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Proceeding Paper

Social Research: How People Realize Information Related to Sustainability/Circular Economy, Their Perception and Purchase Options. A Survey Particularly Based on the Island of Lemnos †

Kiouranakis G. [1], Ioannou Z. [1], Papanikolaou S. [2] and Sarris D. [1]

[1] Laboratory of Physico-Chemical and Biotechnological Valorization of Food by-Products, Department of Food Science & Nutrition, School of Environment, University of the Aegean, Leoforos Dimokratias 66, 81400 Myrina, Lemnos, Greece; email1@email.com (K.G.); email2@email.com (I.Z.); email3@email.com (S.D.)
[2] Department of Food Science and Human Nutrition, Agricultural University of Athens, 75, Iera Odos, 11855 Athens, Greece; email4@email.com
* Correspondence: dsarris@aegean.gr
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Abstract: Agro-industrial waste biotechnology refers to the applications of biotechnological processes and techniques to convert agricultural/agro-industrial waste into valuable products. The food and agricultural industries generate significant amounts of waste during processing and production, including by-products from crops, fruits, vegetables, and other agricultural products. By using biotechnological techniques such as fermentation, enzymatic conversion, and microbial processes, it is possible to convert these waste materials into various useful products. But how do people get this information (and others generated from this field of science) in their daily lives? This study aims to cover this and provide an approach to how they ultimately relate to their purchasing options. A total of 120 people (37.5% men, 62.5% women) from 6 different parts of Greece (34.2% from Lemnos) took part in this survey. The key result of the survey was that 85.0% of respondents responded positively to their awareness of sustainability/circular economy. In addition, 64.6% of participants answered negatively when asked whether they thought the information they received from the media and public bodies on the topic of sustainability/circular economy was sufficient for them. 36.7% of participants responded that they would be willing to pay 20% to purchase a product that itself or a component of it is produced through biotechnological applications, and 46.7% responded that they would be happy to pay more, but they cost coverage is important.

Keywords: agro-industrial; biotechnology; applications; survey

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1. Introduction

The circular economy is a concept and economic system that aims to minimize the waste generated and maximize the value of resources by promoting the continuous circulation of products, materials, and resources in a closed loop (Ghisellini P. et al., 2016). Unlike the traditional linear economy, where goods are produced, used, and then disposed of as waste, the circular economy aims to create a sustainable, regenerative system (Geisendorf S. et al., 2018). Circular economy, bioeconomy and food waste biotechnology are interrelated concepts related to sustainable resource management and aim to reduce waste in the food industry (Paes Luis Alberto Bertolucci et al., 2019). Depending on their interests, background, and access to information, people engage with scientific research in different ways. This includes the scientific community, the media, online

platforms/blogs, educational institutions, government/policy makers, NGOs and interest groups, business/industry applications, citizen science, peer review/replication, policy consultations and public feedback (Corcoran N. et al., 2019). The survey was done by using the google forms tool because it's easily accessible and free.

2. Methods

This study was developed using a structured numerical process to examine the extent to which people perceive and interact with information related to the circular economy and biotechnological applications in the agro-industrial waste management sector, but also their associated potential purchasing preferences. A total of 120 participants took part in this study (37.5% men, 62.5% women). The 120 participants came from regions: 34.2% Lesvos (All from Lemnos) 15.0% Athens, 21.7% Thessaloniki, 7.5% Thessaly, 4.2% Peloponnese, 6.7% Heperus and 10.8% from the rest of Europe.

Table 1. Structure of the questionnaire.

Part A: Examining the public's familiarity with the conceptual meaning of sustainable development	
Section A	
Questions	Sustainable development-green development, bioeconomy
	1/3 of the food produced worldwide is turned into waste
	Food waste is a source of pollution for the environment (CO_2, destruction of the sea, lakes/rivers, soil, atmosphere, bad/toxic smells, etc.)
	Can food waste be used to produce new products with high added value?
	The EU. has created frameworks in which practical changes/compliances are envisaged for a greener society. These changes are considered necessary because the intensive destruction of the environment has and will have devastating effects on the environment
Possible answers	Yes, No, Else
Section B	
Part A: Investigating the degree of interaction towards the placement that was given to the participants	
Question:	The information on the circular economy/bioeconomy/green development as far as I can find it from the media is enough and covers me
	I get a lot of information about the circular economy/bioeconomy/green development from public bodies such as municipalities, schools, universities, organizations, and any public institutions that can provide it to me
	I believe that the application of frameworks to promote circular economy/sustainable economy/green development is a key issue in our society and requires immediate implementation
	I believe that I am not most directly involved in the practical implementation of circular economy/bioeconomy/green development policies
	I believe that the practical applications of circular economy/bioeconomy/green development come with negative impacts such as speculation, misinformation, expediency, etc.
Possible answers	Totally disagree, Disagree, Neither agree or disagree, Agree, Totally agree
Part B.1.: Qualitative and quantitative study of citizen satisfaction and changes in various consumer parameters	
Questions	Would you be willing to pay more to acquire a product (of the order of <20–30%, 30–50%, 50–80%, 80>%) than another of the same category, which is produced (or a component thereof) in the framework of the circular economy?
Possible Answers	Yes, No, I would like to but I consider the cost cover
Part B.2: Note your opinion on a scale 1–10 expressing less to more reaction	
Questions	I would buy a food that itself or some of its ingredients come from biotechnological production processes

