive environmental impact, reverse the loss of biodiversity, ensure food security and nutrition while preserving affordability" (DoA, p. 2).

1. The EXCEL4MED project

The EXCEL4MED project, funded by the EU, "aims to strengthen innovation ecosystems in the Mediterranean region's agricultural sector. It focuses on producing nutritious food products and maximizing the use of food industrial by-products. The project aims to foster collaboration between Greece, Malta, and France to enhance the region's food value chains and to create an Excellence Hub in Mediterranean fruit supply chains. Ultimately, the goal is to promote sustainable growth in the Mediterranean agricultural industry" (*The Project*, Excel4med, 2023) and to "support the development of the food industry addressing current needs on sustainability, resilient food supply chain under climate change and pandemic crisis" (*Specific Objectives*, Excel4med, 2023).

EXCEL4MED is a research programme that will create three separate ecosystems: a) green extraction process of pomegranate and citrus seed oil for improved fatty acid and bioactive profile, b) green technologies for juice sugar breakdown conversion, c) green valorisation technologies of side-stream by-products and industrial effluents.

EXCEL4MED "aims to bring consumers the fruits of their desire, by creating a sustainable, efficient and resilient supply chain that can adapt to various challenges. The project is designed to foster collaboration and knowledge management between various stakeholders and to establish an Excellence hub, that will provide a platform that can showcase the best practices of sourcing, processing and delivering Mediterranean fruits. Working closely with policymakers and industry leaders, it aims to create a platform that fosters innovation, excellence, and resilience" (*About Us,* Excel4med, 2023).

2. WP2/Task 2.1: Assessment on the factors that are essential towards the development of a "market-oriented" strategy

The purpose of this task, as declared at the DoA of the project's grant agreement, is to investigate the consumers' view of Mediterranean functional value-added products and identify the main socio-cultural aspects which determine consumers' choices towards these products. The knowledge gained will feed in better and locally adapted investment decisions for the project's new food products. Specifically, the scope of the survey is to assess consumers' acceptance and the consumers' willingness to purchase agricultural products and foodstuff being produced, and their willingness to pay a premium for them. Furthermore, the outcomes of the survey can be used for the identification of the barriers, consumer resistance, negative consumer perceptions and of ways to overcome them.

For the achievement of this purpose, a consumer survey was conducted, aimed to investigate consumers' acceptance on the novel food products being produce by the extraction – with the use of novel green technologies – of the antioxidant and other bioactive compounds present in the residues from citrus fruits and pomegranates (such as in the seeds and peels) and their incorporation into new food products such as juices, cheese, smoothies, making the latter more nutritious and health beneficial.

The survey was carried out in Greece, Malta and France with the aim to gauge the perspectives of the public regarding the proposed green technologies that aim to valorise food waste products. A questionnaire was constructed based on consumer behaviour models using quantitative and qualitative research methods and it was also influenced by the outcomes of the living labs (Task 6.3). The purpose of the living labs of Task 6.3 in Greece and Malta were to involve and promote better stakeholder understanding of ecosystems, their role and the proposed added value food innovations.

The survey provides valuable insights into consumer preferences and expectations for the project partners and possible key stakeholders.

This report provides a summary of the outcomes of the consumer survey. It is based on a descriptive analysis of the data collected including an in-depth look at consumers' acceptance and their willingness to pay for the new proposed food products.

Consumer Survey Methodology

The research methodology followed for the design of the consumer survey has utilized a combination of quantitative and qualitative research techniques. Mainly, it is a quantitative methodology that was implemented with qualitative research tools used to inform and gain a more in-depth understanding. This combination was chosen in order to achieve a double goal: to gather information from a large and representative sample of citizens in all participating countries and also to ensure that the questions addressed to consumers would be clearly understood. In this context, the main information about consumers' acceptance and consumers' willingness to purchase agricultural products and foodstuff being produced, were gathered through an online questionnaire in Greece and France and by telephone survey in Malta. In order to achieve a better understanding to what extent consumers understand the questions of the questionnaire and the novel food products being produced and also the possible changes and adjustments that would need to be made, qualitative research tools were used before the main survey was carried out. These were based on utilising focus groups in the case of Greece and France and a pilot survey by telephone in the case of Malta.

For the purpose of this research, the partners from Greece and France involved in the Task 2.1, agreed to conduct an online survey in both countries and partners from Malta to proceed with a telephone survey, as the latter was deemed to be a more suitable method for the socio-cultural conditions of the country. The data collected in all three countries were anonymous and a statement of anonymity and protection of personal data was made to the survey participants and a declaration that their personal data would be used only for the purposes of this research.

The construction of the questionnaire was influenced by consumer behaviour models and a willingness to pay component for the innovative products the project is proposing. The questions were prepared using elements requested by the project partners, a mix of the theory of planned behaviour, environmentally friendly purchase behaviour and health belief models, as well as willingness to pay theory.

The theory of planned behaviour (TPB) model was used to identify the external stimuli and internal consumers´ motives influencing the purchase of novel food products. Health belief model (HBM) was used to determine consumers' intentions and perceptions of the health effects of novel food products. The environmental purchase behaviour model (ECPB) was used to understand the relationship between environmental attitudes and behaviours with preferred green technologies products. In addition, demographic and socioeconomic factors such as age, gender, nationality, and culture related to origin, education and income should be considered.

The theory of planned behaviour (TPB) is a commonly used theory to better understand human behaviour. The TPB was proposed by Ajzen. The theory of planned behaviour suggests that behaviour is based on a rational decision-making process guided by a set of beliefs about the specific behaviour in question (Ajzen, 1991). According to this theory, attitude towards behaviour, subjective norm, and perceived behavioural control are three factors that determine the intention to perform a behaviour (Clement et al., 2014; Madden et al., 1992). According to the Environmentally Conscious Purchase Behaviour and juice consumption (ECPB) theory, personal and social norms play an active role in an individual's purchasing of environmental products (Vermeir & Verbeke, 2008; Goldsmith & Goldsmith, 2011). The consumer sustainability orientation defines the value consumers place on sustainability; perceived availability, on the other hand, indicates whether consumers' feelings for the obtain of eco-friendly products (Vermeir & Verbeke, 2008; Roth & Robert, 2013). Health Belief Models (HBM) have been proposed by social scientists at the US Public Health Service to understand and better predict health behaviours by focusing on the attitudes and beliefs of people (Sheeran, 2001). Individual beliefs about health conditions are the key element of this model.

Willingness to pay (WTP), is an approach used in surveys to “forecast consumer behaviour in response to different prices” (Breidert, Hahsler, Reutterer, 2006:13) and played a significant role in the design of the questionnaire. In particular, the willingness to pay questions have been drafted based on a measurement approach, according to which the consumers “are presented product profiles with systematically varied prices and are asked to indicate whether they would purchase the good at that price or not” (Breidert, Hahsler, Reutterer, 2006:15). In our case, the participants of the consumer survey were presented the three novel food products being proposed in EXCEL4MED (smoothies, cheese in brine, juices) with varied prices and asked to indicate whether they would be willing to pay a premium to purchase them and at what price.

In Greece and France, the questionnaire survey was on-line and in the case of Malta a telephone survey was conducted using random quota sampling based on gender, age and district. The Greek and French questionnaire survey went online between 9 of October 2023 and 12 of November 2023. The Maltese telephone survey was also undertaken during the same time period.

1. The consumer questionnaire construction

The starting point in the process of the consumer questionnaire construction was the identification of the need to have a common understanding between the project partners of the research question and start forming the questions based on what the partners would most like to know from consumers. What would be the most important for them to know and in what way the outcomes of the survey would be able to assist the future work of the project.

The partners' and stakeholders' considerations were partly obtained through the project's initial living labs (Task 2.3 Innovation-oriented Living Labs and Task 6.3 Living labs for citizen engagement).

In the next stage, it was tested in the focus groups carried out in Greece and France and in the pilot telephone survey in Malta. The outcomes obtained from this pre-survey, were very important for the better design and formulation of the questions, taking into account the weaknesses, the comprehensibility of the questions and the consumers' suggestions. The final version of the questionnaire was created by the beginning of October 2023.

Once all the feedback was obtained, the first draft of the questionnaire was constructed, by evaluating, prioritising and finally choosing the questions that had arisen up to that point. An initial draft of the questionnaire was circulated to the partners involved in the consumer survey. Through iterations of changes and adjustments the final first full draft of the questionnaire was formed, which was translated in all three languages of the countries where the survey is being implemented, i.e., Greek, French and Maltese.

1.1 Feedback from the living labs in Malta and Greece

As task leader, EKPIZO, participated as an observer in the living labs that took place in Malta on 4 May 2023 (Task 2.3 Innovation-oriented Living Labs) and 5 May 2023 (Task 6.3 Living labs for citizen engagement), as well as in the living lab held in Greece on the 4th of July 2023. The aim was to gather feedback from the stakeholders and the consumers that attended the living labs and to draw some conclusions that would be used for the design of the questionnaire.

Through a vivid conversation and the exchange of views, the participants contributed with their ideas and concerns to the discussion, as regards the type of the new products expected to be produced. They expressed their opinions on whether the new proposed technologies can improve their diet and help protect the environment and in what way.

The main issues that came out from these living labs that were of concern in designing a consumers' questionnaire, were:

- Consumers' reservations regarding the nutritional value of the final products
- Reservations on the nutritional value of fruit juices
- An incomplete understanding of the novel food products that have been proposed
- Environmental considerations with the use of new food technologies
- Food safety was considered to be paramount in creating a new food product
- The cost of the new products (both to producers and to consumers)
- In Malta there may be a problem both on the agricultural side as well as the industrial side in producing these products
- A marketing campaign would be required to inform consumers of the value of the new products
- Consumers preference on the type of products being produced with the use of new food technologies
- Consumers' willingness to pay a premium to purchase the novel products and how much extra they would be willing to pay
- Concerns regarding the financial ability of small-scale producers to invest in the new technologies

As can be seen from the above, the issues that were raised were varied. Nonetheless, they largely informed what was included in the consumers' questionnaire, even if not all the points mentioned were incorporated.

1.2 Input from the Project partners

Furthermore, EKPIZO held one-to-one meetings with all the project partners and proceeded with a brainstorming of possible questions for the consumer questionnaire. The meetings were held between 2 and 5 of May 2023 in Malta and in Greece between 10 and 24 of July 2023. These meetings also played a significant role for EKPIZO as task leader, to clarify the kind of products being produced, to bridge the gap between the different fields of knowledge and consequently, to be able to design targeted questions based on the project's needs. In addition, the participation of EKPIZO at the living labs in Malta and Athens of task 6.3 was considered necessary in gathering the feedback from the interaction between the participants consumers, stakeholders and project partners and incorporate it into the questionnaire.

The main outcomes and the questions that emerged from the aforementioned meetings with the project partners are the following:

- The investigation of consumer behaviour, lifestyle, interest in protecting the environment through their consumption choices had been the basis of the discussion with all partners and a key element they would like to be investigated through the questionnaire. What do they perceive as an important nutritional aspect in the food they consume and what are the main selection criteria of the products they buy.
- How important is the quality/nutrition of a product, the taste, the prospect of a healthier option with fewer preservatives and how willing they would be purchasing a more nutritious and greener food product and how much extra they would be willing to pay for it. Also, the degree of consumer confidence in the application of new, green technologies in the food production process and if

they would trust to consume a food product that has been processed with the use of new technologies.

- Concluding, the survey should investigate the consumers views on a possible increase in the selling price of a food product that has been processed with the use of new technologies to make it healthier (e.g., reduced sugars, addition of bioactive ingredients) and whether this would constitute a negative factor for its purchase and their preference on the type of novel product being produced. Would they prefer to buy smoothies or white cheese in brine enriched with antioxidants extracted from the peel and seeds of citrus fruits and pomegranates without the use of chemicals, or orange/pomegranate juice of reduced sugars.

A full listing of the questions raised by partners can be seen in Annex 4.

1.3 Focus groups

Following the completion of the living labs in Malta and Greece and the meetings between EKPIZO and the project partners and living labs, EKPIZO proceeded with the selection of questions for the questionnaire. This initial questionnaire, was tested in focus groups in France and Greece and through a pilot telephone survey in Malta in early September 2023.

The number of consumers that were called to participate in the focus groups had been decided to be no more than 7-8 people, as a larger group would limit the depth and detail of some responses because participants would have to share time and consequently, there would probably be participants who would not have the chance to express their opinion.

Based on the feedback gathered, the questionnaire was revised and many of the questions initially included had to be rephrased, others were excluded and others were added. In addition, many online meetings with the partners involved in the task 2.1 were carried out and revisions of the drafts were made before the finalisation of the questionnaire and the implementation of the survey.

The participants from both focus groups mentioned that reformulation of some questions was needed in order to be more comprehensible for consumers. When terms like naturalness of foods, or novel technologies and novel products were mentioned, consumers needed clarification as there was no clear definition in their minds, thus, they stated that more understandable expressions should be used. Another thing that emerged was whether innovation is attractive enough to purchase a product. Consumers generally assume that a novel food product does not contain harmful chemicals and is environmentally friendly.

The participants of the French focus group asked for clarifications regarding the types of fruit juices mentioned in the questionnaire (like concentrated juice, pure juice, nectar, etc.). Also, they mentioned that there should be given definitions of “smoothie” and “cheese in brine”. Furthermore, they stated that when talking about reduced sugar fruit juice, it is necessary for them to know of the exact method and type of fruit juice. For example, is the juice of reduced sugars, or is it juice without any added ingredients? They also suggested that indicating the motivation for purchasing the new product at a higher price in the survey is important. In the questions asking socio-demographic characteristics, they stated that the question of education level should be arranged according to the national education system. Finally, they stated that they would prefer to have a text at the beginning of the survey stating the purpose of this project, its partners and the purpose of this survey.

The first topic raised in the Greek focus group was the lack of understanding of the terms “novel products”, “novel technologies” and “processed food”. They proposed explanations to be incorporated defining these notions in the questionnaire. In addition, the term “antioxidants” used in some questions was also not familiar to some participants and needed clarification. Additionally, explanations were sought for the terms “traditional” food, “natural” products and “environmentally friendly” food products, although these terms were more familiar to the consumers.

As for the willingness to pay questions, the participants noted that they should be reformulated in order to be clearer whether the prices corresponded to the new product being produced or to the one being in the market now. Another issue raised in the Greek focus group regarded the term “natural” and the confusion the term provoked, as the majority of the participants didn’t identify as “natural” juices the ones being sold at super markets. The term triggered a discussion about marketing practices for the promotion of products presenting them as natural and relatively healthy, thus it was suggested that the explanation "without additives" should be added.

In Malta a pilot survey was conducted by telephone. A pilot sample of 40 individuals was selected and minor issues were reported to the whole group of partners. The participants did not face any problem in fully understanding the questions.

1.4 Liaison with project partners

A total of 5 consecutive drafts of the questionnaire were produced before settling on the final version. The drafts were circulated amongst all task 2.1 partners for final comments, suggestions and changes.

The main discussion points raised by partners during revisions of the questionnaire drafts, had been the length of the questionnaire (number of questions), the challenge to keep it simple and easy to understand by consumers so that a representative sample could be reached and on the other hand, the need to get as much information as possible regarding consumer behaviour models and willingness to pay models.

The partners from France (CIHEAM-IAMM) also provided a significant number of questions based on a mix of the “theory of planned behaviour (TPB)”, “health belief model (HBM)”, and “environmentally conscious purchase behaviour (ECPB),” models. These models, together with demographic and socioeconomic factors, played a crucial role in the designing of the questionnaire and the questions included in it.

EKPIZO and MAFA also had separate meetings with the contracted service provider for the survey in Malta, Dr. Vincent Marmara to discuss the survey questionnaire, the methodology that would be used, the sample size, and the timeframe of its implementation in Malta, as the Maltese version of the questionnaire survey followed a different form from the other countries, being a CATI (computer aided telephone interview) survey. It was deemed by the local partners in Malta, that this form would yield a better and guaranteed response rate.

A final version of the questionnaire was decided upon in early October 2023 and, after having it translated in Greek, French and Maltese, the survey in all three countries went live. In Greece and France, it was carried out online using Google Forms and in Malta a telephone survey was conducted. The survey started on the 9th of October 2023 and ended on the 12th of November 2023.

1.5 Sampling

Two different sampling methods were chosen. For the Greek and French surveys, a simple random sampling was used (in a simple random sampling method, individuals are chosen randomly, giving each population member an equal chance of being selected) $\frac{(Nt^2\, p\, q)}{d^2\,(N-1)+(t^2-p\, q)}$ (Yamane, 1967).

For the Maltese questionnaire which was conducted via computer aided telephone survey (CATI) method, a stratified sample was used (in the stratified sampling technique, a population is divided into subgroups based on shared characteristics (e.g., gender, age, race etc.) $n = \frac{N \sum N_h S_h^2}{N^2 D^2 + \sum N_h\, S_h^2}$, $D^2 = \frac{e^2}{t^2}$ (Yamane, 1967). In the Maltese survey the sample was stratified based on age and gender with a level of confidence of 95% (confidence interval: +/- 4%).

The total valid responses collected in the case of the Greek questionnaire were 730, for France 511 and 600 for Malta.

Survey Analysis

The achieved sample of the online surveys in Greece and France was compared to the population through the socio-demographic data that was collected. In Malta, the achieved sample was considered largely representative of the population as a whole. In Greece there was an overrepresentation of higher educated persons (see Annex 1). Thus, the analysed data was weighted to overcome this bias.

The following is a partial analysis of the most significant results of the questionnaire survey. The data is available for further analysis of required by the project partners.

1. Descriptive statistics

For the descriptive analysis of the questionnaire data a mixture of crosstabulation and analysis of variance was used.

1.1 Purchasing behaviour

The respondents were asked to rank how they value food in terms of naturalness, impact on the environment, impact on health, the adherence to traditional methods of production and preparation, with addition of vitamins and with the addition of other additives.

The respondents were provided with the following statements regarding food attributes (table 2) and were required to indicate how much they value them on a scale from 1 to 5, with 1 being “not at all”, and 5 being “very much”.

Table 1. Purchasing behaviour – values given to different characteristics

"How would you rate the following (on a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much'? When I buy food, I am a person who values"

Rate	Greece	Malta	France
	%	%	%
Naturalness			
(blank)	3	0	0
5	54	35	35
4	20	27	22
3	13	25	20
2	6	6	15
1	4	7	8
Total	**100**	**100**	**100**
Food with added vitamins			
(blank)	6	0	0
5	13	19	20
4	18	24	25
3	24	25	25
2	21	11	13
1	19	21	17
Total	**100**	**100**	**100**
Other additives used in foods			
(blank)	6	0	0
5	6	21	22
4	7	23	19
3	13	24	16
2	20	13	20
1	48	20	23
Total	**100**	**100**	**100**
Traditional foods			
(blank)	4	0	1
5	42	42	25
4	19	25	26
3	22	21	26
2	6	7	13
1	7	5	9
Total	**100**	**100**	**100**

Rate	Greece	Malta	France
	%	%	%
Environmental Protection			
(blank)	4	0	1
5	46	22	25
4	21	22	23
3	16	33	27
2	9	9	14
1	4	14	10
Total	**100**	**100**	**100**
Health benefits			
(blank)	4	0	1
5	74	56	42
4	11	26	28
3	7	13	18
2	3	2	7
1	2	3	4
Total	**100**	**100**	**100**
Taste			
(blank)	7	0	0
5	51	75	57
4	23	15	19
3	14	9	13
2	4	0	4
1	1	1	7
Total	**100**	**100**	**100**
Locally produced			
(blank)	3	0	1
5	74	47	28
4	11	24	28
3	7	20	17
2	3	5	14
1	2	3	12
Total	**100**	**100**	**100**

Question 1 of the questionnaire

Overall, in all three countries consumers highly valued food to be “natural”, especially so in Greece. In all three countries over half of respondents placed a value of 4 or 5 for the naturalness of food they would consume. It thus follows that they would also value highly “traditional” foods. Again, in all three countries over half of respondents placed a value of 4 or 5 for traditional foods. In conjunction with naturalness and tradition also follows that most consumers support food being locally produced, especially so in Greece.

Consumers were generally more supportive of traditional foods, which are seen as more natural. This is also reflected when they placed values on taste and health benefits. Overall, the majority of respondents rated 4 or 5 health and taste as important factors in foodstuff. Greeks in particular rated health as an important consideration, whilst the Maltese rated taste as paramount.

So, when asked to value if they would support additives in foods, it is unexpected that there would at least be a lukewarm attitude. The majority of Greek consumers gave a value of 2 or less for the enrichment of foods with additives, whilst in Malta and France consumers were evenly spread amongst supporters and detractors. When specifically asked about the insertion of added vitamins to foods there was only a very slight shift towards a more favourable position, with Greeks abandoning their strong resistance to additives.

Last, when asked about foods that would benefit the environment, there was a generally positive feeling with Greeks coming out as strongly supportive of such food products.

