

## CONSUMERS' PERCEPTIONS OF FOOD SUSTAINABLE DESIGN PACKAGING: A SYSTEMATIC LITERATURE REVIEW

Alin-Ionuț HOSU, Alexandra-Ioana GLOGOVETAN, Cristina Bianca POCOL

University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, Department of Animal Production and Food Safety, 3-5, Manastur Street, 400372, Cluj-Napoca, Romania, Emails: alin.i.hosu@gmail.com, alexandra.glogovetan@gmail.com, cristina.pocol@usamvcluj.ro

*Corresponding author:* cristina.pocol@usamvcluj.ro

### Abstract

*Packaging plays an essential role in ensuring that goods are delivered safely and in good condition to the final consumer within supply chains. Packaging also has many potentials to help with the long-term development of food products. This review paper investigates consumer perceptions and understanding of design food packaging and how design packaging can help the environmental pillar of sustainable development. A literature analysis was conducted using the search strategy in Web of Science as well as other suitable international databases based on their global accessibility and researchers' library access. The result indicates that, from the consumer's standpoint, the essential aspect of sustainable packaging is represented by packing materials, and the packaging design must contain information about recycling actions. Considering the current issues, such as plastic waste and plastic packaging, the consumers believe that sustainable packaging is not as available on the food market as expected.*

**Key words:** consumer perceptions, design packaging, food packaging, packaging materials, sustainable packaging

### INTRODUCTION

Nowadays, the stakeholders involved in the food industry, from entrepreneurs, corporations, governments, non-profit organizations to the final consumers, grant increasingly more attention to sustainable food packages [18, 7, 65].

In this context, more and more consumers believe they are responsible for making environmentally friendly purchases [43, 3, 53, 47].

On the one hand, sustainability initiatives are being enforced by food companies mainly in response to consumers' needs and demands [38, 40, 57].

On the other hand, consumers' and corporations' focus on sustainability tends to vary. As producers bring on the market food products with sustainable packages, consumers do not show a willingness to purchase and pay for food products that have sustainable packaging and a high degree of recyclability [46, 54].

One of the reasons for this fact is that consumers face several issues, one of which is a deficiency of diagnostic information on the

food market, and therefore they do not comprehend the usefulness and the benefit they could have from acquiring food products with sustainable packaging [35, 48, 53, 23].

In the outlined context, the aim of this review paper is to investigate consumer perceptions and understanding of design food packaging and how design packaging can help the environmental pillar of sustainable development.

The next section displays the materials and methods, followed by exhibiting the results and discussions. The paper is completed with the final section containing conclusions, practical implications, limitations, and future research directions.

### MATERIALS AND METHODS

This present review aims to determine and analyse consumers' perceptions of food sustainable design packaging. In fulfilling this purpose, a search strategy, also reported by [10, 17, 15] was employed.

The period examined in this review was 2007-2021.

A thorough and systematic search of the literature using specific keywords (Figure 1) was performed. In order to obtain results from a range of disciplinary study areas, the most relevant databases were employed. The 49 reviewed papers (Appendix) belong to the following databases: Web of Science, Scopus, Science Direct.

After the studies had been analysed and interpreted, the authors set up three identified directions based on the paper's reported results: how sustainability influences consumers' packaging commitment; associations between age, education, willingness to pay, and the recognized value of sustainable packaging, as well as the impact of COVID-19 on the consumer perceptions regarding food packages.

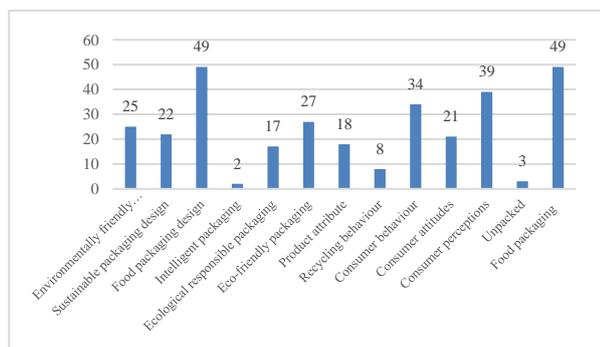


Fig. 1. Keywords and number of reviewed studies containing them

Source: Own development.