	I support the consumption of products or food ingredients using biotechnology methods and would buy a product to do so.
	I believe that the products or food ingredients produced by biotechnological methods of processing food waste are of inferior quality (in terms of nutrients, taste, aroma, etc.)
	If I knew that a healthcare facility (e.g., restaurant or hotel) contained one or more ingredients produced by bioengineering food waste in one or more of the dishes they offer, I would choose to eat there
	Manufacturing products or food ingredients using biotechnological methods is relatively new and scares me
	I consider biotechnological applications in the field of food waste to be necessary for people and society and see an application in everyday life in the future.
Possible Answers	Less to more (1–10)

3. Result and Discussion

Table 2. Results of the participants answers.

Statement	Yes (%)	No (%)	Else (%)
Sustainable development-green development, bioeconomy	87.6	11.2	1.1
1/3 of the food produced worldwide is turned into waste	74.2	25.8	0.0
Food waste is a source of pollution for the environment (CO_2, destruction of the sea, lakes/rivers, soil, atmosphere, bad/toxic smells, etc.)	88.8	11.2	0.0
Can food waste be used to produce new products with high added value?	84.3	15.7	0.0
The EU. has created frameworks in which practical changes/compliances are envisaged for a greener society. These changes are considered necessary because the intensive destruction of the environment has and will have devastating effects on the environment	89.9	10.1	0.0

Statement	Totally disagree (%)	Disagree (%)	Neither agree or disagree (%)	Agree (%)	Totally agree (%)
The information on the circular economy/bioeconomy/green development as far as I can find it from the media is enough and covers me	18.0	48.3	22.5	9.0	2.2
I get a lot of information about the circular economy/bioeconomy/green development from public bodies such as municipalities, schools, universities, organizations, and any public institutions that can provide it to me	11.2	51.7	24.7	12.4	0.0
I believe that the application of frameworks to promote circular economy/sustainable economy/green development is a key issue in our society and requires immediate implementation	28.1	6.7	7.9	55.1	28.1
I believe that I am not most directly involved in the practical implementation of circular economy/bioeconomy/green development policies	9.0	22.5	37.1	23.6	7.9
I believe that the practical applications of circular economy/bioeconomy/green development come with negative impacts such as speculation, misinformation, expediency, etc.	4.5	32.6	38.2	20.2	20.2

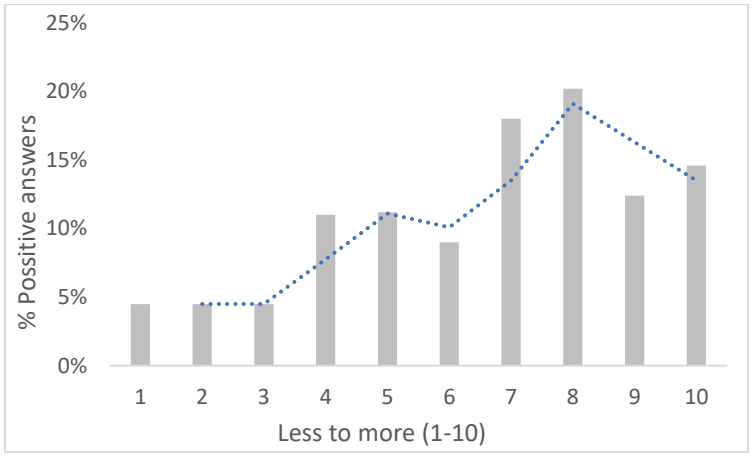

Figure 1. Answers to the question: I would buy a food that itself or some of its ingredients come from biotechnological production processes.