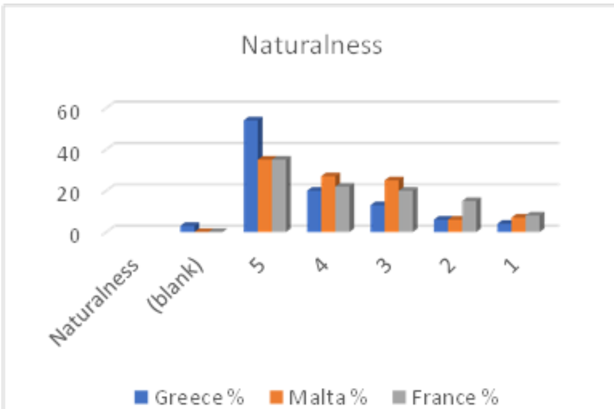


Figure 1. Purchasing behaviour – value given to naturalness of foods

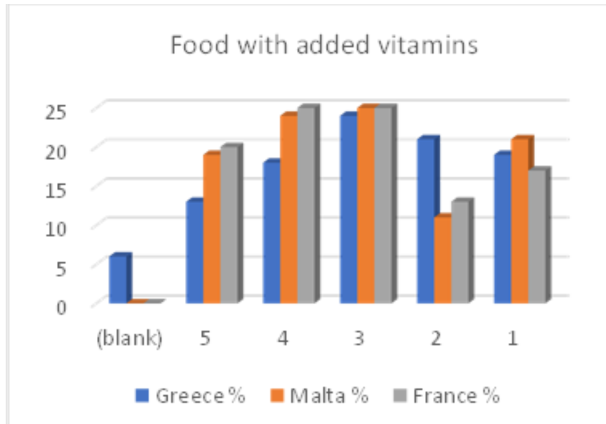


Figure 2. Purchasing behaviour – value given to food with added vitamins

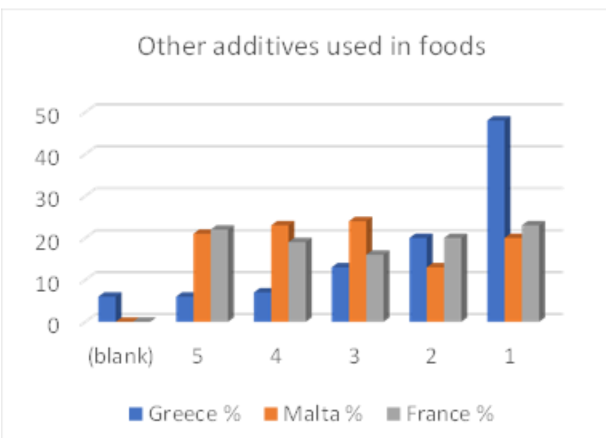


Figure 3. Purchasing behaviour – value given to other additives used in foods

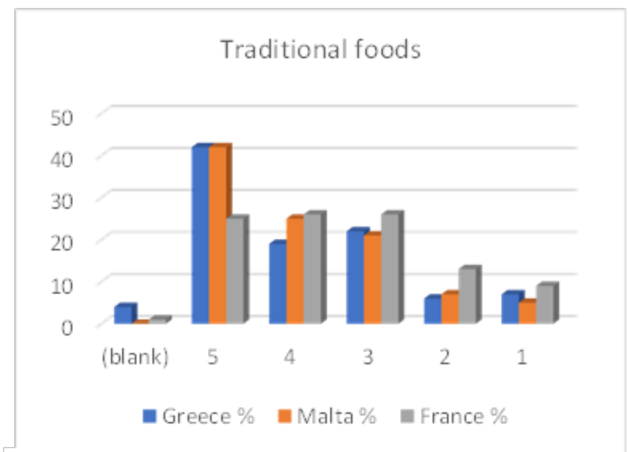


Figure 4. Purchasing behaviour – value given to traditional foods

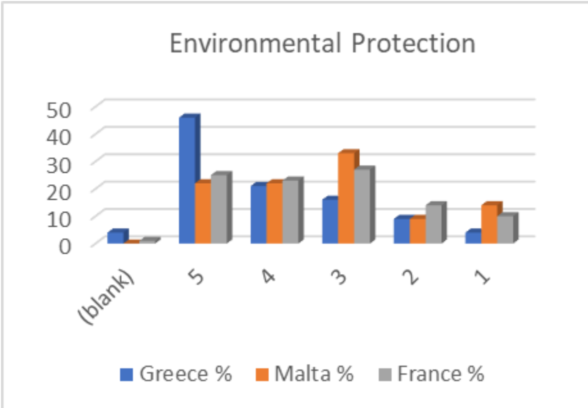


Figure 5. Purchasing behaviour – value given to environmental protection

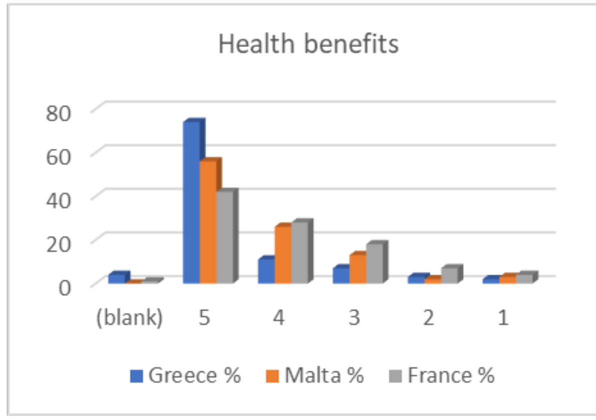


Figure 6. Purchasing behaviour – value given to health benefits

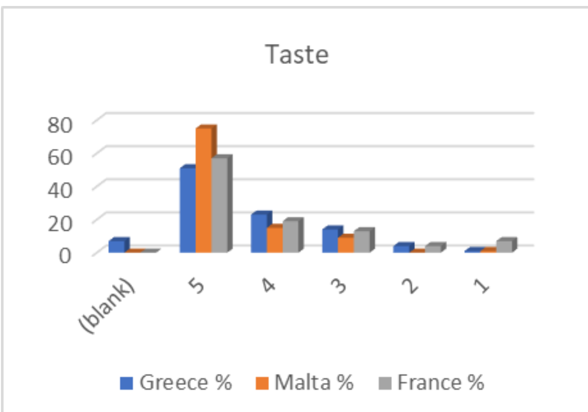


Figure 7. Purchasing behaviour – value given to taste

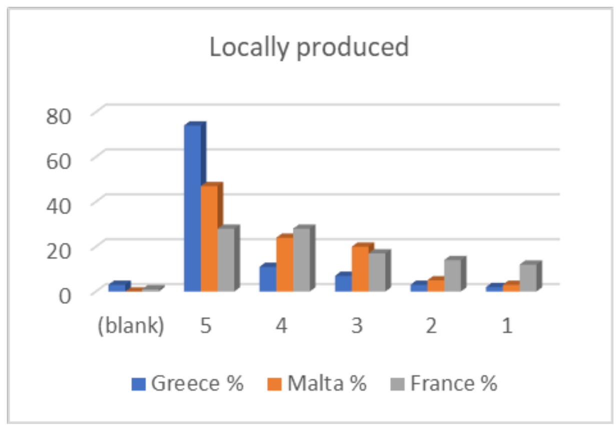


Figure 8. Purchasing behaviour – value given to foods locally produced

The survey participants were also asked if they read the labels of ingredients of the food products when buying. The responses are presented in the following table.

Table 2. Reading the labels of ingredients of the food products

Question 2 of the questionnaire: "Do you read the labels of ingredients of the food products?"

	Greece	**Malta**	**France**
	%	**%**	**%**
Always	21	26	20
Most of the time	44	24	30
Sometimes	27	34	34
Rarely	8	17	10

Never	0	17	6
Total	**100**	**100**	**100**

Question 2 of the questionnaire

The majority of consumers claim to read food labels before purchasing packaged food products.

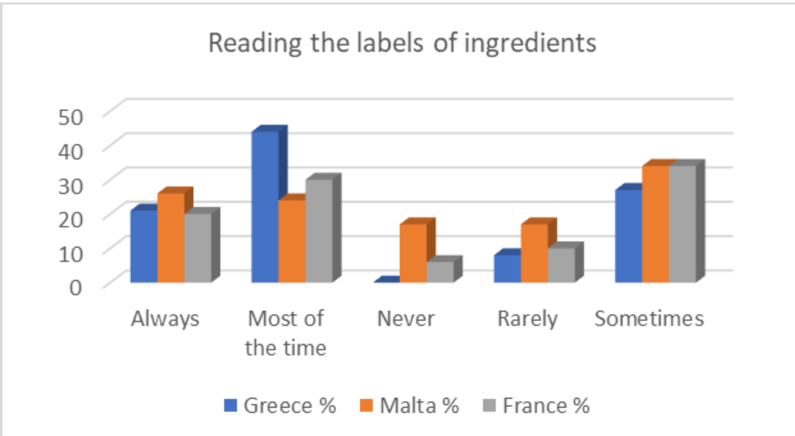


Figure 9. Reading the labels of ingredients

Table 3. Frequency of consumption of natural fruit juices, smoothies, cheese in brine

"How often do you consume packaged 'natural fruit juices', 'cheese in brine' and 'smoothies'?"

	Greece	Malta	France
	%	%	%
Packaged natural fruit juices			
More than 1 glass per day	2	1	6
1 glass per day	5	7	8
2 to 6 glasses per week	17	14	19
1 glass per week	20	16	25
Less than 1 glass per	34	18	27
Never	22	44	15
Total	**100**	**100**	**100**
Smoothies			
More than 1 per day	0	0	5
1 per day	2	3	9
1 per week	10	12	16
2 to 6 per week	3	11	9
Less than 1 per month	38	20	34
Never	47	54	27
Total	**100**	**100**	**100**
Cheese in brine			
One or more times a day	0	0	9
Once per week	13	11	21
Two to six times per week	2	2	19
Less than once per month	28	14	25
Never	56	73	25
(blank)	1	0	1
Total	**100**	**100**	**100**

Questions 5, 6 & 7 of the questionnaire

The food products that this project focuses on are fruit juices, smoothies, cheese in brine, and is envisaged that in these will be the focus of our innovative processes. Consumers were questioned on the level of consumption of these three products.

In Greece and Malta respondents largely do not consume packaged fruit juices with most responding that they consume 1 glass or less per month. In Malta 44% claimed to never consume packaged fruit juices. In France instead, fruit juices are more popular with 58% asserting that they consume at least one glass per week. It is important to bear in mind that the question was regarding only packaged fruit juices and not freshly squeezed juices, which may be more popular in places such as Greece, whereas we have seen above, the value given to naturalness of food scores very high.

Smoothies are not at present popular with consumers. In Greece and Malta about half never consume them and the majority of respondents in all three countries consume them once a month or less. The same can be said for white cheese in brine, excluding feta. 73% of Maltese consumers never consume such cheese. In Greece most consumers do not consume this cheese, whilst in France it is a quarter with a further quarter consuming it sparingly.

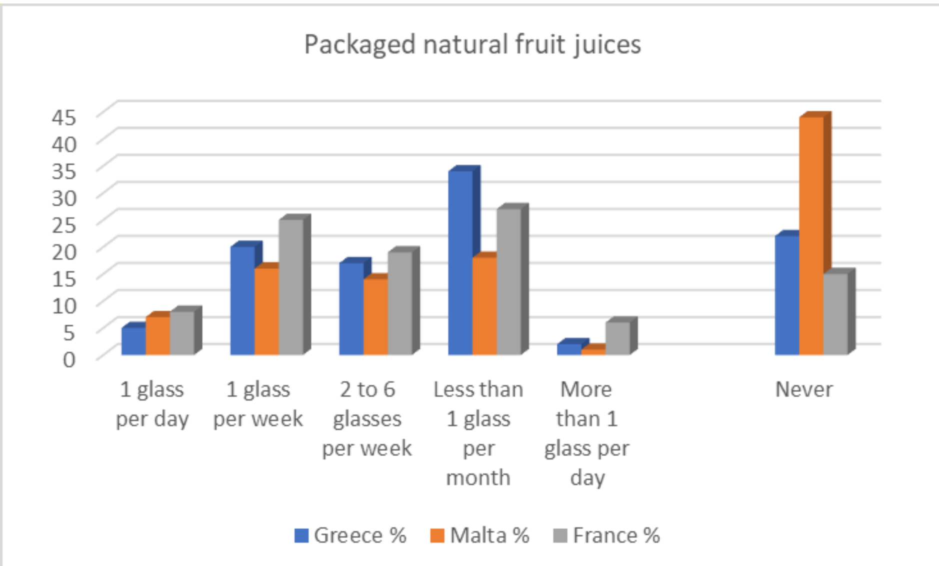


Figure 10. Frequency of consumption packaged natural fruit juices

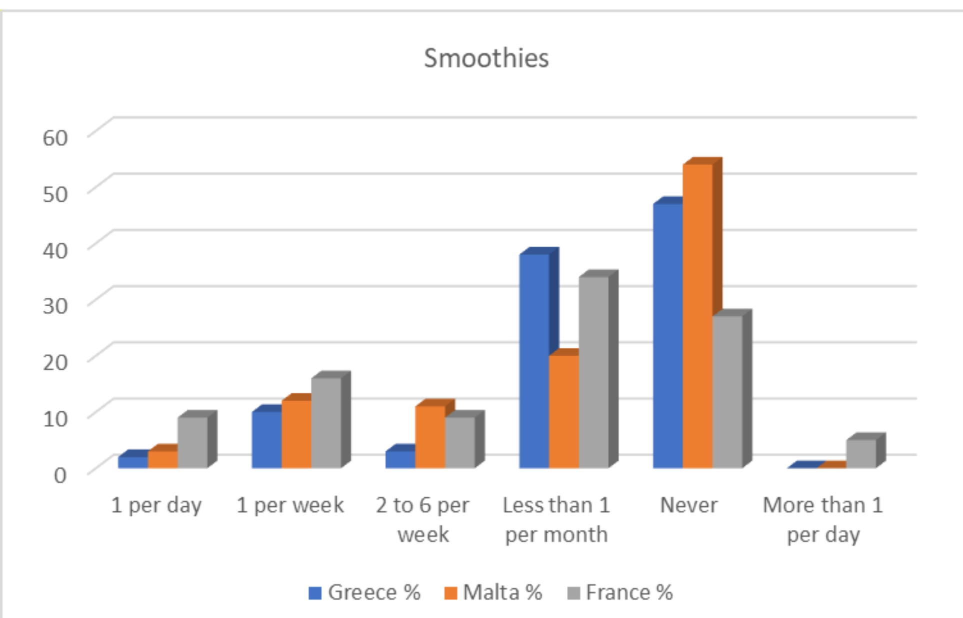


Figure 11. Frequency of consumption of smoothies

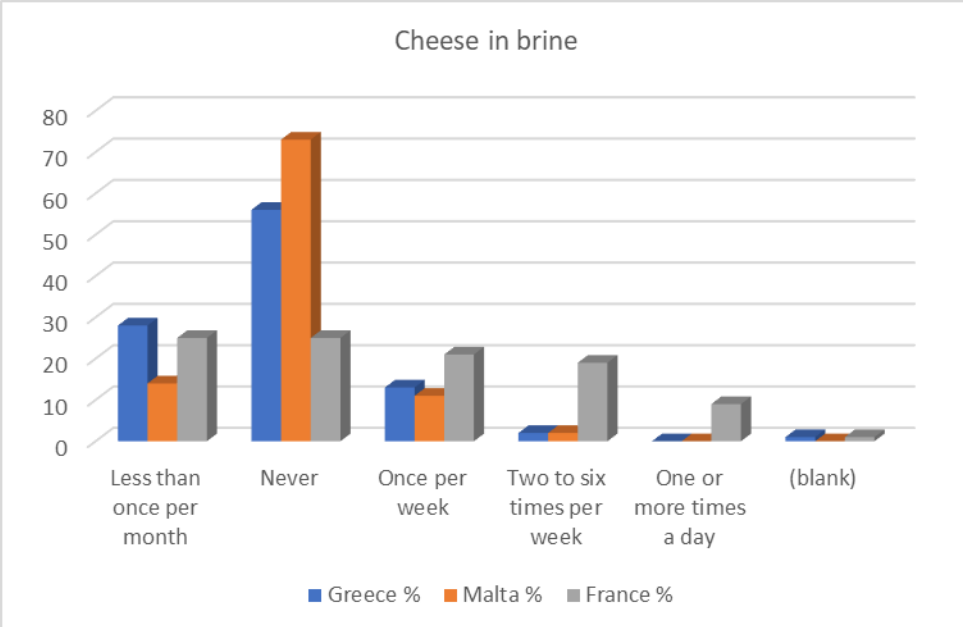


Figure 12. Frequency of consumption of cheese in brine

Table 4. Willingness to try novel products

"How willing would you be to try a novel food product? (on a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much')"

Rate	**Greece**	**Malta**	**France**
	%	**%**	**%**
5	16	20	23
4	31	27	36
3	29	29	27
2	11	13	9
1	12	11	5
Total	**100**	**100**	**100**

Question 3 of the questionnaire

The survey results in all three countries, indicate a reasonable interest among respondents in experimenting with new products with only a small proportion indicating that they would not be at all interested trying out new foodstuff.

Thus, although consumers in the three countries concerned, and particularly so in Greece, in their patterns of consumption are characterised by traditional, natural and local foods, nonetheless, they would be prepared to try out new products.

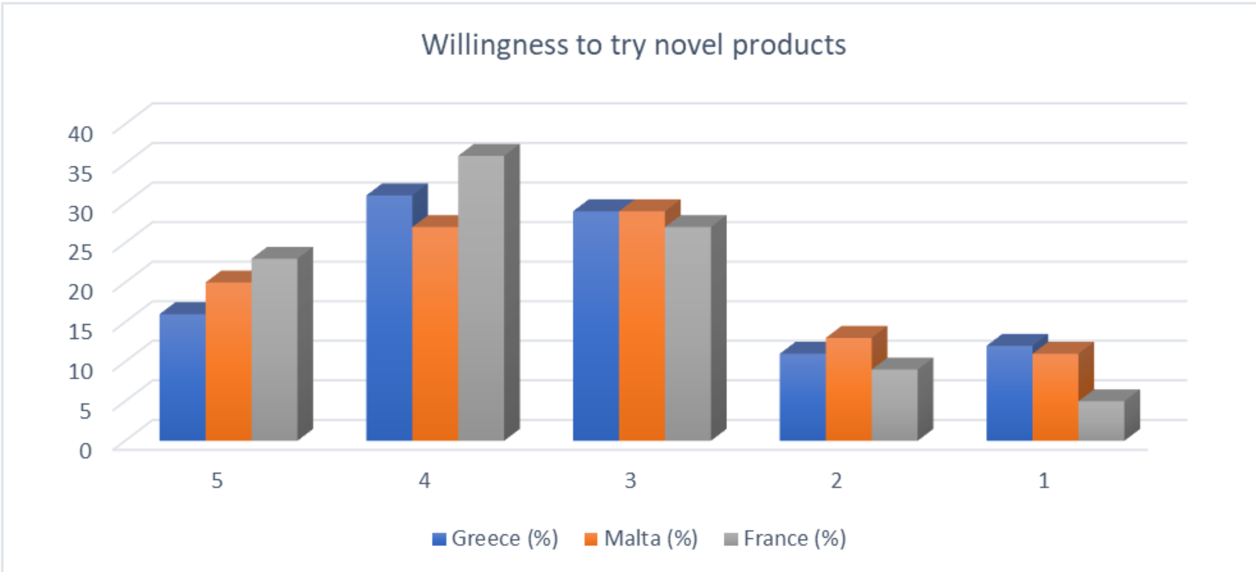


Figure 13. Willingness to try novel products

Table 5. Willingness to buy novel products

How willing would you be to purchase the following items (smoothies, cheese in brine and juices of reduced sugars) for yourself and/or your household? - where 1 signifies 'not at all' and 5 denotes 'very much'.

Rate	Greece	Malta	France
	%	%	%
Juice			
5	35	28	28
4	34	21	26
3	17	23	24
2	6	8	13
1	8	20	9
Total	**100**	**100**	**100**
Smoothies			
5	17	23	23
4	28	22	25
3	23	17	26
2	16	12	14
1	16	25	12
Total	**100**	**100**	**100**
Cheese in brine			
5	13	8	23
4	17	9	24
3	30	15	32
2	20	13	12
1	20	55	9
Total	**100**	**100**	**100**

Question 14 of the questionnaire

The above table is for those that answered positively to question 13 of the questionnaire, that would be willing to buy novel foods enriched with antioxidants extracted from the peel and seeds of citrus fruits and pomegranates without the use of chemicals.

Overall, there was a positive response to this question for fruit juices. Greeks were the most willing to buy the novel orange juice product with enriched antioxidants and reduced sugars.

For smoothies there was an even spread in all countries regarding the willingness to buy the innovative products.

Last for cheese in brine, there was a quite negative response from the Maltese consumers mirroring the responses for questions 5, 6 & 7. Three quarters of Maltese consumers had indicated that they never purchase cheese in brine, which is not feta. Greek consumers were largely neutral with a modest interest shown by the French consumers.

Furthermore, we can investigate and analyze the consumers' willingness to pay extra for these products. Consumers' willingness to pay was compared according to their socio-demographic characteristics, such as age and income. We report each country in turn.

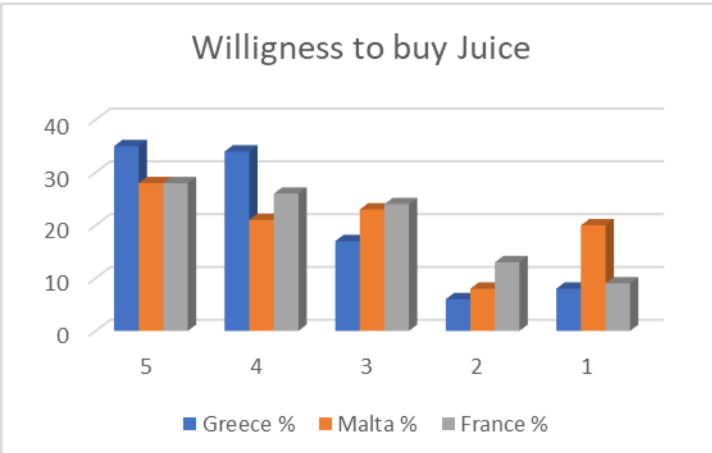


Figure 14. Willingness to buy juice

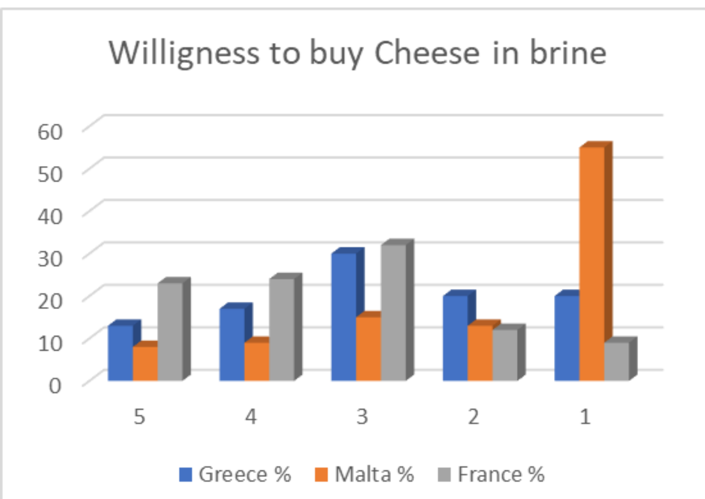


Figure 15. Willingness to buy cheese in brine

2. Willingness to pay

The analysis of consumers' willingness to pay extra for the proposed enhanced products was done through a calculation of the mean price and an analysis of variance (ANOVA).

2.1 Greece

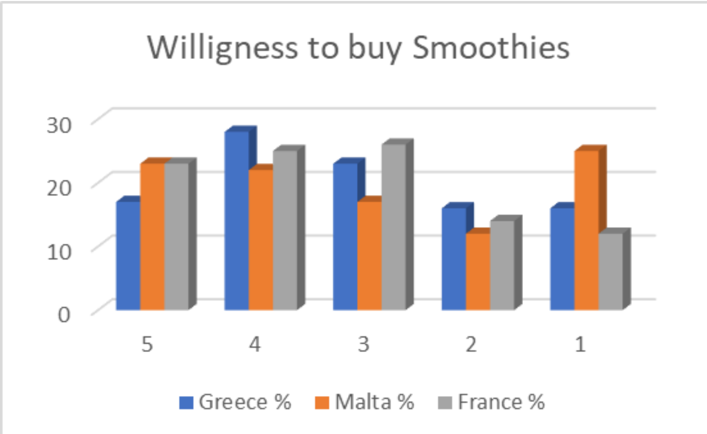


Figure 16. Willingness to buy smoothies

Table 6. Comparison of willingness to pay for smoothies by age groups in Greece

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
18-24 years	51	2.67	0.169	0.024		
25-30 years	48	2.63	0.155	0.022		
31-40 years	59	2.62	0.157	0.020	4.378	<0.001
41-50 years	139	2.59	0.140	0.012		
51-65 years	154	2.58	0.137	0.011		
Over 65 years	52	2.58	0.135	0.019		
Total	503	2.60	0.148	0.007		

The ANOVA test showed differences between age groups regarding willingness to pay for smoothies, and the test was statistically significant ($p<0.001$).

From Table 6, it can be seen that the group with the least willingness to pay for enriched smoothies were consumers over the age of 51. The group willing to pay the most were young people aged between 18 and 24.

Table 7. Comparison of willingness to pay for white cheese by age groups in Greece

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
18-24 years	51	4.29	0.286	0.040		
25-30 years	49	4.22	0.272	0.039		
31-40 years	59	4.22	0.308	0.040	4.495	<0.001
41-50 years	137	4.13	0.246	0.021		
51-65 years	149	4.12	0.238	0.020		
Over 65 years	52	4.17	0.283	0.039		
Total	497	4.17	0.267	0.012		

The ANOVA test showed differences between age groups regarding willingness to pay for cheese in brine, and the test was statistically significant ($p<0.001$).

From Table 7, it can be seen that the group with the least willingness to pay for enriched white cheese in brine were all consumers over the age of 41. The group willing to pay the most were young people aged between 18 and 24.

Table 8. Comparison of willingness to pay for fruit juice by age groups in Greece

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
18-24 years	51	2.67	0.199	0.028		
25-30 years	49	2.66	0.172	0.025		
31-40 years	60	2.61	0.165	0.021	4.315	<0.001
41-50 years	140	2.59	0.133	0.011		
51-65 years	157	2.59	0.138	0.011		
Over 65 years	56	2.58	0.136	0.018		
Total	513	2.60	0.153	0.007		

The ANOVA test showed differences between age groups regarding willingness to pay for enriched fruit juices, and the test was statistically significant ($p<0.001$).

A similar picture emerges for the willingness to pay for enriched fruit juices. Consumers over the age of 41 were most unwilling to pay extra whilst the youngest age group were most willing to pay more.

Consumers' willingness to pay was also compared according to income groups.

Table 9. Comparison of willingness to pay for smoothies by income groups in Greece

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
Under 750 €	29	2.56	0.099	0.018		
751-1000 €	74	2.56	0.110	0.013		
1001-1500 €	127	2.57	0.130	0.012	4.187	<0.001
1501-2000 €	97	2.62	0.159	0.016		
Over 2001 €	152	2.63	0.163	0.013		
Other	24	2.61	0.168	0.034		
Total	503	2.60	0.147	0.007		

The ANOVA test showed differences between income groups in terms of willingness to pay for smoothies and was found to be statistically significant (p<0.001).

Table 10. Comparison of willingness to pay for white cheese by income groups in Greece

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
Under 750 €	29	4.12	0.189	0.035		
751-1000 €	73	4.12	0.231	0.027		
1001-1500 €	126	4.15	0.259	0.023	1.530	0.179
1501-2000 €	97	4.20	0.282	0.029		
Over 2001 €	151	4.19	0.281	0.023		
Other	21	4.17	0.312	0.068		
Total	497	4.17	0.267	0.012		

The ANOVA test showed differences between income groups regarding willingness to pay for cheese, and the test was not statistically significant (p = 0.179).

Table 11. Comparison of willingness to pay for fruit juice by income groups in Greece

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
Under 750 €	29	2.58	0.145	0.027		
751-1000 €	76	2.56	0.116	0.013		
1001-1500 €	129	2.58	0.134	0.012	3.731	0.003
1501-2000 €	101	2.62	0.156	0.015		
Over 2001 €	155	2.64	0.168	0.013		
Other	23	2.60	0.183	0.038		
Total	513	2.60	0.152	0.007		

The ANOVA test showed differences between income groups regarding willingness to pay for fruit juice, and the test was statistically significant (p = 0.003).

As can be expected it is the wealthiest consumers most willing to pay extra for all the enriched products (smoothies, cheese in brine and orange juice).

Yet what can be seen from the responses shown in the tables above, is that Greek consumers are not willing to pay much extra for the enhanced products. On average, they reported that they would be willing to pay less than 5% extra for all the proposed innovative food products.

2.2 France

Table 12. Comparison of willingness to pay for smoothies by age groups in France

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
18-24 years	144	2.60	0.139	0.116		
25-30 years	106	2.67	0.167	0.162		
31-40 years	91	2.67	0.160	0.168	4.230	<0.001
41-50 years	77	2.67	0.148	0.169		
51-65 years	58	2.68	0.183	0.240		
Over 65 years	19	2.64	0.177	0.040		
Total	495	2.65	0.160	0.007		

The ANOVA test showed differences between age groups regarding willingness to pay for smoothies, and the test was statistically significant (p<0.001).

According to Table 12, it can be seen that the age group with the least willingness to pay for enriched smoothies were the participants between aged 18 to 24. The elderly (those aged over65) also showed a reticence to pay any extra.

Table 13. Comparison of willingness to pay for white cheese by age groups in France

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
18-24 years	141	4.19	0.283	0.238		
25-30 years	102	4.32	0.327	0.324		
31-40 years	92	4.29	0.317	0.033	4.307	<0.001
41-50 years	77	4.37	0.309	0.035		
51-65 years	58	4.30	0.300	0.394		
Over 65 years	19	4.37	0.399	0.091		
Total	489	4.28	0.315	0.014		

The ANOVA test showed differences between age groups regarding willingness to pay for white cheese, and the test was statistically significant (p<0.001).

Younger people were also the least willing to pay extra for another product, white cheese. It was consumers aged 41 and over in France who were the most willing to pay extra.

Table 14. Comparison of willingness to pay for fruit juice by age groups in France

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
18-24 years	143	2.60	0.142	0.011		
25-30 years	104	2.68	0.169	0.016		
31-40 years	92	2.68	0.170	0.017	4.071	0.001
41-50 years	77	2.67	0.159	0.018		
51-65 years	58	2.67	0.156	0.020		

Over 65 years	19	2.67	0.193	0.444
Total	493	2.65	0.162	0.007

The ANOVA test showed differences between age groups in terms of willingness to pay for fruit juice and was found to be statistically significant (p = 0.001).

Finally, when willingness to pay extra for enriched fruit juice was compared between age groups (Table 14) the same pattern emerges as with the other products, namely that consumers between the ages of 18-24 are least willing to pay extra. All other age groups were willing to pay between 16 cents and 17 cents extra.

Table 15. Comparison of willingness to pay for smoothies by income groups in France

Group variable	**N**	**Mean price**	**Std. Deviation**	**Std. Error**	**F**	**Sig.**
No salary	14	2.60	0.135	0.036		
Below 1383 €	59	2.61	0.152	0.019		
1383 - 1664 €	62	2.68	0.169	0.021		
1665 - 2012 €	84	2.70	0.154	0.016	3.150	0.009
2013 - 3041 €	76	2.67	0.150	0.172		
More than 3041 €	29	2.71	0.185	0.344		
Total	324	2.67	0.160	0.008		

The ANOVA test showed differences between income groups regarding willingness to pay for smoothies and was statistically significant (p = 0.009).

Table 16. Comparison of willingness to pay for white cheese by income groups in France

Group variable	**N**	**Mean price**	**Std. Deviation**	**Std. Error**	**F**	**Sig.**
No salary	14	4.21	0.308	0.082		
Below 1383 €	58	4.28	0.341	0.044		
1383 - 1664 €	62	4.32	0.310	0.039		
1665 - 2012 €	84	4.39	0.304	0.033	2.133	0.061
2013 - 3041 €	76	4.32	0.313	0.035		

More than 3041 €	29	4.46	0.404	0.075		
Total	323	4.34	0.327	0.018		

The ANOVA test showed differences between income groups regarding willingness to pay for white cheese, and the test was statistically significant at the 10% level (p = 0.061).

Table 17. Comparison of willingness to pay for fruit juice by income groups in France

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
No salary	14	2.62	0.152	0.040		
Below 1383 €	58	2.64	0.137	0.018		
1383 - 1664 €	62	2.67	0.169	0.021		
1665 - 2012 €	84	2.72	0.163	0.017	2.702	0.021
2013 - 3041 €	76	2.68	0.163	0.018		
More than 3041 €	29	2.72	0.216	0.040		
Total	323	2.68	0.167	0.009		

The ANOVA test showed differences between income groups regarding willingness to pay for fruit juice, and the test was statistically significant (p = 0.021).

Consumers' willingness to pay in France was also compared to different income groups. Not surprisingly, for all three proposed new food products it was the poorest groups that were least like to want to pay any extra. Overall, for enhanced smoothies and orange juice French consumers were willing to pay an extra 7%, rising to an average of 9% for cheese in Brine.

2.3 Malta

Table 18. Comparison of willingness to pay for smoothies by age groups in Malta

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
18-24 years	69	2.67	0.217	0.026		
25-30 years	66	2.61	0.172	0.021		
31-40 years	126	2.66	0.203	0.018		

41-50 years	128	2.63	0.184	0.016	7.738	<0.001
51-65 years	119	2.57	0.147	0.013		
Over 65 years	135	2.54	0.117	0.010		
Total	644	2.61	0.178	0.007		

The ANOVA test showed differences between age groups regarding willingness to pay for smoothies, and the test was statistically significant (p<0.001).

From Table 18, it can be seen that the group with the least willingness to pay for enriched smoothies were consumers over the age of 51. The group willing to pay the most were young people aged between 18 and 24.

Table 19. Comparison of willingness to pay for white cheese by age groups in Malta

Group variable	**N**	**Mean price**	**Std. Deviation**	**Std. Error**	**F**	**Sig.**
18-24 years	57	4.12	0.264	0.035		
25-30 years	66	4.12	0.289	0.036		
31-40 years	122	4.15	0.277	0.025	3.498	0.002
41-50 years	122	4.16	0.334	0.030		
51-65 years	112	4.06	0.187	0.018		
Over 65 years	126	4.04	0.169	0.015		
Total	606	4.10	0.260	0.011		

The ANOVA test showed differences between age groups in terms of willingness to pay for white cheese and was found to be statistically significant (p=0.002).

From Table 19, it can be seen that the group with the least willingness to pay for enriched white cheese in brine were all consumers over the age of 51. On average, Maltese consumers were only prepared to pay an extra 2.5% for this product. However, it must be remembered that about three quarters of the Maltese population do not purchase white cheese in brine.

Table 20. Comparison of willingness to pay for fruit juice by age groups in Malta

Group variable	**N**	**Mean price**	**Std. Deviation**	**Std.**	**F**	**Sig.**

				Error		
18-24 years	69	2.70	0.218	0.026		
25-30 years	66	2.63	0.181	0.022		
31-40 years	129	2.66	0.200	0.018	5.549	<0.001
41-50 years	130	2.62	0.174	0.015		
51-65 years	123	2.59	0.173	0.016		
Over 65 years	139	2.57	0.149	0.013		
Total	657	2.62	0.184	0.007		

The ANOVA test showed differences between age groups in terms of willingness to pay for fruit juice and was found to be statistically significant (p<0.001).

A similar picture emerges for the willingness to pay for enriched fruit juices. Consumers over the age of 51 were most unwilling to pay extra whilst the youngest age group were most willing to pay more.

Consumers' willingness to pay was also compared according to income groups.

Table 21. Comparison of willingness to pay for smoothies by income groups in Malta

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
Under 750 €	55	2.58	0.153	0.021		
751-1000 €	90	2.53	0.096	0.010		
1001-1500 €	115	2.64	0.191	0.018		
1501-2000 €	95	2.65	0.200	0.021	5.474	<0.001
Over 2001 €	134	2.62	0.167	0.014		
Other	155	2.60	0.193	0.016		
Total	644	2.61	0.178	0.007		

The ANOVA test showed differences between income groups in terms of willingness to pay for smoothies and was found to be statistically significant (p<0.001).

Table 22. Comparison of willingness to pay for white cheese by income groups in Malta

Group variable	N	Mean price	Std. Deviation	Std.	F	Sig.

				Error		
Under 750 €	53	4.06	0.210	0.029		
751-1000 €	88	4.06	0.215	0.023		
1001-1500 €	112	4.09	0.255	0.024	2.823	0.016
1501-2000 €	92	4.12	0.255	0.027		
Over 2001 €	134	4.17	0.321	0.028		
Other	127	4.08	0.234	0.021		
Total	606	4.10	0.260	0.011		

The ANOVA test showed differences between income groups regarding willingness to pay for cheese, and the test was found to be statistically significant (p=0.016).

Table 23. Comparison of willingness to pay for fruit juice by income groups in Malta

Group variable	N	Mean price	Std. Deviation	Std. Error	F	Sig.
Under 750 €	55	2.57	0.135	0.018		
751-1000 €	91	2.63	0.209	0.022		
1001-1500 €	115	2.64	0.178	0.017		
1501-2000 €	95	2.62	0.179	0.018	1.006	0.413
Over 2001 €	134	2.61	0.174	0.015		
Other	167	2.63	0.197	0.015		
Total	657	2.62	0.184	0.007		

The ANOVA test showed that there are no significant differences between income groups regarding willingness to pay for fruit juice (p=0.413).

2.4 Comparisons

Unlike what was seen with the Greek and French consumers there was not a clear differentiation regarding income and willingness to pay extra for all the enriched products (smoothies, cheese in brine and orange juice).

Yet what can be seen from the responses shown in the tables above, is, that Maltese consumers, like the Greek consumers are not willing to pay much extra for the enhanced products. On average, they reported that they would be willing to pay less than 5% extra for all the proposed innovative food products.

It is the younger and more wealthy consumers in Greece and Malta that would be most willing to pay extra for the novel proposed enhanced food products. But, even with these groups, they would not be willing to pay with more than an extra 8% for juices, smoothies or cheese in brine.

The picture was slightly different for the French consumers. Although, like the consumers of the other countries they were not prepared to pay much extra (5%) for the novel products, they were willing to go above the others for the enhanced cheese in brine.

Unlike Greece and Malta, it is the older and wealthier consumers in France that would be most willing to pay extra for the novel proposed enhanced food products. Within this group, the maximum they would be prepared to pay is also not much, reaching 11% extra for the cheese in brine, but still no more than an extra 8% for smoothies and fruit juice.

Furthermore, a factor analysis for the three countries has also been made, which can be found at Annex 2. This tends to reinforce the conclusions drawn above.

Conclusion

A picture emerges in all three countries of consumers highly valuing food to be "natural" local and healthy, especially so in Greece. Consumers were generally more supportive of traditional foods, which are seen as more natural. Generally, consumers were not enthused by the prospect of enriching their foods with additives, even vitamins. The French consumers were the ones to most support innovation in food products.

Yet the survey results show that in all three countries, there is a significant interest in trying out new food products. However, although keen to try, consumers in Greece and Malta were not willing to pay extra for the enriched novel foodstuffs that were proposed. In most cases they did not go above the 5% monetary extra ceiling for any of the products that were proposed. In France there was a slightly greater willingness to pay extra for the novel foods, but even there it did not surpass 7%, with the exception of cheese in brine, reaching 9%.

From this three-nation consumer survey, it can be postulated that the main barriers, consumer resistance and negative perceptions are related to the notion that food additives (even if vitamins) do not match consumer preferences who look for wholesomeness in foodstuffs. In our survey, the naturalness, tradition, healthiness and locality play an important role in consumer choice. Additives are seen with suspicion. The second main barrier to the adoption of the enhanced novel products is the cost. At present, consumers are very reluctant to pay any extra for such new products and even if they are prepared to pay extra, that amount is very modest, in the region of an extra 5%.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.

(Breidert, C., Hahsler, M., Reutterer, T. (2006). A review of methods for measuring willingness-to-pay. *Innovative Marketing,* 2(4), 13-15, [online] available from: https://mail.google.com/mail/u/0/#inbox/FMfcgzGwJJSTjKVNFSrWMnfPGHFnmcXv?projector=1&messagePartId=0.1 [accessed 12/11/2023].

Clement, C. A., Henning, J. B., & Osbaldiston, R. (2014). Integrating factors that predict energy conservation: The theory of planned behavior and beliefs about climate change. *Journal of Sustainable Development*, 46.

European Council, Council of the European Union (2023), Reducing food loss and food waste, [online] available from: https://www.consilium.europa.eu/en/policies/food-losses-waste/ [accessed 10/2/2023].

European Council, Council of the European Union (2023), Infographic - Food waste: prevent, reuse and recycle, [online] available from: https://www.consilium.europa.eu/en/infographics/food-loss-and-food-waste/ [accessed 11/29/2023].

Excel4med (2023), Specific Objectives, [online] available from: https://excel4med.eu/the-project/specific-objectives/ [accessed 11/20/2023].

Excel4med (2023), The Project, [online] available from: https://excel4med.eu/ [accessed 11/22/2023].

Excel4med (2023), About Us, [online] available from: https://excel4med.eu/about/ [accessed 11/22/2023].

Goldsmith, E. B., & Goldsmith, R. E. (2011). Social influence and sustainability in households. *International journal of consumer studies*, *35*(2), 117-121.

Gundumogula, M. (2020) Importance of Focus Group Discussion in Research. The International Journal of Humanities & Social Studies, 8, 299-302. [online] available from: https://doi.org/10.24940/theijhss/2020/v8/i11/HS2011-082 [accessed 6/29/2023].

Harvard T.H. Chan/School of Public Health (2023), Food Waste. The Big Picture, [online] available from: https://www.hsph.harvard.edu/nutritionsource/sustainability/food-waste/ [accessed 11/20/2023].

Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and social psychology Bulletin*, *18*(1), 3-9.

Miller, K. M., Hofstetter, R., Krohmer, H., & Zhang, Z. J. (2011). How should consumers' willingness to pay be measured? An empirical comparison of state-of-the-art approaches*. Journal of Marketing Research,* 48(1), 172–184.

Roth, S., & Robbert, T. (2013). Consumer sustainability orientation–development of a measurement instrument. In *Proceedings of the 42nd EMAC Conference 2013*.

Sheeran, P., Conner, M., & Norman, P. (2001). Can the theory of planned behavior explain patterns of health behavior change?. *Health psychology*, *20*(1), 12.

Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecological economics*, *64*(3), 542-553.

Yamane, T. (1967). Statistics: An Introductory Analysis, 2nd Edition, New York: Harper and Row.

ANNEX 1: Socio-demographics

Table 24 – Sociodemographic characteristics of respondents

	Greece		Malta		France	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Gender						
Female	439	61	306	**51**	271	**53**
Male	285	**39**	294	**49**	211	41
Other	1	0				
Prefer to not say					29	6
Total	725	**100**	**600**	**100**	511	**100**
Age						
18-24 years	58	8	54	9	145	**28**
25-30 years	56	8	60	10	110	**22**
31-40 years	83	11	114	19	96	19
41-50 years	182	25	114	19	80	16
51-65 years	252	35	120	20	59	11
Over 65 years	93	13	138	23	21	4
Total	724	**100**	**600**	**100**	511	**100**
Education						
Primary school	4	0	66	11	14	3
Secondary(middle)	7	1	246	41	56	11
High school	116	16			125	24
Tertiary	565	78	258	43	316	**62**
Other	35	5	30	5		
Total	727	**100**	**600**	**100**	511	**100**
Occupation						
Employed	433	60	342	57	209	**41**
Student	58	8	30	5	170	**33**
Retired	145	20	162	27	25	5
Unemployed	30	4	24	4	32	6
Other	60	8	42	7	75	15
Total	726	**100**	**600**	**100**	511	**100**

EXCEL4MED

Table 25 – Income levels of respondents

Monthly Family Income								
euros	**Greece**		**euros**	**Malta**		**euros**	**France**	
	Frequenc	**%**		**Frequency**	**%**		**Frequenc**	**%**
Under 750	47	6	Under 750	48	8	No salary	34	7
751-1000	109	15	751-1000	96	16	Below 1383	117	**23**
1001-1500	184	26	1001-1500	102	17	1383-1664	86	17
1501-2000	134	19	1501-2000	78	13	1665-2012	109	**21**
Over 2001	209	29	Over 2001	120	20	2013-3041	92	18
Other	37	5	No response	156	26	More than 3041	73	14
Total	720	100	**Total**	**600**	**100**	**Total**	511	100

ANNEX 2: Factor Analysis

Principal component analysis - Greece

Principal component analysis (PCA) is a multivariate technique used in social sciences such as economics and marketing. In this project, PCA can be used to identify key factors that influence consumers' behaviour on new food products.

Principal Components Analysis (PCA) was used to determine the significant difference in the criteria that consumers who participated in the research attach importance to when purchasing food. The primary purpose of factor analysis was to reduce the dimensionality of the data set to fewer and more meaningful factors. While eight variables were taken into account before the factor analysis, these variables were reduced to two factors after the PCA analysis stage.

For the questionnaire in Greece, the responses of 730 consumers concerned eight Likert scale variables that were later analysed with Principal Component Analysis (PCA). Table 26 shows the communalities in Greece.

Table 26. Communalities in Greece

	Extraction
Naturalness	0.437
Food with added	0.489
Other additives	0.722
Traditional food	0.418
Environmental	0.557
Health benefit	0.598
Taste	0.367
Locally produced	0.576

Table 27 shows the rotated factor matrix in Greece. The first factor alone explains 36.429% of the total variance, and the second factor explains 15.815%. The first two factors explain 52.244% of the total variance.

Table 27. Rotated Factor Matrix in Greece

	1	**2**
Naturalness	0.641	
Food with added		0.617
Other additives		0.849
Traditional food	0.640	
Environmental	0.738	
Health benefit	0.773	

Taste	0.529
Locally produced	0.740

The fact that the Kaiser-Meyer-Olkin (KMO) test is calculated as 0.791 and the Bartlett test is less than 0.05 shows that the data obtained is suitable for factor analysis (Table 28).

Table 28. Kaiser-Meyer-Olkin and Bartlett test results in Greece

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.791
Bartlett's test of sphericity	Approx. Chi-Square	1062.290
	Df	28
	Sig.	<0.001

Principal component analysis - France

Principal Components Analysis (PCA) was used to determine the significant difference in the criteria that consumers who participated in the research attach importance to when purchasing food. The primary purpose of factor analysis was to reduce the dimensionality of the data set to fewer and more meaningful factors. While eight variables were taken into account before the factor analysis, these variables were reduced to two factors after the PCA analysis stage.

For the questionnaire in France, the responses of 511 consumers concerned eight Likert scale variables that were later analysed with Principal Component Analysis (PCA). All the above statistical analyses were conducted using IBM SPSS Statistic version 29. Table 29 shows the communities in France.

Table 29. Communalities in France

	Extraction
Naturalness	0.557
Food with added	0.801
Other additives	0.764
Traditional food	0.607
Environmental	0.568
Health benefit	0.624
Taste	0.427
Locally produced	0.661

Table 30 shows the rotated factor matrix in France. The first factor alone explains 47.392% of the total variance, and the second factor explains 15.216%. The first two factors explain 62.608% of the total variance.

Table 30. Rotated Factor Matrix in France

	1	2
Naturalness	0.631	
Food with added		0.875
Other additives		0.867
Traditional food	0.747	
Environmental	0.686	
Health benefit	0.715	
Taste	0.653	
Locally produced	0.812	

The fact that the Kaiser-Meyer-Olkin (KMO) test is calculated as 0.781 and the Bartlett test is less than 0.05 shows that the data obtained is suitable for factor analysis (Table 31).

Table 31. Kaiser-Meyer-Olkin and Bartlett test results in France

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.781
Bartlett’s test of sphericity	Approx. Chi-Square	1599.843
	Df	28
	Sig.	<0.001

Principal component analysis- Malta

Principal Components Analysis (PCA) was used to determine the significant difference in the criteria that consumers who participated in the research attach importance to when purchasing food. The primary purpose of factor analysis was to reduce the dimensionality of the data set to fewer and more meaningful factors. While eight variables were taken into account before the factor analysis, these variables were reduced to two factors after the PCA analysis stage.

For the questionnaire in Malta, the responses of 734 consumers concerned eight Likert scale variables that were later analysed with Principal Component Analysis (PCA). All the above statistical analyses were conducted using IBM SPSS Statistic version 29. Table 32 shows the communalities in Malta.

Table 32. Communalities in Malta

	Extraction
Naturalness	0.586
Food with added	0.647
Other additives	0.676
Traditional food	0.540
Environmental	0.361

Health benefit	0.564
Taste	0.263
Locally produced	0.605

Table 33 shows the rotated factor matrix in Malta. The first factor alone explains 35.160% of the total variance, and the second factor explains 17.872%. The first two factors explain 53.032% of the total variance.