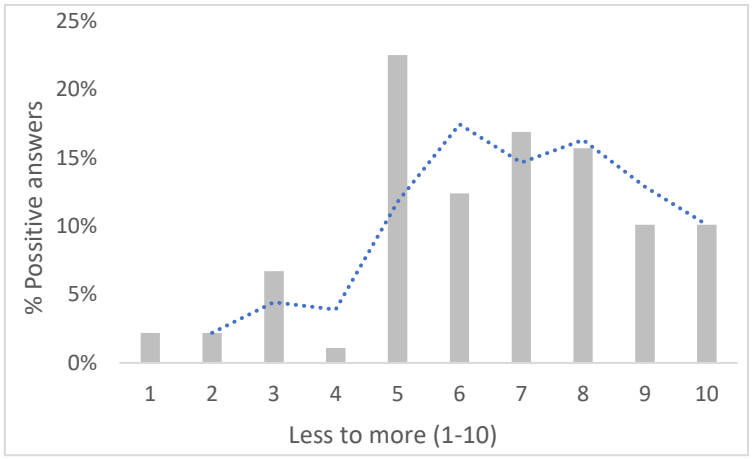

Figure 2. Answers to the question: I support the consumption of products or food ingredients using biotechnology methods and would buy a product to do so.

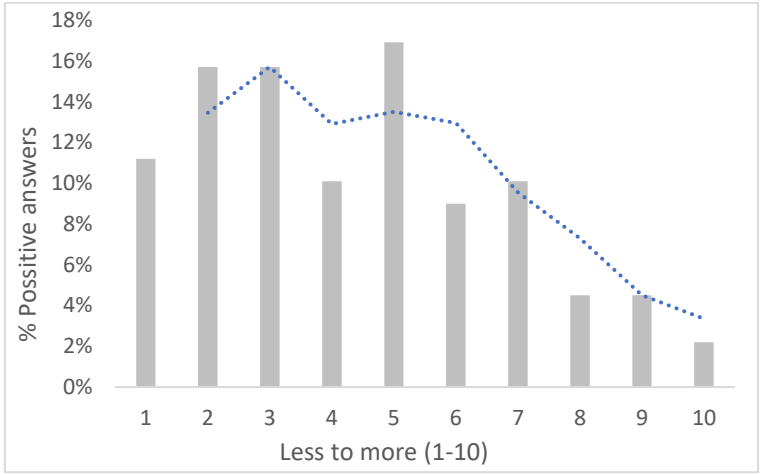

Figure 3. Answers to the question: I believe that the products or food ingredients produced by biotechnological methods of processing food waste are of inferior quality (in terms of nutrients, taste, aroma, etc.).

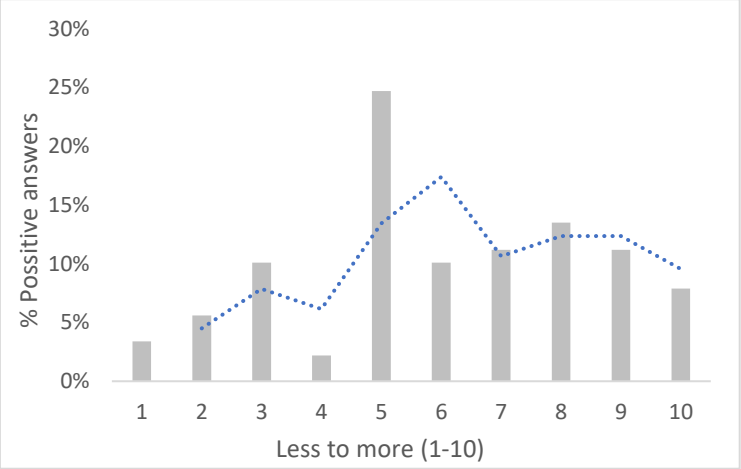

Figure 4. Answers to the question: If I knew that a healthcare facility (e.g., restaurant or hotel) contained one or more ingredients produced by bioengineering food waste in one or more of the dishes they offer, I would choose to eat there.

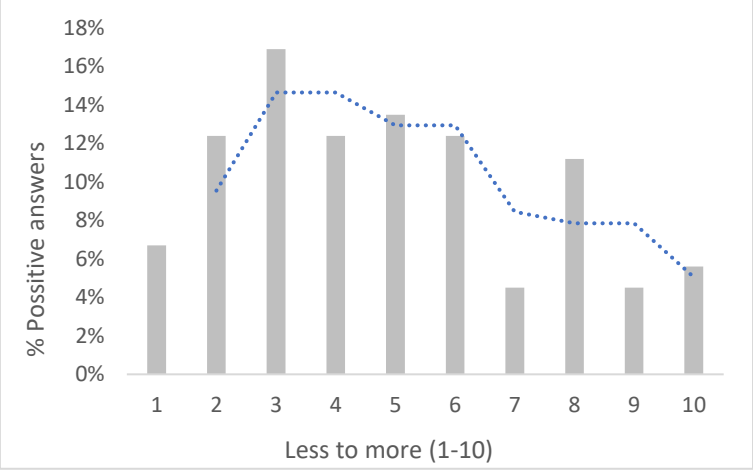

Figure 5. Answers to the question: Manufacturing products or food ingredients using biotechnological methods is relatively new and scares me.