Table 33. Rotated Component Matrix in Malta

	1	**2**
Naturalness		0.676
Food with added		0.803
Other additives		0.819
Traditional food	0.733	
Environmental	0.517	
Health benefit	0.582	
Taste	0.511	
Locally produced	0.776	

The fact that the Kaiser-Meyer-Olkin (KMO) test is calculated as 0.735 and the Bartlett test is less than 0.05 shows that the data obtained is suitable for factor analysis (Table 34).

Table 34. Kaiser-Meyer-Olkin and Bartlett test results in Malta

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.735
Bartlett's test of sphericity	Approx. Chi-Square	1201.603
	Df	28
	Sig.	<0.001

ANNEX 3: Questionnaire

The EXCEL4MED / Consumer survey

The purpose of the questionnaire is to investigate and record consumers' opinion on the new food products to be produced by utilising the residues from citrus fruits and pomegranates (i.e. seeds, peels).

The project is coordinated by the National & Kapodistrian University of Athens (NKUA) with the participation of 13 partners from Greece, Malta and France, in the context of the implementation of the European research programme EXCEL4MED.

Answers to the questionnaire are anonymous. The time required to complete it is 7 minutes.

1. **How would you rate the following (on a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much'? When I buy food, I am a person who values:**

   a. Naturalness of food ________
   (*For natural food, we mean food without human intervention/processing*)

   b. Food with added vitamins ________
   (*Foods fortified with added vitamins*)

   c. Other additives used in foods ________
   (*Additives may be colourings, flavour enhancers, preservatives or antioxidants*)

   d. Traditional foods ________
   (*Foods that have been consumed, raw or cooked for many generations*)

   e. Environmental Protection ________
   (*Foods that their production protects the natural environment and/or have a low carbon footprint and/or reduce food waste*)

   f. Health benefits ________
   (*Foods that are beneficial to your health such as fruits and vegetables*)

   g. Taste ________
   (*The taste of the food product*)

   h. Locally produced ________
   (*Foods which are grown and produced locally*)

2. Do you read the labels of ingredients of the food products? (select one)

a. □ Always
b. □ Most of the time
c. □ Sometimes
d. □ Rarely
e. □ Never

3. How willing would you be to try a novel food product? (on a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much')
(*For **novel food product**, we mean a food product that didn't exist before*).

Not at all__1__2__3__4__5 **Very much**

4. How much would you rate the following statements? (on a scale of 1 to 5, with 1 being "Strongly disagree" and 5 being 'Strongly agree')

a) I prefer novel food products because they may be more nutritious than conventional food.
Strongly disagree __1__2__3__4__5 **Strongly agree** __I don't know
b) I prefer novel food products because I believe they are processed without any chemicals.
Strongly disagree __1__2__3__4__5 **Strongly agree** __I don't know
c) I prefer novel food products because they are environmentally friendly.
Strongly disagree __1__2__3__4__5 **Strongly agree** __I don't know

5. How often do you consume packaged "natural fruit juices"?
(*Juices made with only 100% fruit juice with no additives*)

a. Never
b. □ Less than 1 glass per month
c. □ 1 glass per week
d. □ 2 to 6 glasses per week
e. □ 1 glass per day
f. □ More than 1 glass per day

6. In which part of the day do you consume "natural fruit juices"?

a. I do not consume
b. Breakfast
c. Brunch
d. Lunch
e. Afternoon snack
f. Dinner
g. Any part of the day

7. **How often do you consume smoothies?**
   (*These may be both from grocery stores as well as coffee shops and bars*)

   a. □ Never
   b. □ Less than 1 per month
   c. □ 1 per week
   d. □ 2 to 6 per week
   e. □ 1 per day
   f. □ More than 1 per day

8. **In which part of the day do you consume smoothies?**

   a. I do not consume
   b. Breakfast
   c. Brunch
   d. Lunch
   e. Afternoon snack
   f. Dinner
   g. Any part of the day

9. **How often do you buy white cheese in brine (not feta)?**

   a. □ Never
   b. □ Less than once per month
   c. □ Once per week
   d. □ Two to six times per week
   e. □ Once or more per day

10. **In which part of the day do you consume cheese in brine (not feta)?**

   a. I do not consume
   b. Breakfast
   c. Brunch
   d. Lunch
   e. Afternoon snack
   f. Dinner
   g. Any part of the day

11. **How would you rate the following, on a scale of 1 to 5?**

   a. The consumption of “Natural fruit juices” or smoothies as an ingredient in my diet is:

   Too bad habit__1__2__3__4__5 **A very good habit**

   b. The consumption of “Natural fruit juices” or smoothies as an ingredient in my diet is:

Very bad for health__1__2__3__4__5 **Very good for health**

c. The consumption of cheese in brine as an ingredient in my diet is:

Too bad habit__1__2__3__4__5 **A very good habit**

d. The consumption of cheese in brine as an ingredient in my diet is:

Very bad for health__1__2__3__4__5 **Very good for health**

12. How would you rate the following, on a scale of 1 to 5?

a. If I consume one glass of "Natural fruit juices" or smoothies per day, it will improve my health by providing me with vitamin C, calcium, potassium and magnesium.

Strongly disagree__1__2__3__4__5 **Strongly agree**

b. Not consuming enough juices may be harmful to my health due to vitamin deficiency.

Strongly disagree__1__2__3__4__5 **Strongly agree**

c. If I consume regularly cheese in brine, it will improve my health by providing me with vitamin B12, calcium and probiotics.

Strongly disagree__1__2__3__4__5 **Strongly agree**

d. Not consuming enough cheese in brine may be harmful to my health due to vitamin deficiency.

Strongly disagree__1__2__3__4__5 **Strongly agree**

13. Would you be willing to buy novel foods enriched with antioxidants extracted from the peel and seeds of citrus fruits and pomegranates without the use of chemicals?

*(**Antioxidants** are compounds in foods that neutralise harmful free radicals preventing cell damage. The **novel production process** of the products mentioned above contributes to the reduction of food waste and supports the income of smallholders from a circular economy perspective)*

a. □ Yes
b. □ No
c. □ I don't understand what these food products are

14. If you answered YES to the above question (question 13) how willing would you be to purchase the following items for yourself and/or your household?

On a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much'.
Mark X if you do not buy or would not buy these products.

a. Smoothies **enriched with antioxidants**: _________
b. Cheese in brine **enriched with antioxidants**: _________
c. Orange or pomegranate juice **of reduced sugars**: _________

15. For those products that you selected above, how much would you be willing to pay:

a. [show product] a bottled smoothy (260ml) > current cost €2.50:

€2.50__€2.60__ €2.70__ €2.80__ €2.90__ €3.00

b. [show product] a packet of white cheese in brine (300gr) > current cost €4.00:

€4.00__€4.20__ €4.40__ €4.60__ €4.80__ €5.00

c. [show product] a carton of orange juice of reduced sugars (1 litre) > current cost €2.50:

€2.50__€2.60__ €2.70__ €2.80__ €2.90__ €3.00

16. What gender do you identify with?

a. □ Female
b. □ Male
c. □ Other

17. What is your age?

a. □ 18-24
b. □ 25-30
c. □ 31-40
d. □ 41-50
e. □ 51-65
f. □ Over 65

18. What is the highest level of education you completed?

a. □ Primary
b. □ Secondary
c. □ Tertiary
d. □ Other

19. What is the monthly (family) income of your household?

a. □ under 750 €

b. □ 751-1000 €
c. □ 1001-1500 €
d. □ 1501-2000 €
e. □ over 2001 €

20. What is your occupation?

a. □ Employed
b. □ Student
c. □ Retired
d. □ Unemployed
e. □ Other

Thank you for your participation!
More information about the programme and the new products to be produced, you can find on the website of EXCEL4MED.

ANNEX 4: Questionnaire questions that emerged from the meetings between EKPIZO and project partners

The feedback from the project partners and what information they wanted to get from consumers and capture from the consumers' survey was crucial for the better design of the questionnaire. In this context, EKPIZO held physical meetings with the following partners in Malta: University of Malta (2 of May 2023), MGARR FARMING (2 of May 2023), The Malta Chamber of Commerce, Enterprise & Industry, Koperattivi Malta (3 of May 2023), CIHEAM-IAMM - Mediterranean Agronomic Institute of Montpellier (5 of May 2023). Physical meetings were also held between EKPIZO and the following partners in Greece: NKUA (24 of July 2023), ELGO – DIMITRA (12 of July 2023), SEVT (20 of July 2023).

The following is a list of questions/issues raised by the partners that they would want asked/investigated from a consumer perspective.

University of Malta:

- What do you understand with the term bioactive compounds?
- What do you perceive as an important nutritional aspect in the food you consume?
- Do you know what compounds in oranges are good for your health and what are bad? For example, vitamin C is good. But vitamin C in an extremely high amount is also toxic, that's why is regulated and we are not allowed to take as much as we want in the day.
- What type of product would you prefer to be produced with the use of the new technologies? Would you prefer a yogurt, a smoothie, or cosmetics cream?
- Would you be willing to pay the potentially extra for better nutrition, for a greener generated product? How much extra?

MGARR FARMING:

- What would you value more in the new product? High nutrient value or more convenience (example: something on the go)?
- Would you be more willing to buy a better-quality product, a better taste, or a healthier option with less preservatives?
- How much extra would you be willing to pay for the new product?
- Would you like to drink juices/smoothies that combine fruits and vegetables?
- Would you be willing to pay, for example 2 euros for 85 ml or 3 euros for 500 ml?
- Would you prefer a product of high nutrient value in family pack or a smaller pack?
- Preferred packaging Volume – 250ml, 450ml, 1000ml, 2000ml
- If it's going to be high nutritional content, we need to target people who want to live healthier. There is market for that option
- Preference of short shelf life and more healthy or long shelf life and more convenient.

<u>TMC and Kooperattivi Malta</u> (joint meeting):

- What type of product would you prefer to be produced with the use of the new technologies? (Understand what the market trends are)
- Preference of convenience with good nutritional content
- How much extra would you be willing to pay for the new product? (Classification between different social classes)
- Preferred packaging Volume
- Question regarding lifestyle
- Question regarding income

<u>CIHEAM-IAMM:</u>

- Questions about demographics
- Do you buy bio products?
- How often do you buy bio products?
- What would you be more interested in buying? A product of high nutrient value with short shelf life or a product with more preservatives but with longer shelf life?
- On a scale of 1 to 5, how important is it for you in purchasing a product, its high nutritional value?
- On a scale of 1 to 5, how important is convenience (eg practical packaging) to you when choosing a product?
- Would you be willing to buy a new product of high nutritional value, fortified with antioxidants extracted from the peels and seeds of citrus fruits and pomegranates, in a natural way without the use of chemicals?
- How much extra would you be willing to pay to buy such a product? (on a scale)
- Would you prefer this product to be a smoothie, another product like cheese or yogurt?

<u>ELGO DIMITRA</u>:

Based on scientific data, the implementation of new technologies in food processing versus thermal processing leads to products of higher quality and nutritional value and increased shelf life.

- Do you know or have you ever heard of the implementation of new technologies in the food production process?
- Would you trust the production method of a food product that has been processed with the use of new technologies?
- Would you trust to consume a food product that has been processed with the use of new technologies?
- Does the use of new technologies convince you of the good quality, the highest nutritional value and the healthy profile of the product?

- Would the possible increase in the selling price of a food product that has been processed with the use of new technologies for optimal quality characteristics (e.g. improved colour, taste) constitute a negative factor for its purchase?
- Do you believe that the possible increase in the selling price of a food product that has been processed with the use of new technologies to make it healthier (e.g. reduced sugars, addition of bioactive ingredients), would constitute a negative factor for its purchase?
- Would you be interested in learning about the use of new food processing technologies and the advantages/disadvantages compared to conventional processing technologies (e.g.: thermal processing)?
- Do you believe that the use of new processing technologies for the production of innovative foods of a healthier profile will improve the diet of consumers or favour the nutrition of consumers in high-risk such as diabetic people or of cardiometabolic risk?
- Would you trust more to consume a minimally processed food or a standardized one with new processing technologies to maintain its nutritional, quality and organoleptic characteristics?

NKUA:

Discussion between EKPIZO and NKUA focused on the following:

- Clarifications provided by NKUA regarding the novel products to be produced. The type of products, the range of extra price that consumers will need to pay for purchasing the novel food products.
- Discussion regarding consumers perceptions about health, environmental protection, lifestyle and the type of questions that could investigate these perceptions.

SEVT:

The possible questions that SEVT would suggest to be included in the questionnaire are the following:

- Willingness to pay questions
- How familiar are you with the concept of functional food?
- Questions about food waste

ANNEX 5: A Study about ‘Food Technology’ amongst the Maltese Population

A Study about ‘Food Technology’ amongst the Maltese Population

Dr. Vincent Marmarà Ph.D.(Stir.)
Sagalytics

Final Report | November 2023

Contents

Contents

Section 1

Methodology and Demographics

Sagalytics

Methodology and Demographics

- The purpose of the questionnaire is to investigate and record consumers' opinion on the new food products to be produced by utilising the residues from citrus fruits and pomegranates (i.e. seeds, peels).
- The project is coordinated by the National & Kapodistrian University of Athens (NKUA) with the participation of 13 partners from Greece, Malta and France, in the context of the implementation of the European research programme EXCEL4MED.

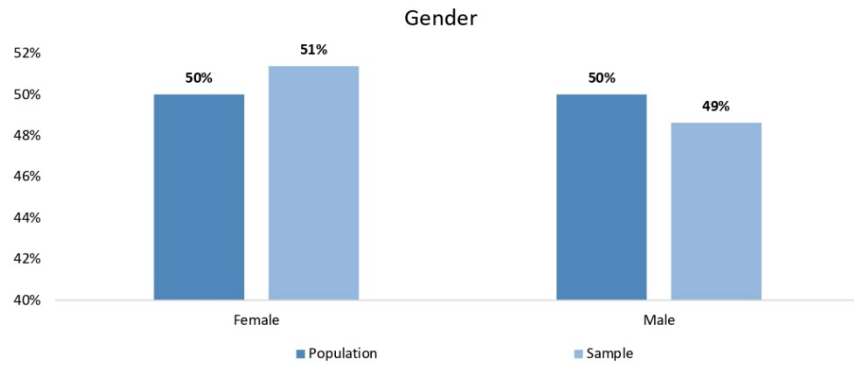
Methodology and Demographics

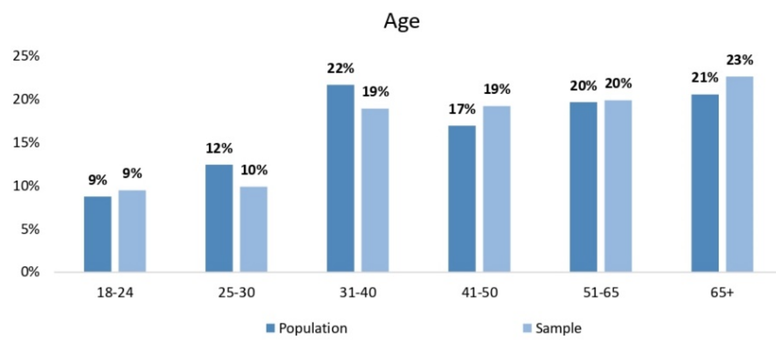
- In order to design the questionnaire some focus groups were organised in Malta amongst various stakeholders and amongst the general public, to understand the level of knowledge about ‘food technology’ products. Based on their feedback the first draft of the questionnaire was designed. Following this the questionnaire was shared with all the other partners and after several discussions a draft questionnaire was set up to be tested amongst the general public. A pilot sample of 40 individuals was selected and minor issues were reported to the whole group of partners. Following the pilot survey of the other countries, the final questionnaire was prepared for the final data collection stage.

Methodology and Demographics

- The survey was carried out through telephone interviews
- A sample size of 600 individuals was collected amongst the Maltese population of 16 years and over
- Level of confidence: 95%
- Confidence interval: +/- 4%
- Sample was stratified based on Age and Gender
- The data was collected during October 2023.

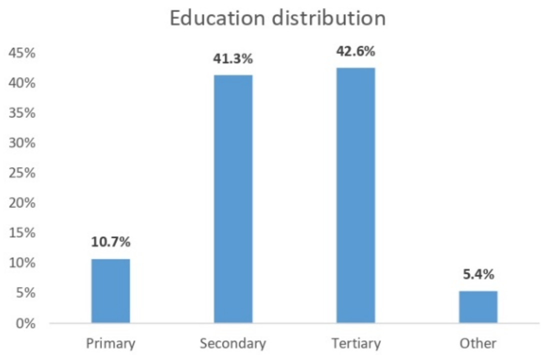
Methodology and Demographics

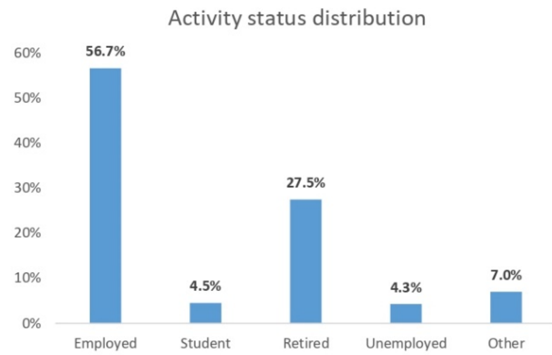




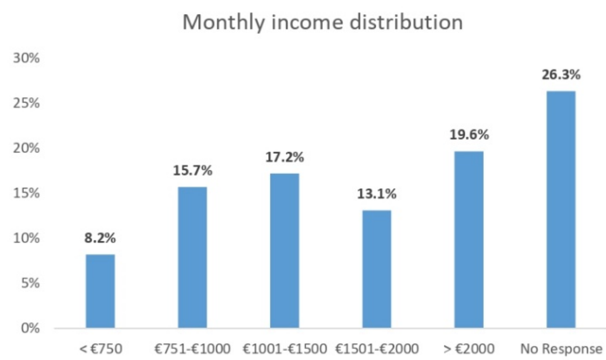
Sagalytics

Methodology and Demographics





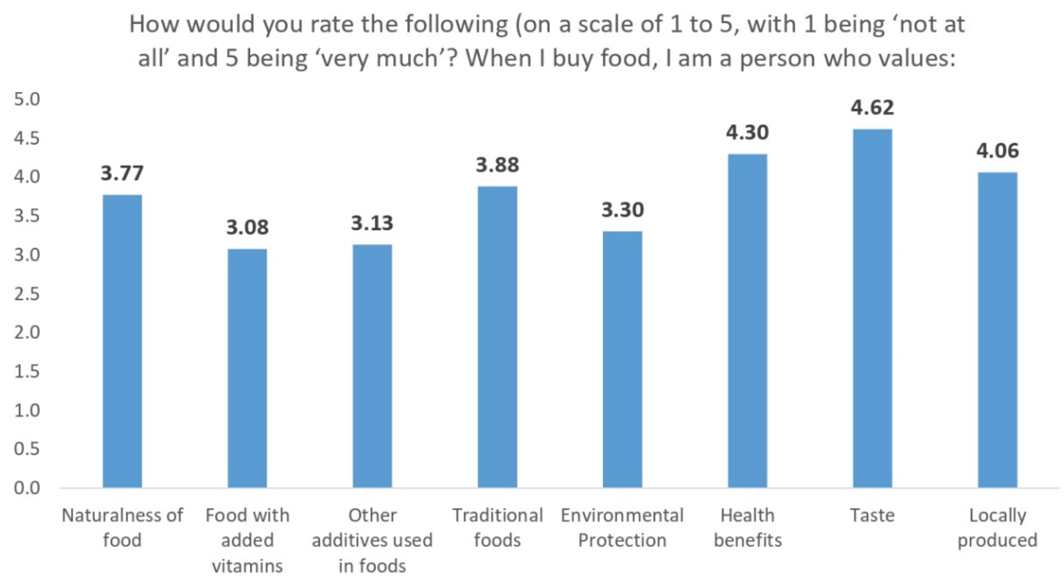
NB: *Statistics presented in this report that are related to 'Other' level of education, 'Students', 'Unemployed', 'Other' status, and the lowest income group need to be treated with caution as number of individuals for these categories are low.*



Sagalytics

Section 2 – Values considered when buying food

Section 2 – Values considered when buying food



Section 2 – Values considered when buying food

- The respondents were provided with the following statements and were required to indicate their level of value on a scale from 1 to 5. A rating of 1 signified 'not at all,' while a rating of 5 indicated 'very much':

	Average:
• Naturalness of food	3.77
• Food with added vitamins	3.08
• Other additives used in foods	3.13
• Traditional foods	3.88
• Environmental Protection	3.30
• Health benefits	4.30
• Taste	4.62
• Locally produced	4.06

- The respondents place the highest importance on the "taste" of food (rated at 4.62), followed by "health benefits" (4.30) and "locally produced" (4.06). The least significant factor is "Food with added vitamins" (3.08).
- The subsequent tables illustrate the results based on various demographic factors of the respondents.

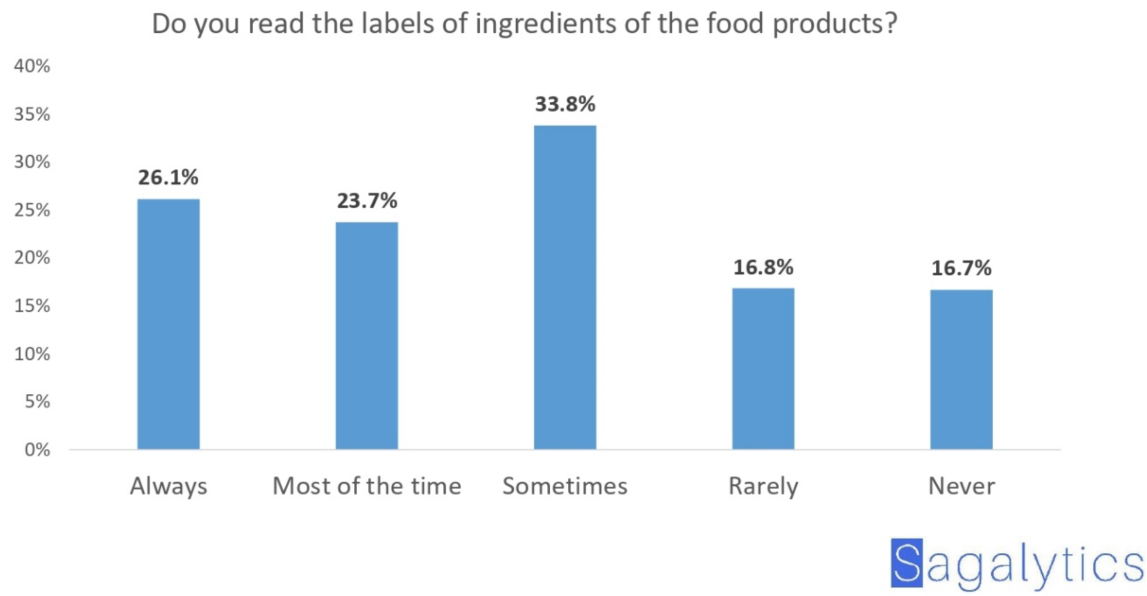
Section 2 – Values considered when buying food

	Naturalness of food	Food with added vitamins	Other additives used in foods	Traditional foods	Environmental Protection	Health benefits	Taste	Locally produced
Female	3.85	3.18	3.22	3.96	3.31	4.36	4.65	4.08
Male	3.68	2.97	3.04	3.80	3.29	4.21	4.58	4.03
18-24	3.68	3.14	3.32	3.73	3.36	4.36	4.55	3.95
25-30	3.42	3.17	3.17	3.38	3.17	4.29	4.71	3.29
31-40	3.54	2.81	3.21	3.65	3.12	4.12	4.40	3.90
41-50	4.04	3.07	3.16	3.97	3.29	4.37	4.77	4.16
51-65	3.85	3.21	3.13	4.08	3.56	4.46	4.66	4.26
65+	3.86	3.14	2.98	4.10	3.26	4.21	4.62	4.32
Primary	3.94	3.13	3.10	3.97	3.14	4.09	4.41	4.13
Secondary	3.75	3.10	3.00	4.04	3.29	4.25	4.69	4.26
Tertiary	3.83	3.15	3.39	3.73	3.32	4.37	4.57	3.84
Other	3.13	2.32	2.36	3.59	3.42	4.44	4.74	4.15
Employed	3.67	2.99	3.24	3.77	3.26	4.26	4.63	3.89
Student	3.90	3.10	2.70	3.50	3.20	4.40	4.30	3.80
Retired	3.95	3.17	2.89	4.19	3.35	4.35	4.68	4.42
Unemployed	3.48	3.13	2.81	3.61	2.71	3.84	4.29	3.90
Other	3.90	3.35	3.55	4.00	3.80	4.53	4.73	4.31
< €750	3.93	3.05	3.37	4.19	2.95	4.21	4.61	4.32
€751-€1000	3.70	3.23	2.72	3.89	3.30	4.19	4.63	4.18
€1001-€1500	3.79	3.05	2.94	4.06	3.36	4.24	4.76	4.12
€1501-€2000	3.81	3.21	3.36	3.82	3.21	4.24	4.52	3.73
> €2000	3.71	2.94	3.28	3.34	3.25	4.26	4.53	3.75
No Response	3.79	3.04	3.21	4.10	3.46	4.47	4.63	4.27

Section 3 – Reading the labels of ingredients of the food products

Section 3 – Reading the labels of ingredients of the food products

Over a quarter of the respondents indicated that they consistently read the ingredient label when purchasing a food product (26.1%). Conversely, about one-third of the respondents reported reading this label casually (33.8%). Additionally, 16.7% of the respondents stated that they never read the ingredient label.



Section 3 – Reading the labels of ingredients of the food products

	Female	Male
Always	30.5%	13.7%
Most of the time	21.7%	18.8%
Sometimes	30.2%	27.4%
Rarely	12.6%	16.2%
Never	5.1%	23.9%

	18-24	25-30	31-40	41-50	51-65	65+
Always	18.2%	33.3%	21.7%	31.4%	12.4%	20.6%
Most of the time	27.3%	16.7%	19.6%	22.9%	22.1%	15.8%
Sometimes	40.9%	20.8%	39.9%	20.0%	27.6%	26.7%
Rarely	9.1%	16.7%	10.9%	18.6%	15.9%	13.9%
Never	4.5%	12.5%	8.0%	7.1%	22.1%	23.0%

	Primary	Secondary	Tertiary	Other
Always	17.9%	15.6%	32.2%	5.1%
Most of the time	21.8%	18.9%	18.6%	41.0%
Sometimes	12.8%	30.6%	30.9%	30.8%
Rarely	14.1%	15.9%	13.0%	15.4%
Never	33.3%	18.9%	5.2%	7.7%

Sagalytics

Section 3 – Reading the labels of ingredients of the food products

	Employed	Student	Retired	Unemployed	Other
Always	25.7%	10.0%	17.5%	22.6%	21.6%
Most of the time	18.9%	40.0%	17.5%	25.8%	21.6%
Sometimes	29.1%	30.0%	27.0%	16.1%	43.1%
Rarely	14.6%	20.0%	13.0%	22.6%	11.8%
Never	11.7%	0.0%	25.0%	12.9%	2.0%

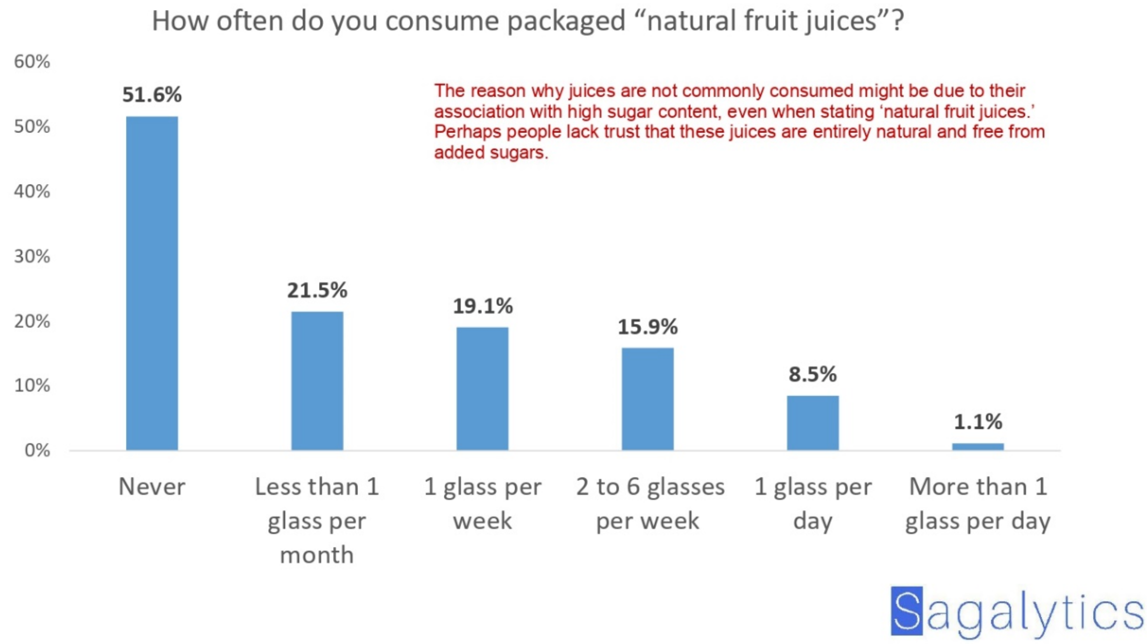
	< €750	€751-€1000	€1001-€1500	€1501-€2000	> €2000	No Response
Always	31.7%	15.7%	19.8%	31.3%	25.0%	18.4%
Most of the time	11.7%	12.2%	19.0%	21.9%	18.1%	29.5%
Sometimes	31.7%	27.0%	21.4%	25.0%	31.9%	33.7%
Rarely	15.0%	18.3%	19.0%	15.6%	12.5%	9.5%
Never	10.0%	27.0%	20.6%	6.3%	12.5%	8.9%

Section 4 – Consumption on natural fruit juices and smoothies

Section 4.1 – Frequency of consumption natural fruit juices and smoothies

Section 4.1 – Frequency of consumption natural fruit juices and smoothies

Most respondents (51.6%) indicated that they refrain from consuming packaged "natural fruit juices". However, 44.6% of the respondents do consume at least one glass of "natural fruit juice" per week.



Section 4.1 – Frequency of consumption natural fruit juices and smoothies

	Female	Male
Never	44.1%	44.1%
Less than 1 glass per month	19.0%	17.5%
1 glass per week	15.5%	16.9%
2 to 6 glasses per week	15.8%	11.0%
1 glass per day	5.3%	8.8%
More than 1 glass per day	0.3%	1.7%

	18-24	25-30	31-40	41-50	51-65	65+
Never	30.4%	33.3%	30.4%	35.7%	51.0%	65.5%
Less than 1 glass per month	21.7%	37.5%	18.1%	20.0%	13.8%	11.5%
1 glass per week	21.7%	16.7%	19.6%	21.4%	14.5%	7.9%
2 to 6 glasses per week	17.4%	8.3%	26.1%	11.4%	12.4%	6.7%
1 glass per day	4.3%	4.2%	5.8%	11.4%	6.9%	7.3%
More than 1 glass per day	4.3%	0.0%	0.0%	0.0%	1.4%	1.2%

	Primary	Secondary	Tertiary	Other
Never	70.5%	50.8%	31.9%	28.2%
Less than 1 glass per month	9.0%	14.0%	23.2%	33.3%
1 glass per week	6.4%	15.3%	21.0%	5.1%
2 to 6 glasses per week	3.8%	14.3%	14.5%	20.5%
1 glass per day	10.3%	4.7%	8.1%	12.8%
More than 1 glass per day	0.0%	1.0%	1.3%	0.0%

Sagalytics

Section 4.1 – Frequency of consumption natural fruit juices and smoothies

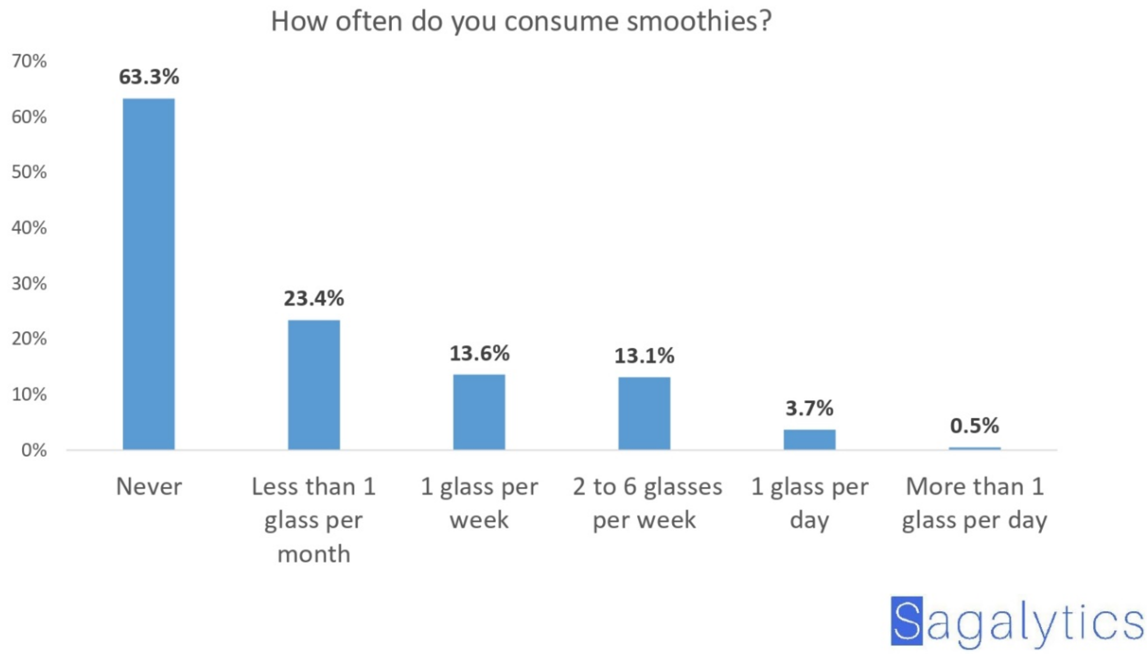
	Employed	Student	Retired	Unemployed	Other
Never	36.4%	9.1%	63.5%	61.3%	41.2%
Less than 1 glass per month	21.8%	27.3%	12.0%	3.2%	19.6%
1 glass per week	15.5%	36.4%	9.5%	25.8%	29.4%
2 to 6 glasses per week	17.5%	18.2%	5.5%	9.7%	7.8%
1 glass per day	8.0%	9.1%	7.5%	0.0%	2.0%
More than 1 glass per day	0.7%	0.0%	2.0%	0.0%	0.0%

	< €750	€751-€1000	€1001-€1500	€1501-€2000	> €2000	No Response
Never	55.0%	63.5%	49.2%	32.3%	37.5%	35.8%
Less than 1 glass per month	8.3%	10.4%	11.9%	33.3%	27.8%	15.5%
1 glass per week	25.0%	5.2%	15.1%	21.9%	17.4%	17.1%
2 to 6 glasses per week	10.0%	7.0%	12.7%	11.5%	11.1%	21.8%
1 glass per day	1.7%	11.3%	10.3%	1.0%	6.3%	8.3%
More than 1 glass per day	0.0%	2.6%	0.8%	0.0%	0.0%	1.6%

Sagalytics

Section 4.1 – Frequency of consumption natural fruit juices and smoothies

The majority of respondents (63.3%) mentioned that they abstain from consuming smoothies. However, 30.9% of the respondents do partake in at least one glass of smoothie per week.



Section 4.1 – Frequency of consumption natural fruit juices and smoothies

	Female	Male
Never	49.7%	58.5%
Less than 1 glass per month	21.9%	17.5%
1 glass per week	12.3%	11.0%
2 to 6 glasses per week	11.5%	10.7%
1 glass per day	3.7%	2.3%
More than 1 glass per day	0.8%	0.0%

Regarding smoothies, their consumption is generally more linked to individuals engaged in physical activity and maintain an active lifestyle. Interestingly, 79.4% of respondents who do not consume smoothies are aged 65 and above.

	18-24	25-30	31-40	41-50	51-65	65+
Never	30.4%	37.5%	32.6%	50.0%	68.3%	79.4%
Less than 1 glass per month	47.8%	29.2%	23.9%	15.7%	13.8%	9.7%
1 glass per week	17.4%	20.8%	15.9%	7.1%	11.0%	6.1%
2 to 6 glasses per week	0.0%	12.5%	21.7%	20.0%	4.1%	4.2%
1 glass per day	4.3%	0.0%	5.8%	5.7%	2.1%	0.6%
More than 1 glass per day	0.0%	0.0%	0.0%	1.4%	0.7%	0.0%

	Primary	Secondary	Tertiary	Other
Never	83.3%	63.8%	38.4%	41.0%
Less than 1 glass per month	7.7%	8.3%	33.5%	25.6%
1 glass per week	6.4%	12.6%	12.3%	10.3%
2 to 6 glasses per week	1.3%	11.6%	13.2%	7.7%
1 glass per day	1.3%	3.7%	1.6%	15.4%
More than 1 glass per day	0.0%	0.0%	1.0%	0.0%

Section 4.1 – Frequency of consumption natural fruit juices and smoothies

	Employed	Student	Retired	Unemployed	Other
Never	39.6%	45.5%	77.0%	80.6%	70.6%
Less than 1 glass per month	25.0%	54.5%	9.5%	6.5%	7.8%
1 glass per week	14.3%	0.0%	9.0%	3.2%	13.7%
2 to 6 glasses per week	16.0%	0.0%	3.5%	9.7%	2.0%
1 glass per day	4.6%	0.0%	1.0%	0.0%	3.9%
More than 1 glass per day	0.5%	0.0%	0.0%	0.0%	2.0%

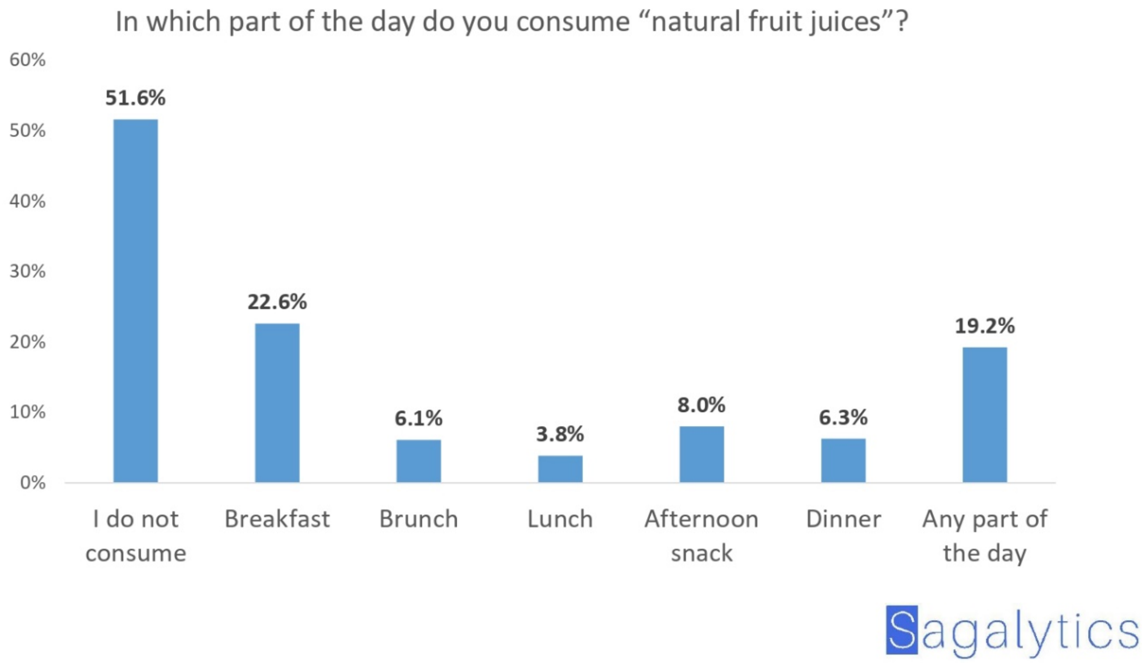
	< €750	€751-€1000	€1001-€1500	€1501-€2000	> €2000	No Response
Never	75.0%	70.4%	57.1%	35.4%	37.5%	56.5%
Less than 1 glass per month	20.0%	12.2%	14.3%	26.0%	24.3%	21.8%
1 glass per week	1.7%	7.8%	14.3%	11.5%	20.8%	8.3%
2 to 6 glasses per week	3.3%	7.8%	10.3%	22.9%	13.2%	8.8%
1 glass per day	0.0%	0.9%	4.0%	2.1%	4.2%	4.7%
More than 1 glass per day	0.0%	0.9%	0.0%	2.1%	0.0%	0.0%

Section 4 – Consumption on natural fruit juices and smoothies

Section 4.2 – The time at which the natural fruit juices and smoothies are normally consumed

Section 4.2 – The time at which the natural fruit juices and smoothies are normally consumed

Most of the respondents who consume “natural fruit juices ” choose to do so at the start of the day, typically during breakfast (22.6%).



Section 4.2 – The time at which the natural fruit juices and smoothies are normally consumed

	Female	**Male**
I do not consume	44.1%	44.1%
Breakfast	18.4%	19.5%
Brunch	6.1%	4.2%
Lunch	3.7%	2.8%
Afternoon snack	7.8%	5.6%
Dinner	3.2%	7.6%
Any part of the day	16.6%	16.1%

	18-24	**25-30**	**31-40**	**41-50**	**51-65**	**65+**
I do not consume	30.4%	33.3%	30.4%	35.7%	51.0%	65.5%
Breakfast	17.4%	25.0%	32.6%	17.1%	17.2%	9.1%
Brunch	8.7%	8.3%	6.5%	4.3%	3.4%	3.6%
Lunch	0.0%	4.2%	2.2%	7.1%	4.1%	1.2%
Afternoon snack	0.0%	8.3%	11.6%	8.6%	5.5%	4.8%
Dinner	17.4%	8.3%	0.0%	10.0%	2.8%	1.8%
Any part of the day	26.1%	12.5%	16.7%	17.1%	15.9%	13.9%

	Primary	**Secondary**	**Tertiary**	**Other**
I do not consume	70.5%	50.8%	31.9%	28.2%
Breakfast	6.4%	16.3%	22.9%	35.9%
Brunch	7.7%	2.0%	8.4%	0.0%
Lunch	2.6%	2.0%	4.2%	7.7%
Afternoon snack	5.1%	7.6%	7.4%	0.0%
Dinner	0.0%	3.7%	6.8%	17.9%
Any part of the day	7.7%	17.6%	18.4%	10.3%

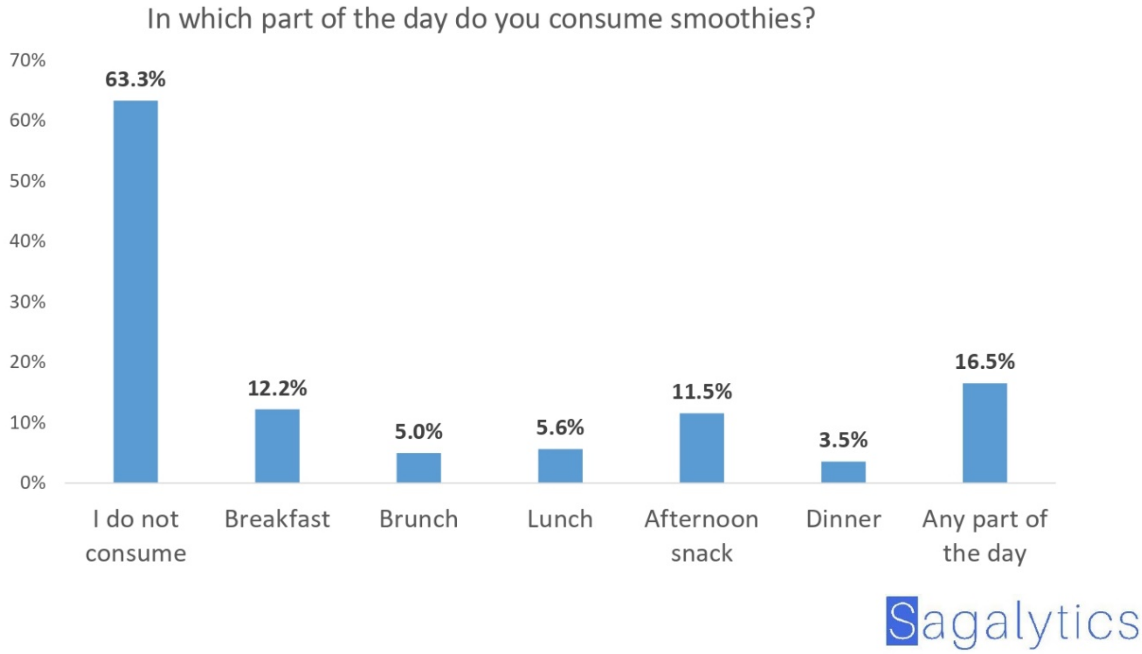
Section 4.2 – The time at which the natural fruit juices and smoothies are normally consumed

	Employed	**Student**	**Retired**	**Unemployed**	**Other**
I do not consume	36.4%	9.1%	63.5%	61.3%	41.2%
Breakfast	25.2%	9.1%	10.0%	19.4%	11.8%
Brunch	5.1%	18.2%	4.5%	0.0%	3.9%
Lunch	4.4%	0.0%	2.0%	0.0%	3.9%
Afternoon snack	8.5%	0.0%	2.5%	12.9%	11.8%
Dinner	5.6%	27.3%	2.0%	3.2%	3.9%
Any part of the day	14.8%	36.4%	15.5%	3.2%	23.5%

	< €750	**€751-€1000**	**€1001-€1500**	**€1501-€2000**	**> €2000**	**No Response**
I do not consume	55.0%	63.5%	49.2%	32.3%	37.5%	35.8%
Breakfast	8.3%	9.6%	18.3%	20.8%	27.8%	21.8%
Brunch	5.0%	2.6%	3.2%	9.4%	1.4%	8.8%
Lunch	1.7%	2.6%	3.2%	5.2%	2.8%	3.6%
Afternoon snack	8.3%	6.1%	7.9%	3.1%	11.1%	4.7%
Dinner	13.3%	0.9%	4.8%	2.1%	5.6%	7.3%
Any part of the day	8.3%	14.8%	13.5%	27.1%	13.9%	18.1%

Section 4.2 – The time at which the natural fruit juices and smoothies are normally consumed

Most respondents who consume smoothies do so at various times throughout the day (16.5%).