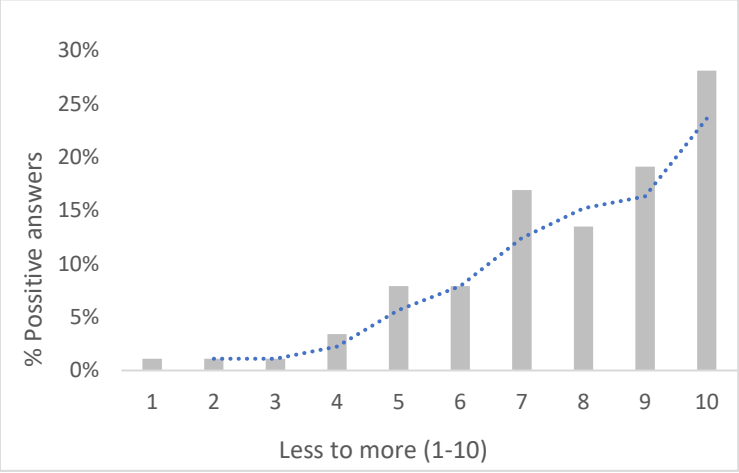

Figure 6. Answers to the question: I consider biotechnological applications in the field of food waste to be necessary for people and society and see an application in everyday life in the future.

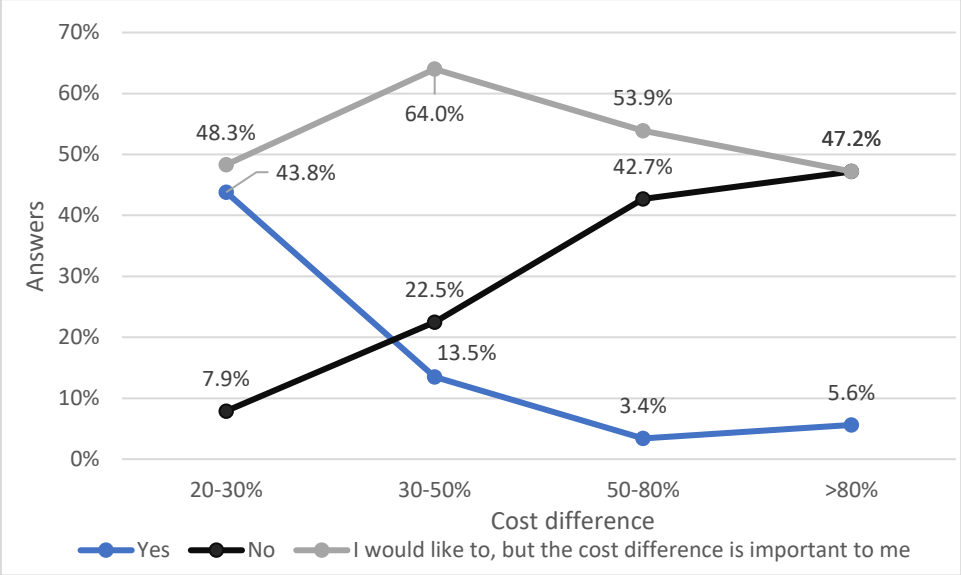

Figure 7. Answers to the question: Would you be willing to pay more to purchase a product than another product in the same category that (or part of it) is manufactured as part of the circular economy?

4. Discussion-Conclusions

The results showed quite interesting results. Most participants answered the questions about their awareness of circular economy and bioeconomy positively (average: 84.96%). Furthermore, results showed that participants (on average 50%) did not think that the information they receive from local authorities (such as schools, media, etc.) is sufficient and covers them. 55.1% of participants agree that the shift towards sustainability is crucial for our society and must be implemented immediately. Finally, 43.8% (highest score) of participants would be willing to pay 20–30% more to purchase a product than for another product in the same category that is (or part of) produced within the circular economy, an average of 53, 4% of them would like to pay more, but covering costs is important to them. In conclusion, this study shows that most participants are aware of biotechnological applications for sustainability etc. and would like to know more about these applications.

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Conflicts of Interest:

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