Section 4.2 – The time at which the natural fruit juices and smoothies are normally consumed

	Female	Male
I do not consume	49.7%	58.5%
Breakfast	13.4%	7.1%
Brunch	4.3%	4.2%
Lunch	5.1%	4.5%
Afternoon snack	10.2%	9.3%
Dinner	2.4%	3.4%
Any part of the day	15.0%	13.0%

	18-24	25-30	31-40	41-50	51-65	65+
I do not consume	30.4%	37.5%	32.6%	50.0%	68.3%	79.4%
Breakfast	21.7%	16.7%	10.1%	8.6%	9.0%	5.5%
Brunch	0.0%	8.3%	8.7%	4.3%	4.1%	0.6%
Lunch	4.3%	4.2%	7.2%	7.1%	3.4%	2.4%
Afternoon snack	17.4%	12.5%	15.2%	10.0%	6.2%	3.6%
Dinner	0.0%	8.3%	1.4%	7.1%	0.7%	1.8%
Any part of the day	26.1%	12.5%	24.6%	12.9%	8.3%	6.7%

	Primary	Secondary	Tertiary	Other
I do not consume	83.3%	63.8%	38.4%	41.0%
Breakfast	5.1%	7.6%	12.9%	20.5%
Brunch	1.3%	3.7%	5.8%	2.6%
Lunch	3.8%	2.7%	7.7%	0.0%
Afternoon snack	2.6%	8.3%	12.9%	10.3%
Dinner	1.3%	4.7%	1.6%	5.1%
Any part of the day	2.6%	9.3%	20.6%	20.5%

Sagalytics

Section 4.2 – The time at which the natural fruit juices and smoothies are normally consumed

	Employed	Student	Retired	Unemployed	Other
I do not consume	39.6%	45.5%	77.0%	80.6%	70.6%
Breakfast	13.6%	0.0%	6.5%	3.2%	11.8%
Brunch	6.1%	0.0%	2.0%	3.2%	2.0%
Lunch	6.1%	9.1%	3.0%	0.0%	2.0%
Afternoon snack	12.9%	18.2%	4.5%	6.5%	2.0%
Dinner	4.6%	0.0%	1.0%	3.2%	0.0%
Any part of the day	17.2%	27.3%	6.0%	3.2%	11.8%

	< €750	€751-€1000	€1001-€1500	€1501-€2000	> €2000	No Response
I do not consume	75.0%	70.4%	57.1%	35.4%	37.5%	56.5%
Breakfast	3.3%	4.3%	7.9%	11.5%	18.8%	10.9%
Brunch	0.0%	0.9%	6.3%	11.5%	1.4%	4.7%
Lunch	5.0%	4.3%	7.9%	3.1%	3.5%	4.7%
Afternoon snack	8.3%	8.7%	9.5%	9.4%	14.6%	7.8%
Dinner	1.7%	5.2%	0.8%	2.1%	4.9%	2.6%
Any part of the day	6.7%	6.1%	10.3%	27.1%	19.4%	13.0%

Sagalytics

EXCEL4MED

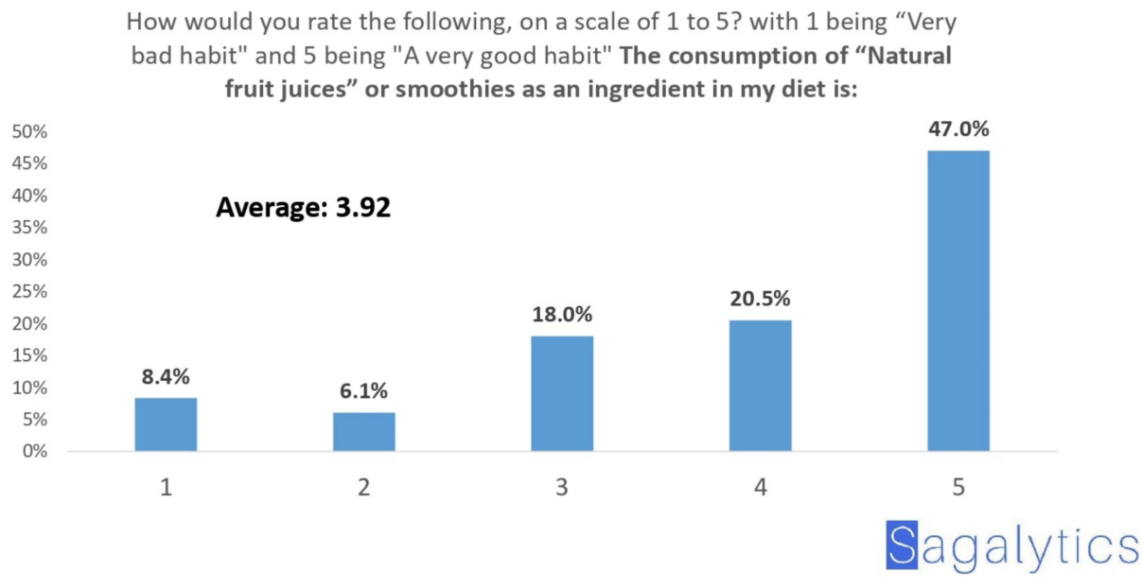
Section 4 – Consumption on natural fruit juices and smoothies

Section 4.3 – Natural fruit juices or smoothies as an ingredient in my diet

Sagalytics

Section 4.3 – Natural fruit juices or smoothies as an ingredient in my diet

Respondents were requested to assess the statement "The consumption of 'Natural fruit juices' or smoothies as an ingredient in my diet is:" on a scale of 1 to 5, where 1 represents "Very bad habit," and 5 denotes "A very good habit." The majority of respondents assigned a rating of 5 (47.0%). The average rating stands at 3.92 out of 5. This indicates that respondents perceive incorporating these two items into one's diet as a very good habit.



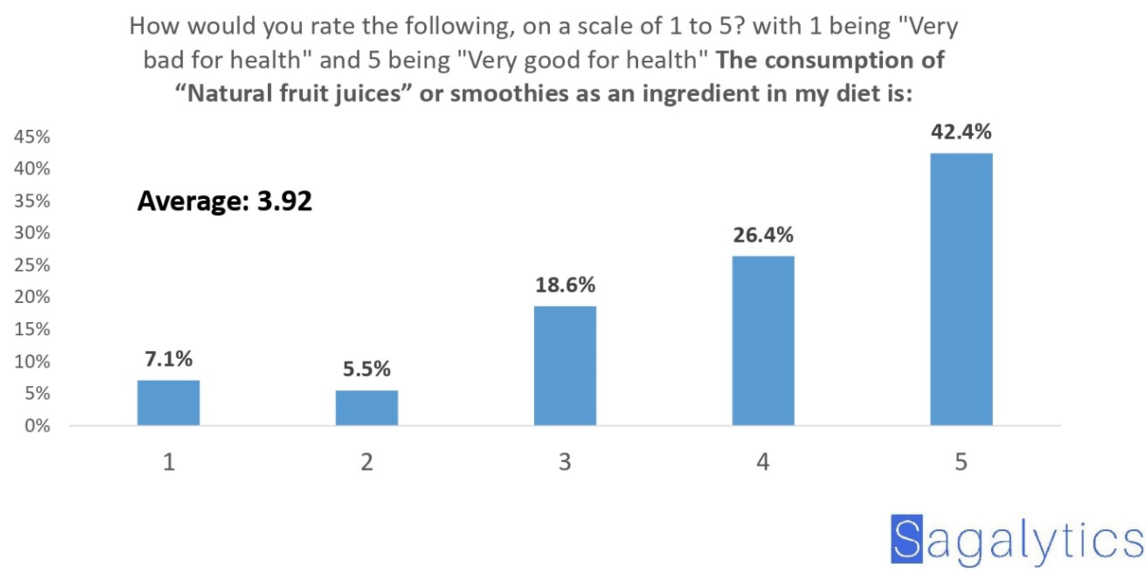
Section 4.3 – Natural fruit juices or smoothies as an ingredient in my diet

	Average:		Average:
Female	4.04	Employed	4.01
Male	3.77	Student	4.55
		Retired	3.76
18-24	3.96	Unemployed	3.18
25-30	3.88	Other	3.82
31-40	4.09		
41-50	4.15	< €750	3.84
51-65	3.97	€751-€1000	3.65
65+	3.55	€1001-€1500	4.04
		€1501-€2000	4.12
Primary	3.44	> €2000	3.72
Secondary	3.89	No Response	4.10
Tertiary	4.05		
Other	4.00		

Sagalytics

Section 4.3 – Natural fruit juices or smoothies as an ingredient in my diet

Respondents were additionally asked to evaluate the statement "The consumption of 'Natural fruit juices' or smoothies as an ingredient in my diet is" on a scale from 1 to 5, where 1 signifies "Very bad for health" and 5 represents "Very good for health." A majority of respondents assigned a rating of 5 (42.4%). The average rating is 3.92 out of 5, suggesting that respondents view integrating these two items into one's diet as a favourable choice.



Section 4.3 – Natural fruit juices or smoothies as an ingredient in my diet

	Average:		Average:
Female	4.03	Employed	3.97
Male	3.79	Student	4.45
		Retired	3.83
18-24	4.00	Unemployed	3.21
25-30	3.88	Other	3.85
31-40	4.10		
41-50	4.00	< €750	3.80
51-65	3.96	€751-€1000	3.58
65+	3.62	€1001-€1500	4.03
		€1501-€2000	4.20
Primary	3.35	> €2000	3.74
Secondary	3.87	No Response	4.09
Tertiary	4.07		
Other	4.00		

Sagalytics

Section 4 – Consumption on natural fruit juices and smoothies

Section 4.4 – Minerals and vitamins from natural fruit juices and smoothies

Section 4.4 – Minerals and vitamins from natural fruit juices and smoothies

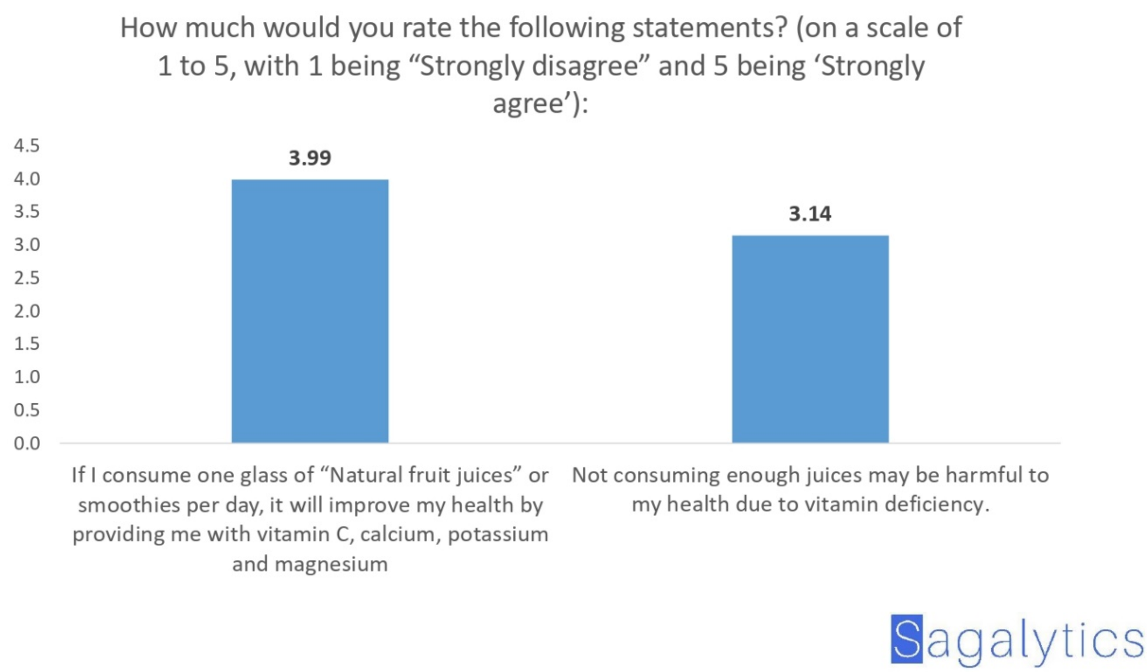
- The respondents were presented with the following two statements:

  1. If I consume one glass of "Natural fruit juices" or smoothies per day, it will improve my health by providing me with vitamin C, calcium, potassium, and magnesium.
  2. Not consuming enough juices may be harmful to my health due to vitamin deficiency.

- They were required to rate their agreement on a scale from 1 to 5, where 1 represented *Strongly disagree*, and 5 indicated *Strongly agree*. The average score for the first statement was 3.99 out of 5, suggesting a strong agreement with this statement. Additionally, the average score for the second statement was 3.14. Although slightly lower than the first score, respondents still believe that not consuming enough juices may be harmful to their health due to vitamin deficiency.
- The following tables present the results categorized by different demographic factors of the respondents.

Sagalytics

Section 4.4 – Minerals and vitamins from natural fruit juices and smoothies



Section 4.4 – Minerals and vitamins from natural fruit juices and smoothies

	If I consume one glass of "Natural fruit juices" or smoothies per day, it will improve my health by providing me with vitamin C, calcium, potassium and magnesium	Not consuming enough juices may be harmful to my health due to vitamin deficiency.
Female	4.08	3.14
Male	3.90	3.14
18-24	3.91	3.48
25-30	3.83	3.43
31-40	4.11	3.30
41-50	4.22	3.00
51-65	4.01	3.08
65+	3.80	2.92
Primary	3.69	2.88
Secondary	4.09	3.06
Tertiary	4.03	3.29
Other	3.59	3.08
Employed	4.01	3.21
Student	4.45	3.73
Retired	3.89	3.00
Unemployed	3.60	2.47
Other	4.18	3.16
< €750	4.18	3.16
€751-€1000	3.87	3.11
€1001-€1500	4.13	3.18
€1501-€2000	4.15	3.31
> €2000	3.91	3.10
No Response	3.90	3.08

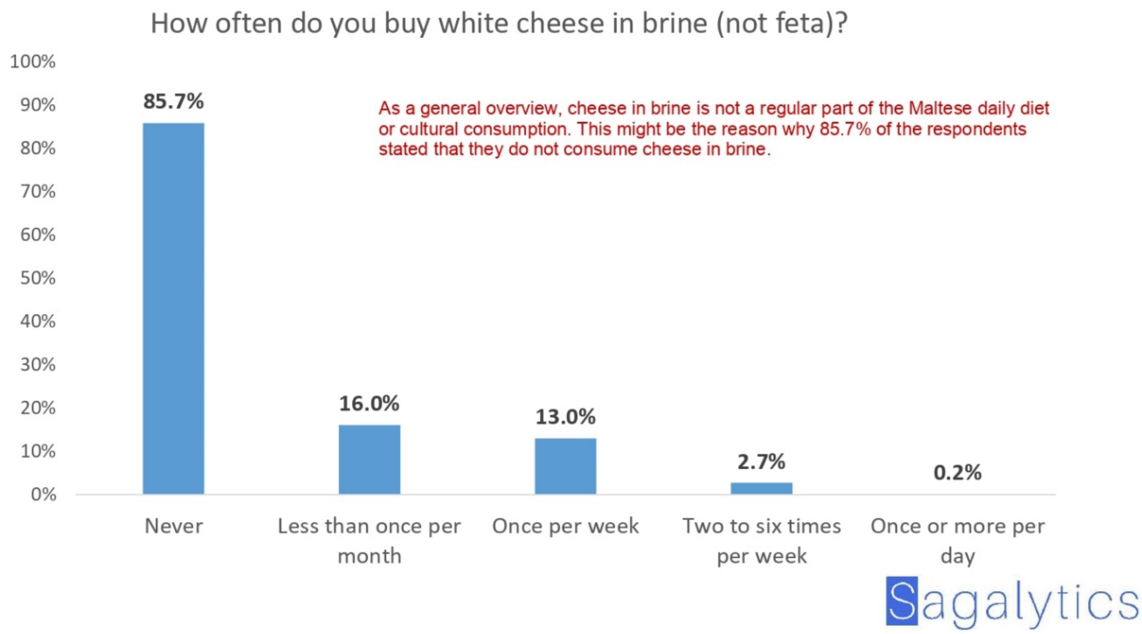
Sagalytics

Section 5 – Consumption on white cheese in brine

Section 5.1 – Frequency of buying white cheese in brine

Section 5.1 – Frequency of buying white cheese in brine

The bulk of respondents (85.7%) indicated that they refrain from consuming white cheese in brine (excluding feta). Only 15.9% of the respondents consume white cheese in brine at least once a week.



Section 5.1 – Frequency of buying white cheese in brine

	Female	Male
Never	74.3%	71.5%
Less than once per month	12.8%	14.7%
Once per week	8.6%	13.6%
Two to six times per week	4.0%	0.3%
Once or more per day	0.3%	0.0%

	18-24	25-30	31-40	41-50	51-65	65+
Never	60.9%	62.5%	53.6%	78.6%	84.8%	83.6%
Less than once per month	21.7%	16.7%	23.2%	7.1%	9.0%	10.9%
Once per week	17.4%	16.7%	20.3%	10.0%	4.1%	4.8%
Two to six times per week	0.0%	4.2%	2.9%	4.3%	1.4%	0.6%
Once or more per day	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%

	Primary	Secondary	Tertiary	Other
Never	76.9%	78.7%	67.7%	64.1%
Less than once per month	12.8%	9.3%	17.7%	17.9%
Once per week	9.0%	9.0%	12.3%	17.9%
Two to six times per week	1.3%	2.7%	2.3%	0.0%
Once or more per day	0.0%	0.3%	0.0%	0.0%

Sagalytics

Section 5.1 – Frequency of buying white cheese in brine

	Employed	Student	Retired	Unemployed	Other
Never	66.7%	45.5%	85.0%	64.5%	98.0%
Less than once per month	17.0%	9.1%	8.5%	29.0%	2.0%
Once per week	13.6%	36.4%	5.0%	6.5%	0.0%
Two to six times per week	2.7%	9.1%	1.0%	0.0%	0.0%
Once or more per day	0.0%	0.0%	0.5%	0.0%	0.0%

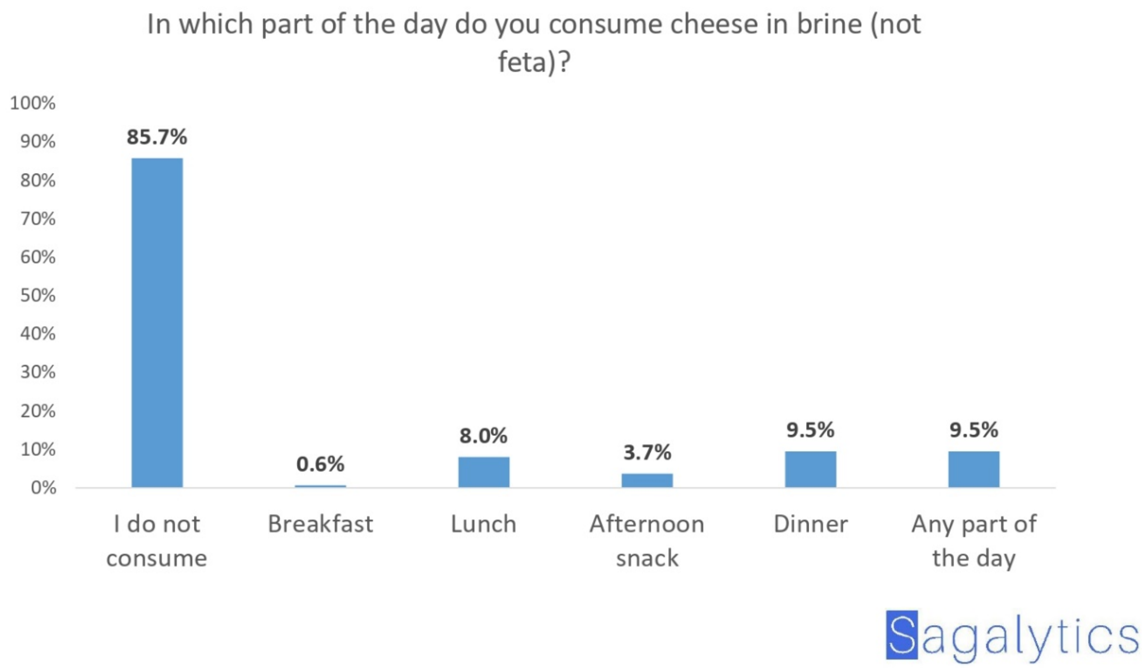
	< €750	€751-€1000	€1001-€1500	€1501-€2000	> €2000	No Response
Never	61.7%	78.3%	81.7%	71.9%	56.9%	79.8%
Less than once per month	23.3%	11.3%	9.5%	11.5%	23.6%	8.3%
Once per week	15.0%	7.8%	5.6%	10.4%	18.1%	10.4%
Two to six times per week	0.0%	1.7%	3.2%	6.3%	1.4%	1.6%
Once or more per day	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%

Section 5 – Consumption on white cheese in brine

Section 5.2 – The time at which the white cheese in brine is normally consumed

Section 5.2 – The time at which the white cheese in brine is normally consumed

White cheese in brine is generally consumed during dinner or at any part of the day (9.5%).



Section 5.2 – The time at which the white cheese in brine is normally consumed

	Female	Male
I do not consume	74.3%	72.3%
Breakfast	0.3%	0.9%
Lunch	5.9%	8.0%
Afternoon snack	2.7%	3.7%
Dinner	8.8%	7.1%
Any part of the day	8.0%	8.0%

	18-24	25-30	31-40	41-50	51-65	65+
I do not consume	60.9%	62.5%	53.6%	80.9%	84.8%	83.6%
Breakfast	4.3%	0.0%	0.0%	0.0%	0.7%	0.0%
Lunch	4.3%	16.7%	12.3%	4.4%	2.8%	4.8%
Afternoon snack	0.0%	12.5%	5.1%	0.0%	0.7%	3.6%
Dinner	8.7%	8.3%	16.7%	7.4%	4.8%	3.6%
Any part of the day	21.7%	0.0%	12.3%	7.4%	6.2%	4.2%

	Primary	Secondary	Tertiary	Other
I do not consume	76.9%	79.3%	67.7%	67.6%
Breakfast	1.3%	0.0%	1.0%	0.0%
Lunch	2.6%	5.7%	9.0%	8.1%
Afternoon snack	5.1%	2.3%	2.6%	10.8%
Dinner	9.0%	5.4%	10.3%	5.4%
Any part of the day	5.1%	7.4%	9.4%	8.1%

Sagalytics

Section 5.2 – The time at which the white cheese in brine is normally consumed

	Employed	Student	Retired	Unemployed	Other
I do not consume	67.4%	45.5%	85.0%	64.5%	98.0%
Breakfast	0.7%	0.0%	0.5%	0.0%	0.0%
Lunch	9.6%	0.0%	4.5%	6.5%	0.0%
Afternoon snack	4.2%	0.0%	2.5%	0.0%	2.0%
Dinner	9.8%	18.2%	3.5%	16.1%	0.0%
Any part of the day	8.3%	36.4%	4.0%	12.9%	0.0%

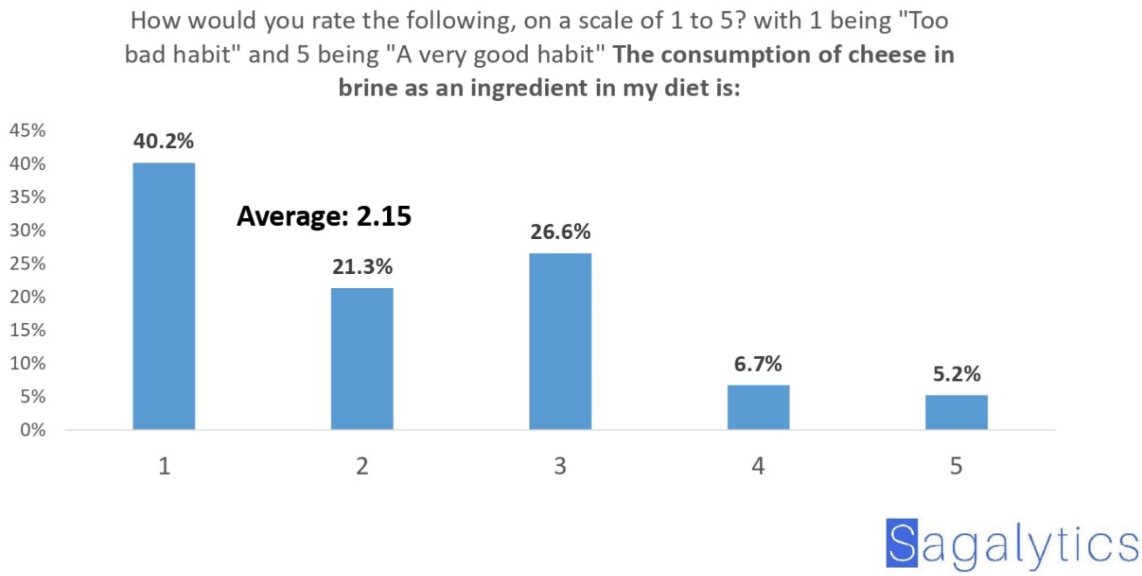
	< €750	€751-€1000	€1001-€1500	€1501-€2000	> €2000	No Response
I do not consume	61.7%	79.6%	81.7%	71.9%	57.7%	79.8%
Breakfast	5.0%	0.9%	0.0%	0.0%	0.0%	0.0%
Lunch	3.3%	3.5%	4.8%	9.4%	16.2%	3.1%
Afternoon snack	3.3%	5.3%	0.0%	0.0%	8.5%	1.6%
Dinner	10.0%	6.2%	10.3%	8.3%	8.5%	6.7%
Any part of the day	16.7%	4.4%	3.2%	10.4%	9.2%	8.8%

Section 5 – Consumption on white cheese in brine

Section 5.3 – White cheese in brine as an ingredient in my diet

Section 5.3 – White cheese in brine as an ingredient in my diet

The majority of respondents hold the belief that consuming white cheese in brine is a highly unfavourable practice. Respondents were tasked with rating the statement: "The consumption of cheese in brine as an ingredient in my diet is 1: very bad habit and 5: a very good habit." As indicated, a significant proportion assigned a value of 1 (40.2%). The average rating stands at 2.15 out of 5.



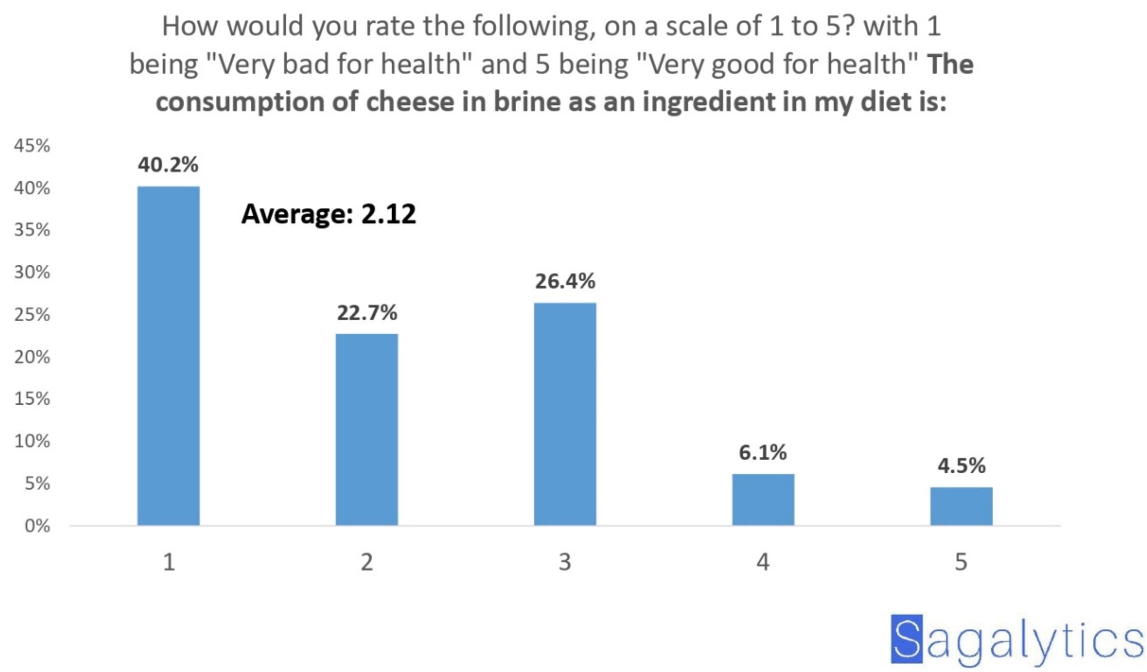
Section 5.3 – White cheese in brine as an ingredient in my diet

	Average:		Average:
Female	2.08	Employed	2.35
Male	2.23	Student	3.38
		Retired	1.72
18-24	2.88	Unemployed	1.75
25-30	2.09	Other	1.70
31-40	2.33		
41-50	2.39	< €750	1.71
51-65	2.03	€751-€1000	1.94
65+	1.67	€1001-€1500	1.99
		€1501-€2000	2.29
Primary	1.73	> €2000	2.41
Secondary	2.14	No Response	2.31
Tertiary	2.28		
Other	2.05		

Sagalytics

Section 5.3 – White cheese in brine as an ingredient in my diet

Consistent with the earlier findings in the preceding section, the majority of respondents believe that white cheese in brine is highly unhealthy.



Section 5.3 – White cheese in brine as an ingredient in my diet

	Average:		Average:
Female	2.06	Employed	2.22
Male	2.18	Student	3.63
		Retired	1.75
18-24	3.11	Unemployed	1.74
25-30	1.89	Other	2.06
31-40	2.34		
41-50	2.17	< €750	1.72
51-65	2.00	€751-€1000	2.00
65+	1.70	€1001-€1500	1.94
		€1501-€2000	2.24
Primary	1.75	> €2000	2.39
Secondary	2.10	No Response	2.20
Tertiary	2.25		
Other	2.00		

Section 5 – Consumption on white cheese in brine

Section 5.4 – Minerals and vitamins from white cheese in brine

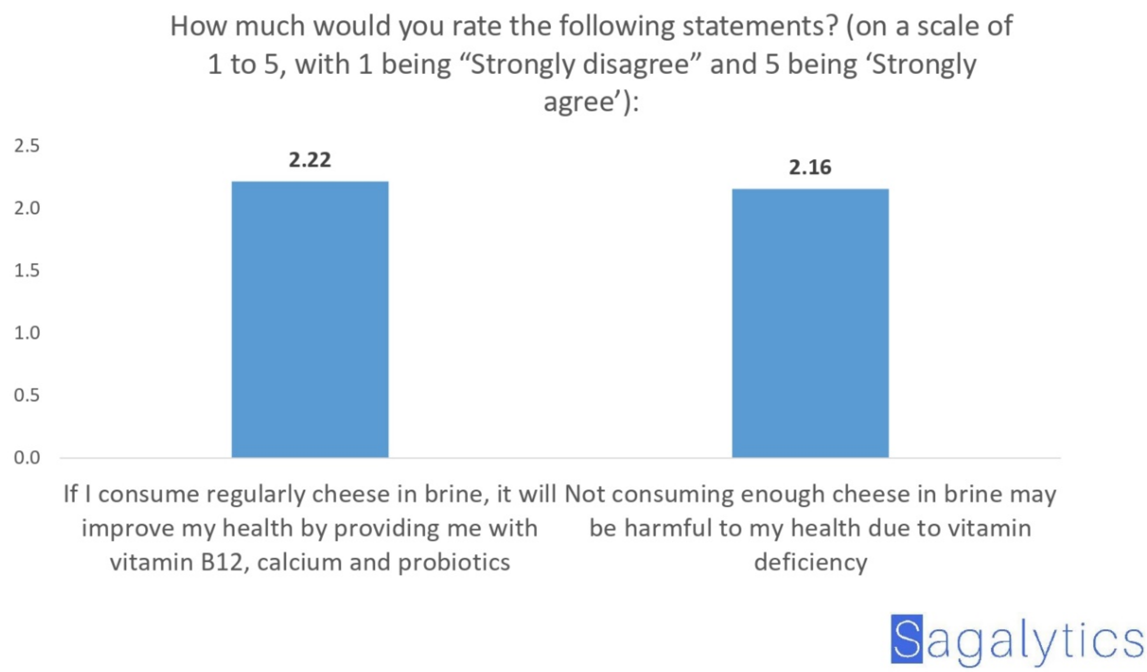
Section 5.4 – Minerals and vitamins from white cheese in brine

- The respondents were presented with the following two statements:

  1. If I consume regularly cheese in brine, it will improve my health by providing me with vitamin B12, calcium and probiotics
  2. Not consuming enough cheese in brine may be harmful to my health due to vitamin deficiency

- Respondents were tasked with providing ratings on a scale from 1 to 5, where 1 denoted "Strongly disagree," and 5 signified "Strongly agree." The average score for the first statement was 2.22 out of 5, indicating a relatively modest agreement with the statement. Moreover, the average score for the second statement was 2.16. Though marginally lower than the first score, respondents still maintain the belief that not consuming enough cheese in brine may not be harmful to their health due to vitamin deficiency.
- The following tables present the results categorized by different demographic factors of the respondents.

Section 5.4 – Minerals and vitamins from white cheese in brine



Section 5.4 – Minerals and vitamins from white cheese in brine

	If I consume regularly cheese in brine, it will improve my health by providing me with vitamin B12, calcium and probiotics	Not consuming enough cheese in brine may be harmful to my health due to vitamin deficiency
Female	2.17	2.02
Male	2.26	2.30
18-24	3.05	2.42
25-30	2.23	2.10
31-40	2.22	2.37
41-50	2.47	2.50
51-65	2.11	1.94
65+	1.75	1.81
Primary	1.92	2.02
Secondary	2.20	2.16
Tertiary	2.34	2.22
Other	1.92	1.95
Employed	2.35	2.37
Student	3.00	2.25
Retired	1.82	1.77
Unemployed	2.03	2.07
Other	2.34	1.97
< €750	2.10	2.08
€751-€1000	2.22	2.15
€1001-€1500	2.07	2.24
€1501-€2000	2.22	2.06
> €2000	2.41	2.18
No Response	2.20	2.16

Section 6 – Novel food products

Section 6.1 – Willingness to try novel food products

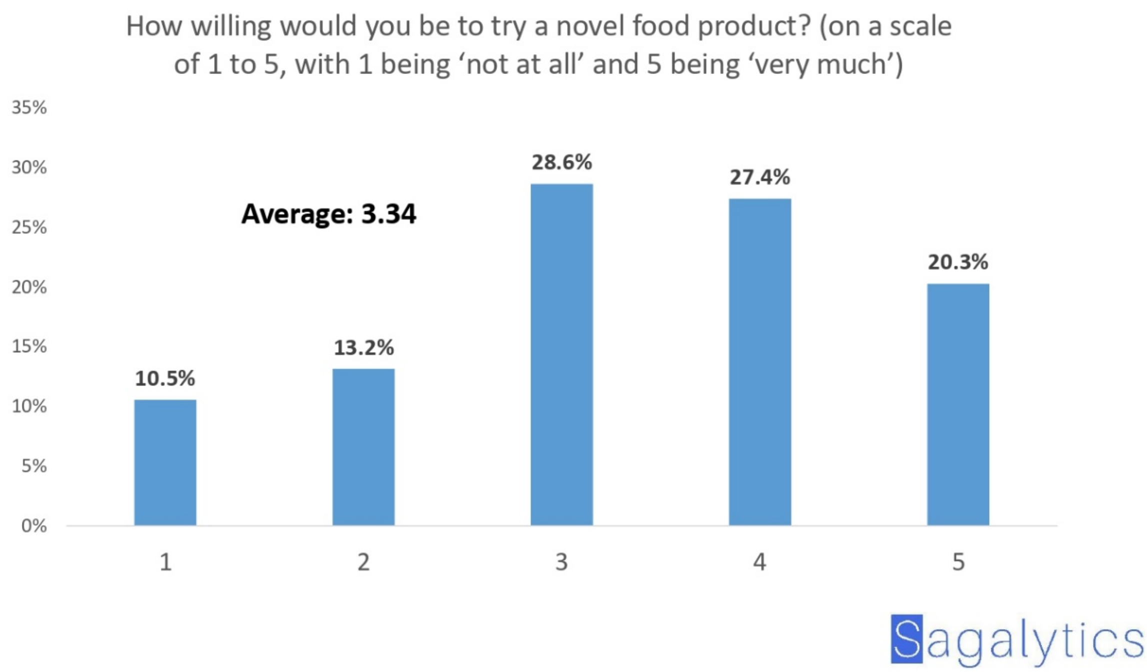
Sagalytics

Section 6.1 – Willingness to try novel food products

- Respondents were requested to express their willingness, ranging from 1 to 5, to try novel food products, where 1 signifies 'not at all' and 5 denotes 'very much.' The average score, at 3.34 out of 5, indicates a considerable interest among respondents in experimenting with new products.
- Female respondents exhibit a higher willingness to try new products compared to their male counterparts, with an average score of 3.40 for females versus 3.29 for males.
- In contrast, the elderly display the least willingness to try novel food products, with an average score of 2.63 out of 5.
- Furthermore, there is a positive correlation between the respondents' level of education and their inclination to try new food products—the higher the education, the greater the likelihood of trying novel items.

Sagalytics

Section 6.1 – Willingness to try novel food products



Section 6.1 – Willingness to try novel food products

	Average:
Female	3.40
Male	3.29
18-24	3.26
25-30	3.88
31-40	3.63
41-50	3.89
51-65	3.10
65+	2.63
Primary	2.59
Secondary	3.25
Tertiary	3.69
Other	2.76

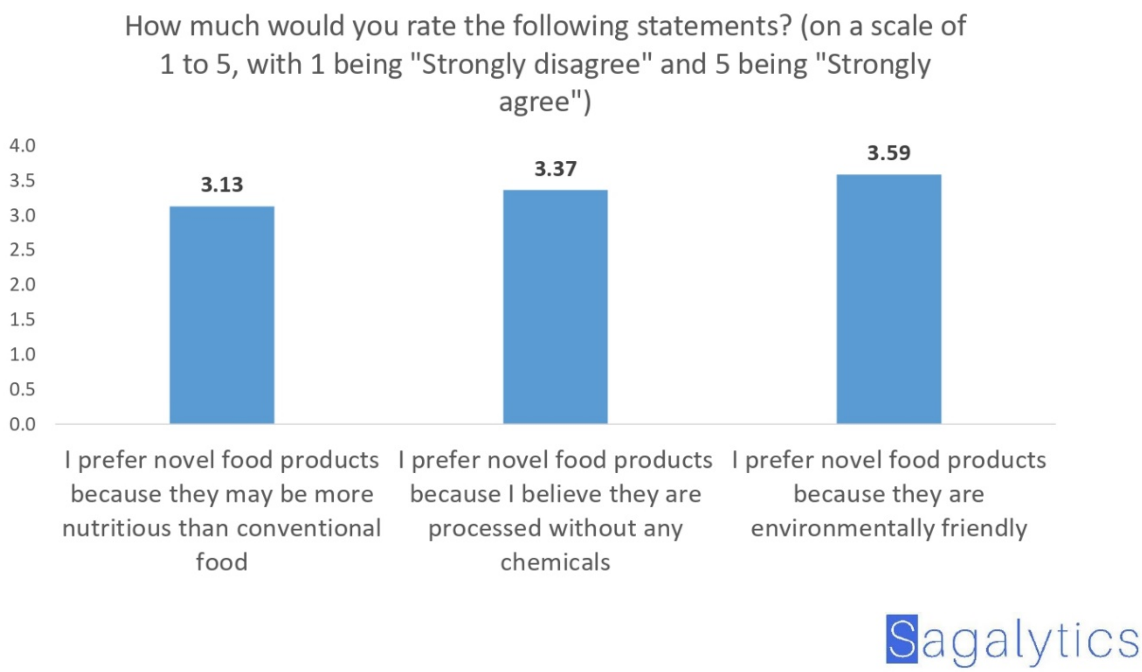
	Average:
Employed	3.67
Student	3.55
Retired	2.74
Unemployed	3.13
Other	2.96
< €750	3.07
€751-€1000	2.70
€1001-€1500	3.32
€1501-€2000	3.72
> €2000	3.62
No Response	3.42

Sagalytics

Section 6 – Novel food products

Section 6.2 – Reasons for preferring novel food products

Section 6.2 – Reasons for preferring novel food products



Section 6.2 – Reasons why preferring novel food products

- Respondents were queried about their level of agreement with the following statements:
  1. I prefer novel food products because they may be more nutritious than conventional food.
  2. I prefer novel food products because I believe they are processed without any chemicals.
  3. I prefer novel food products because they are environmentally friendly.
- Using a scale where 1 represents "Strongly disagree" and 5 signifies "Strongly agree," respondents expressed the highest agreement with the third statement (3.59). This suggests a relatively strong positive inclination towards preferring novel food products due to their perceived environmental friendliness. On the other hand, the first statement garnered the least agreement (3.13) indicating a somewhat lower level of preference for novel food products based on the belief that they may be more nutritious than conventional food.
- Further detailed results based on the demographics of the respondents are provided on the following page.

Section 6.2 – Reasons why preferring novel food products

	I prefer novel food products because they may be more nutritious than conventional food	I prefer novel food products because I believe they are processed without any chemicals	I prefer novel food products because they are environmentally friendly
Female	3.20	3.43	3.60
Male	3.05	3.30	3.59
18-24	3.00	3.05	3.14
25-30	3.38	3.25	3.33
31-40	3.56	3.38	3.74
41-50	3.36	3.70	3.81
51-65	2.86	3.38	3.59
65+	2.78	3.23	3.57
Primary	2.91	3.14	3.24
Secondary	3.02	3.52	3.80
Tertiary	3.32	3.31	3.46
Other	2.95	3.03	3.67
Employed	3.28	3.41	3.56
Student	3.60	3.40	3.30
Retired	2.82	3.35	3.72
Unemployed	2.74	3.19	3.29
Other	3.00	3.08	3.63
< €750	2.96	3.47	3.32
€751-€1000	2.67	3.25	3.41
€1001-€1500	3.20	3.48	3.74
€1501-€2000	3.68	3.66	3.80
> €2000	3.47	3.37	3.70
No Response	2.89	3.18	3.49

Sagalytics

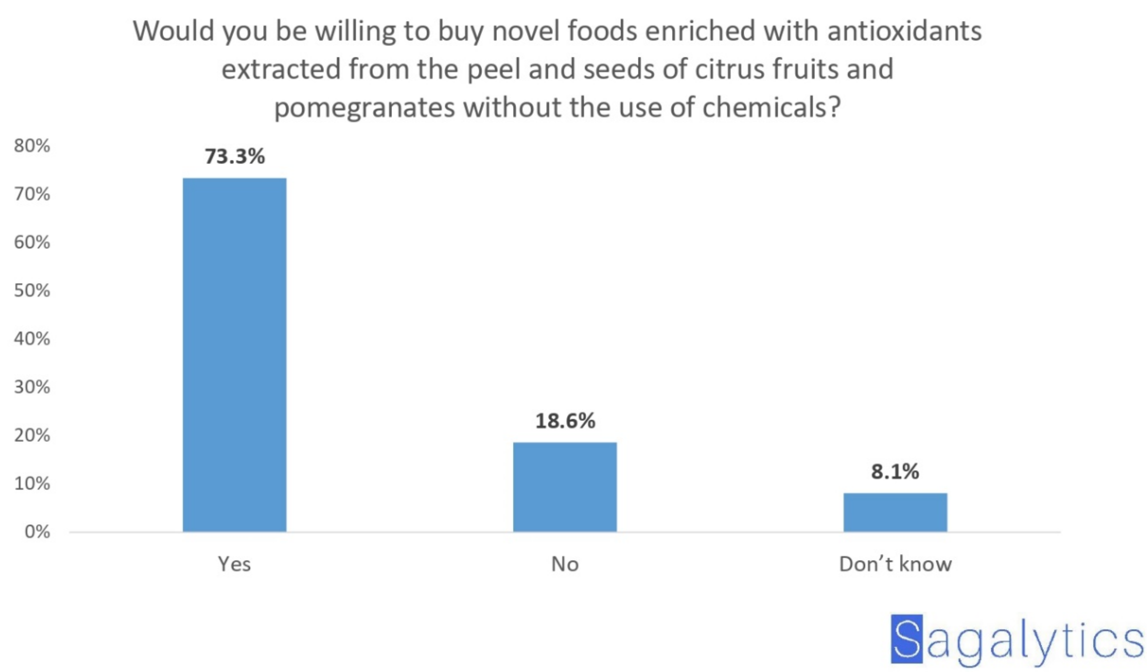
Section 6 – Novel food products

Section 6.3 – Willingness to buy novel food products

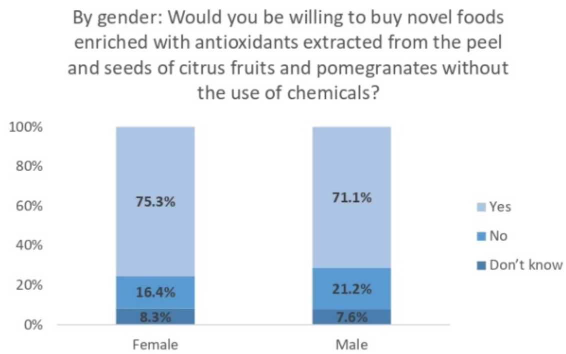
Section 6.3 – Willingness to buy novel food products

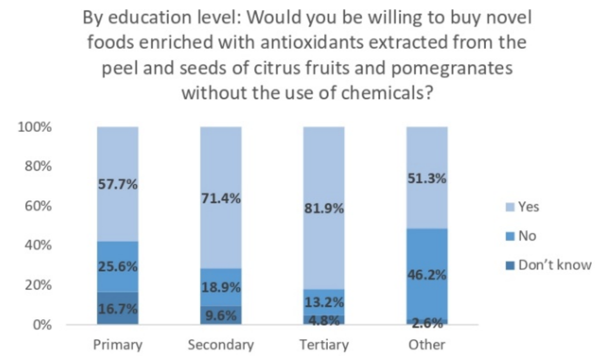
- Approximately three-quarters of respondents express a willingness to purchase novel foods enhanced with antioxidants extracted from the peel and seeds of citrus fruits and pomegranates, and notably, without the use of chemicals (73.3%). Conversely, only 18.6% declined, while 8.1% remain uncertain about such products.
- Among age groups, young respondents exhibit the highest willingness, with an impressive 95.7% expressing their readiness to buy these novel food products. In contrast, the elderly display the least enthusiasm, with only 59.4% expressing a willingness to purchase.
- The educational background of respondents appears to influence their willingness to buy these novel food products positively. Those with higher levels of education demonstrate a greater inclination to purchase.
- Moreover, high-income earners show the highest willingness at 79.9% to buy these products. This suggests that economic factors play a role in shaping consumer attitudes towards these specific novel food products.

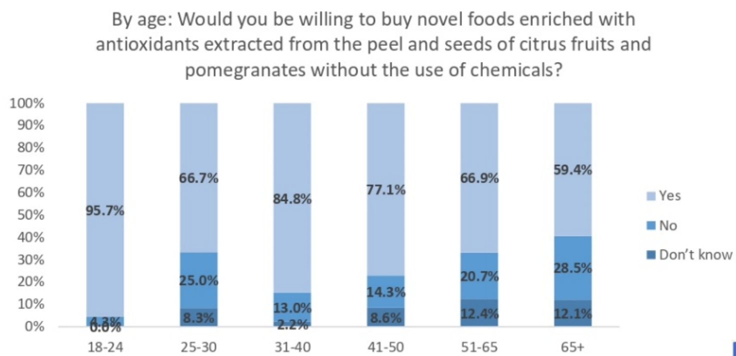
Section 6.3 – Willingness to buy novel food products



Section 6.3 – Willingness to buy novel food products

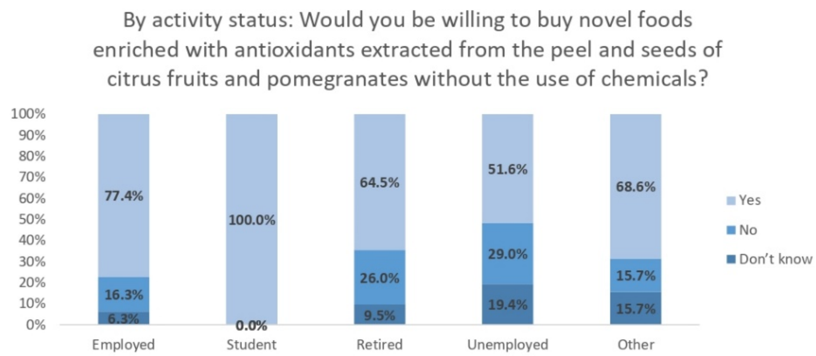


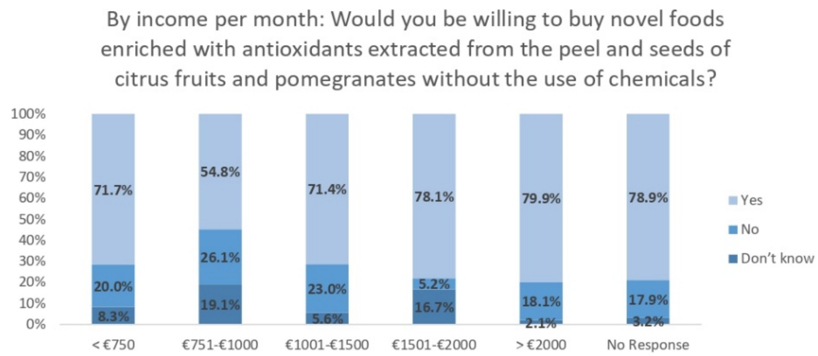




Sagalytics

Section 6.3 – Willingness to buy novel food products





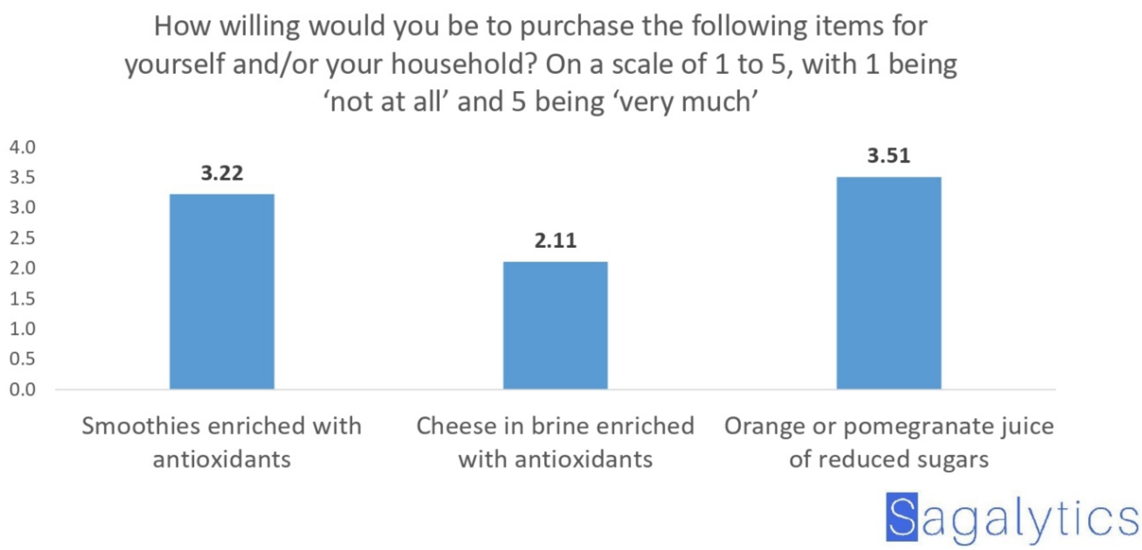
Sagalytics

Section 6 – Novel food products

Section 6.4 – Preferred food items to buy

Section 6.4 – Preferred food items to buy

Among the respondents, the favoured item is orange or pomegranate juice, receiving a rating of 3.51. On the contrary, the least preferred item is Cheese in brine enriched with antioxidants, earning a score of 2.11. The scale, ranging from 1 to 5, signifies the following: 1 denotes "not at all willing to buy," while 5 signifies "very much willing to buy."



Section 6.4 – Preferred food items to buy

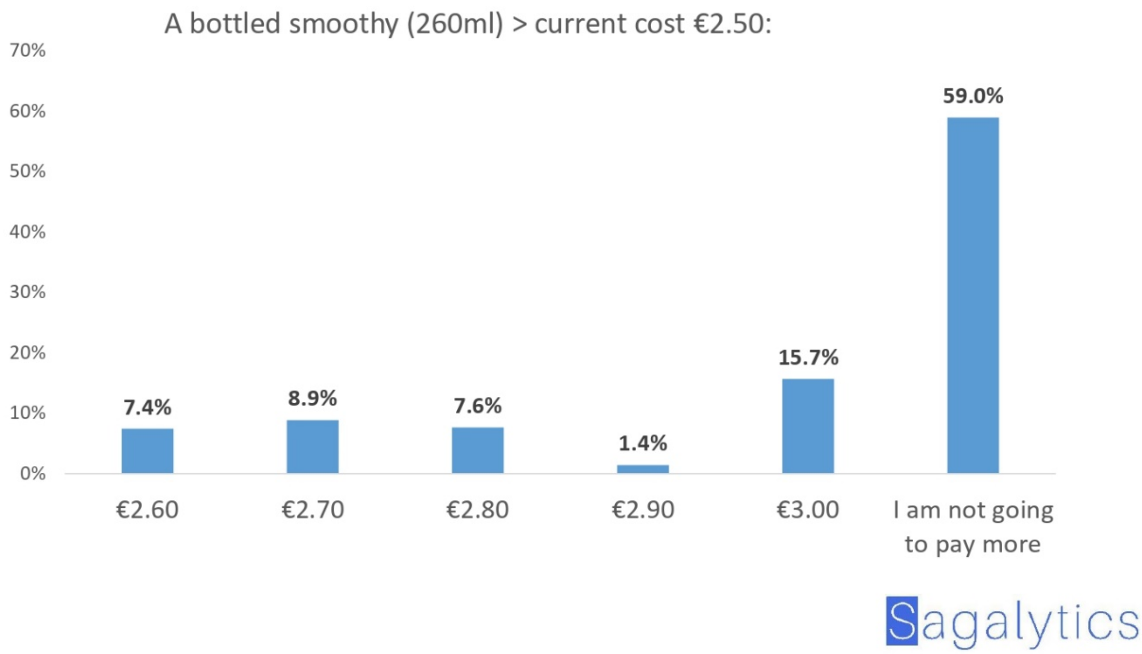
	Smoothies enriched with antioxidants	Cheese in brine enriched with antioxidants	Orange or pomegranate juice of reduced sugars
Female	3.23	2.13	3.40
Male	3.21	2.09	3.62
18-24	3.55	2.35	3.95
25-30	2.88	2.81	3.31
31-40	3.73	2.36	3.81
41-50	3.35	2.22	3.52
51-65	2.95	1.78	3.31
65+	2.73	1.49	3.15
Primary	2.95	1.85	3.26
Secondary	2.90	1.95	3.36
Tertiary	3.53	2.30	3.64
Other	3.50	2.00	3.95
Employed	3.46	2.38	3.68
Student	3.27	2.40	3.73
Retired	2.70	1.55	3.20
Unemployed	2.94	2.00	3.19
Other	3.06	1.50	2.97
< €750	2.95	1.67	3.23
€751-€1000	2.75	2.00	3.16
€1001-€1500	3.08	1.84	3.47
€1501-€2000	3.64	2.52	3.67
> €2000	3.44	2.57	3.52
No Response	3.23	1.83	3.69

Section 6 – Novel food products

Section 6.5 – Price for these new products

Section 6.5 – Price for these new products

The majority of respondents are unwilling to pay more than the current cost price for all three products. This might due to the current high inflation and increase in prices for various products.



Section 6.5 – Price for these new products

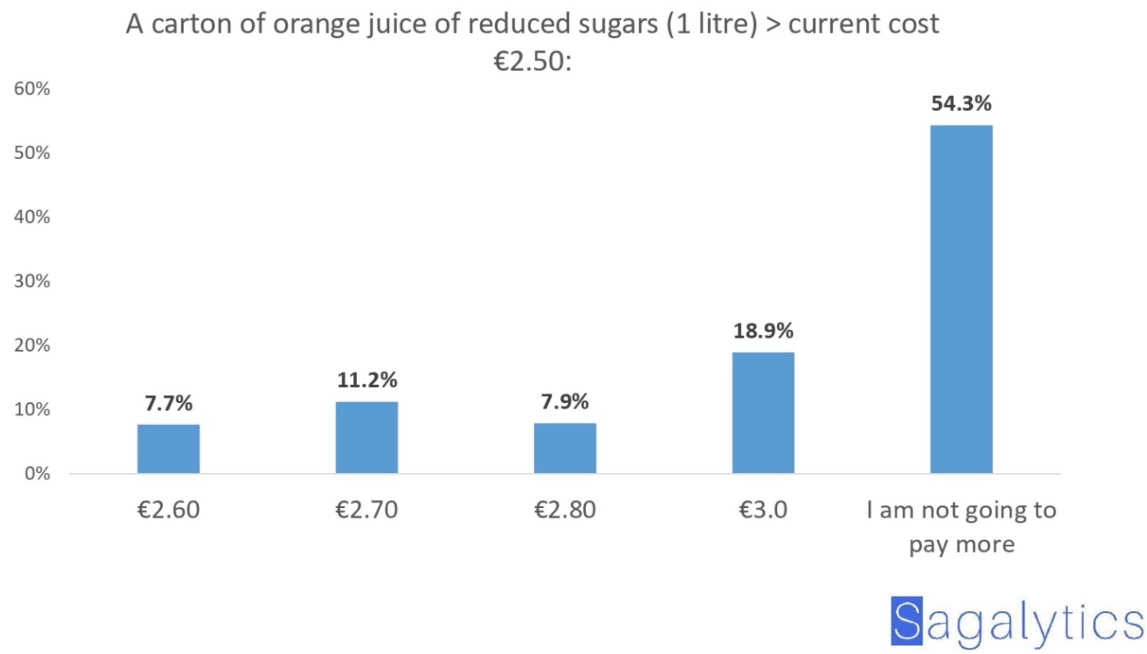
	€2.60	€2.70	€2.80	€2.90	€3.00	I am not going to pay more
Female	7.8%	5.8%	7.0%	2.3%	18.7%	58.4%
Male	7.2%	12.2%	8.4%	0.4%	12.7%	59.1%
18-24	4.5%	4.5%	9.1%	0.0%	27.3%	54.5%
25-30	12.5%	6.3%	12.5%	6.3%	12.5%	50.0%
31-40	8.8%	12.3%	7.0%	0.0%	22.8%	49.1%
41-50	6.0%	10.0%	10.0%	2.0%	14.0%	58.0%
51-65	12.2%	8.5%	2.4%	2.4%	11.0%	63.4%
65+	2.3%	8.1%	7.0%	0.0%	5.8%	76.7%
Primary	7.3%	7.3%	0.0%	2.4%	7.3%	75.6%
Secondary	5.2%	6.2%	7.7%	1.0%	14.9%	64.9%
Tertiary	9.4%	11.5%	9.0%	1.6%	18.0%	50.4%
Other	5.9%	5.9%	5.9%	0.0%	11.8%	70.6%
Employed	8.2%	11.1%	8.5%	1.3%	16.7%	54.2%
Student	9.1%	0.0%	9.1%	0.0%	27.3%	54.5%
Retired	5.5%	7.3%	7.3%	0.9%	5.5%	73.4%
Unemployed	13.3%	0.0%	6.7%	13.3%	6.7%	60.0%
Other	3.3%	6.7%	0.0%	0.0%	26.7%	63.3%
< €750	12.2%	2.4%	14.6%	0.0%	9.8%	61.0%
€751-€1000	3.7%	9.3%	3.7%	0.0%	3.7%	79.6%
€1001-€1500	8.0%	10.3%	11.5%	3.4%	18.4%	48.3%
€1501-€2000	6.8%	5.4%	10.8%	0.0%	25.7%	51.4%
> €2000	10.7%	18.8%	8.9%	3.6%	11.6%	46.4%
No Response	4.7%	3.1%	1.6%	0.0%	18.6%	72.1%

Section 6.5 – Price for these new products

Section 6.5 – Price for these new products

	€4.20	€4.40	€4.60	€4.80	€5.00	I am not going to pay more
Female	7.9%	2.1%	4.5%	0.8%	7.0%	77.7%
Male	9.2%	4.6%	3.7%	0.9%	6.4%	75.2%
18-24	5.6%	5.6%	5.6%	0.0%	5.6%	77.8%
25-30	18.8%	0.0%	0.0%	0.0%	12.5%	68.8%
31-40	9.1%	8.2%	6.4%	3.6%	4.5%	68.2%
41-50	8.3%	0.0%	6.3%	0.0%	12.5%	72.9%
51-65	10.7%	1.3%	2.7%	0.0%	2.7%	82.7%
65+	1.3%	2.6%	1.3%	0.0%	3.9%	90.9%
Primary	5.6%	5.6%	5.6%	0.0%	2.8%	80.6%
Secondary	6.1%	0.6%	7.7%	2.2%	7.7%	75.7%
Tertiary	11.1%	5.3%	1.3%	0.0%	6.2%	76.0%
Other	5.6%	0.0%	0.0%	0.0%	11.1%	83.3%
Employed	11.7%	3.4%	4.1%	1.4%	8.9%	70.4%
Student	0.0%	11.1%	11.1%	0.0%	0.0%	77.8%
Retired	4.1%	2.1%	2.1%	0.0%	5.2%	86.6%
Unemployed	6.7%	0.0%	13.3%	0.0%	0.0%	80.0%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
< €750	0.0%	7.7%	0.0%	0.0%	5.1%	87.2%
€751-€1000	5.8%	1.9%	0.0%	0.0%	5.8%	86.5%
€1001-€1500	6.0%	1.2%	6.0%	0.0%	7.1%	79.8%
€1501-€2000	11.3%	7.0%	8.5%	0.0%	5.6%	67.6%
> €2000	13.4%	4.5%	4.5%	1.8%	11.6%	64.3%
No Response	7.8%	0.0%	2.9%	1.9%	2.9%	84.5%

Section 6.5 – Price for these new products



Section 6.5 – Price for these new products

	€2.60	€2.70	€2.80	€3.0	I am not going to pay more
Female	6.4%	11.7%	7.9%	18.9%	55.1%
Male	9.2%	10.8%	7.9%	18.8%	53.3%
18-24	0.0%	18.2%	4.5%	31.8%	45.5%
25-30	0.0%	18.8%	12.5%	18.8%	50.0%
31-40	9.4%	11.1%	9.4%	21.4%	48.7%
41-50	11.8%	9.8%	11.8%	13.7%	52.9%
51-65	5.9%	4.7%	4.7%	17.6%	67.1%
65+	12.4%	10.1%	4.5%	13.5%	59.6%
Primary	14.3%	9.5%	2.4%	16.7%	57.1%
Secondary	8.2%	10.7%	10.2%	15.3%	55.6%
Tertiary	6.4%	12.4%	7.2%	22.1%	51.8%
Other	5.0%	5.0%	5.0%	20.0%	65.0%
Employed	7.1%	11.0%	10.1%	18.8%	52.9%
Student	0.0%	27.3%	0.0%	36.4%	36.4%
Retired	9.6%	7.8%	7.0%	13.0%	62.6%
Unemployed	26.7%	26.7%	0.0%	6.7%	40.0%
Other	6.1%	3.0%	3.0%	21.2%	66.7%
< €750	12.2%	12.2%	7.3%	7.3%	61.0%
€751-€1000	3.6%	1.8%	7.3%	34.5%	52.7%
€1001-€1500	13.8%	16.1%	13.8%	16.1%	40.2%
€1501-€2000	14.9%	4.1%	12.2%	17.6%	51.4%
> €2000	6.3%	15.2%	7.1%	15.2%	56.3%
No Response	1.4%	12.2%	2.9%	21.6%	61.9%

Sagalytics

Appendix

Questionnaire

Questionnaire

EXCEL4MED / Consumer survey

1. **How would you rate the following (on a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much'? When I buy food, I am a person who values:**

   a. Naturalness of food ______
   (For natural food, we mean food without human intervention/processing)

   b. Food with added vitamins ______
   (Foods fortified with added vitamins)

   c. Other additives used in foods ______
   (Additives may be colourings, flavour enhancers, preservatives or antioxidants)

   d. Traditional foods ______
   (Foods that have been consumed, raw or cooked for many generations)

   e. Environmental Protection ______
   (Foods that their production protects the natural environment and/or have a low carbon footprint and/or reduce food waste)

   f. Health benefits ______
   (Foods that are beneficial to your health such as fruits and vegetables)

   g. Taste ______
   (The taste of the food product)

   h. Locally produced ______
   (Foods which are grown and produced locally)

EXCEL4MED

Questionnaire

2. **Do you read the labels of ingredients of the food products? (select one)**

   a. □ Always
   b. □ Most of the time
   c. □ Sometimes
   d. □ Rarely
   e. □ Never

3. **How willing would you be to try a novel food product?** (on a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much')
   (*For **novel food product**, we mean a food product that didn't exist before*).

   Not at all__1__2__3__4__5 **Very much**

4. **How much would you rate the following statements?** (on a scale of 1 to 5, with 1 being "Strongly disagree" and 5 being 'Strongly agree')

   a) I prefer novel food products because they may be more nutritious than conventional food.
      Strongly disagree __1__2__3__4__5 **Strongly agree** __I don't know
   b) I prefer novel food products because I believe they are processed without any chemicals.
      Strongly disagree __1__2__3__4__5 **Strongly agree** __I don't know
   c) I prefer novel food products because they are environmentally friendly.
      Strongly disagree __1__2__3__4__5 **Strongly agree** __I don't know

5. **How often do you consume packaged "natural fruit juices"?**
   (*Juices made with only 100% fruit juice with no additives*)

   a. Never
   b. □ Less than 1 glass per month
   c. □ 1 glass per week
   d. □ 2 to 6 glasses per week
   e. □ 1 glass per day
   f. □ More than 1 glass per day

6. **In which part of the day do you consume "natural fruit juices"?**

   a. I do not consume
   b. Breakfast
   c. Brunch
   d. Lunch
   e. Afternoon snack
   f. Dinner
   g. Any part of the day

Sagalytics

Questionnaire

7. **How often do you consume smoothies?**
   (*These may be both from grocery stores as well as coffee shops and bars*)

   a. □ Never
   b. □ Less than 1 per month
   c. □ 1 per week
   d. □ 2 to 6 per week
   e. □ 1 per day
   f. □ More than 1 per day

8. **In which part of the day do you consume smoothies?**

   a. I do not consume
   b. Breakfast
   c. Brunch
   d. Lunch
   e. Afternoon snack
   f. Dinner
   g. Any part of the day

9. **How often do you buy white cheese in brine (not feta)?**

   a. □ Never
   b. □ Less than once per month
   c. □ Once per week
   d. □ Two to six times per week
   e. □ Once or more per day

10. **In which part of the day do you consume cheese in brine (not feta)?**

    a. I do not consume
    b. Breakfast
    c. Brunch
    d. Lunch
    e. Afternoon snack
    f. Dinner
    g. Any part of the day

11. **How would you rate the following, on a scale of 1 to 5?**

    a. The consumption of "Natural fruit juices" or smoothies as an ingredient in my diet is:

Sagalytics

Questionnaire

Too bad habit__1__2__3__4__5 A very good habit

b. The consumption of "Natural fruit juices" or smoothies as an ingredient in my diet is:

Very bad for health__1__2__3__4__5 Very good for health

c. The consumption of cheese in brine as an ingredient in my diet is:

Too bad habit__1__2__3__4__5 A very good habit

d. The consumption of cheese in brine as an ingredient in my diet is:

Very bad for health__1__2__3__4__5 Very good for health

12. How would you rate the following, on a scale of 1 to 5?

a. If I consume one glass of "Natural fruit juices" or smoothies per day, it will improve my health by providing me with vitamin C, calcium, potassium and magnesium.

Strongly disagree__1__2__3__4__5 Strongly agree

b. Not consuming enough juices may be harmful to my health due to vitamin deficiency.

Strongly disagree__1__2__3__4__5 Strongly agree

c. If I consume regularly cheese in brine, it will improve my health by providing me with vitamin B12, calcium and probiotics.

Strongly disagree__1__2__3__4__5 Strongly agree

d. Not consuming enough cheese in brine may be harmful to my health due to vitamin deficiency.

Strongly disagree__1__2__3__4__5 Strongly agree

Sagalytics

Questionnaire

13. **Would you be willing to buy novel foods enriched with antioxidants extracted from the peel and seeds of citrus fruits and pomegranates without the use of chemicals?**

    *(**Antioxidants** are compounds in foods that neutralise harmful free radicals preventing cell damage. The **novel production process** of the products mentioned above contributes to the reduction of food waste and supports the income of smallholders from a circular economy perspective)*

    a. □ Yes
    b. □ No
    c. □ I don't understand what these food products are

14. **If you answered YES to the above question (question 13) how willing would you be to purchase the following items for yourself and/or your household?**

    On a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much'.
    Mark X if you do not buy or would not buy these products.

    a. Smoothies **enriched with antioxidants**: ________
    b. Cheese in brine **enriched with antioxidants**: ________
    c. Orange or pomegranate juice **of reduced sugars**: ________

15. **For those products that you selected above, how much would you be willing to pay:**

    a. [show product] a bottled smoothy (260ml) > current cost €2.50:

       €2.50__€2.60__€2.70__€2.80__€2.90__€3.00

    b. [show product] a packet of white cheese in brine (300gr) > current cost €4.00:

       €4.00__€4.20__€4.40__€4.60__€4.80__€5.00

    c. [show product] a carton of orange juice of reduced sugars (1 litre) > current cost €2.50:

       €2.50__€2.60__€2.70__€2.80__€2.90__€3.00

Questionnaire

16. What gender do you identify with?

a. ◻ Female
b. ◻ Male
c. ◻ Other

17. What is your age?

a. ◻ 18-24
b. ◻ 25-30
c. ◻ 31-40
d. ◻ 41-50
e. ◻ 51-65
f. ◻ Over 65

18. What is the highest level of education you completed?

a. ◻ Primary
b. ◻ Secondary
c. ◻ Tertiary
d. ◻ Other

19. What is the monthly (family) income of your household?

a. ◻ under 750 €
b. ◻ 751-1000 €
c. ◻ 1001-1500 €
d. ◻ 1501-2000 €
e. ◻ over 2001 €

20. What is your occupation?

a. ◻ Employed
b. ◻ Student
c. ◻ Retired
d. ◻ Unemployed
e. ◻ Other

The End

Sagalytics