The distribution by year of the reviewed literature is illustrated below (Figure 2).

The lack of publications before 2013 indicates that consumer' perceptions of food sustainable design packaging was not a prevalent research issue.

Nevertheless, there is registered significant growth in publications after 2013, implying an increasing interest in this topic.

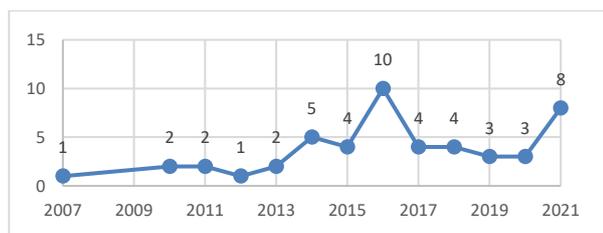


Fig. 2. The reviewed literature distributed by year

Source: Own development.

The publication journals of the revised articles can be viewed below (Figure 3). The numeral in Figure 3 indicate the number of articles that have been published in each of the journals mentioned in the figure. Articles following aspects regarding consumers' perceptions of food sustainable design packaging have been published in numerous journals, from different domains, like marketing, environment, sustainability, food quality, recycling behaviours. This aspect implies a widespread interest and a priority in investigating consumer perceptions regarding sustainable food packaging.

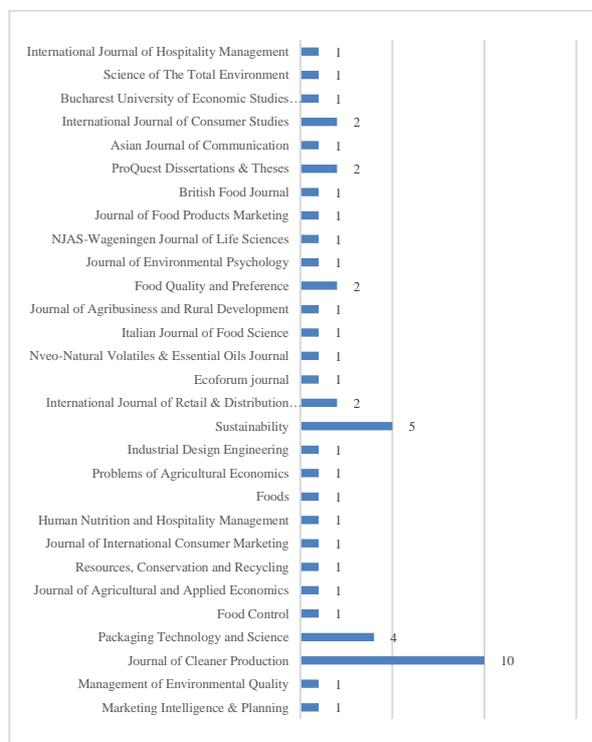


Fig. 3. The journals of publication of the reviewed literature

Source: Own development.

Seventeen articles focus on how sustainability influences consumers' packaging commitment regarding food waste, package sorting, and recycling.

Twenty-eight papers study the acknowledged value of sustainable packaging, and four articles highlight the impact of COVID-19 on consumer perceptions regarding food packages.

## RESULTS AND DISCUSSIONS

*How does sustainability influences consumers' food packaging commitment regarding food waste, sorting and recycling?*

The figure below (Figure 4) illustrates the distribution of the revised literature according to the incentives to which consumers were exposed to. The most investigated topic was sustainable packaging (bio-based and biodegradable). They have also investigated the attitudes and commitment of consumers in terms of environmentally friendly packaging, recycling behaviour, and the intention of consumers to buy food products with little or no packaging at all.

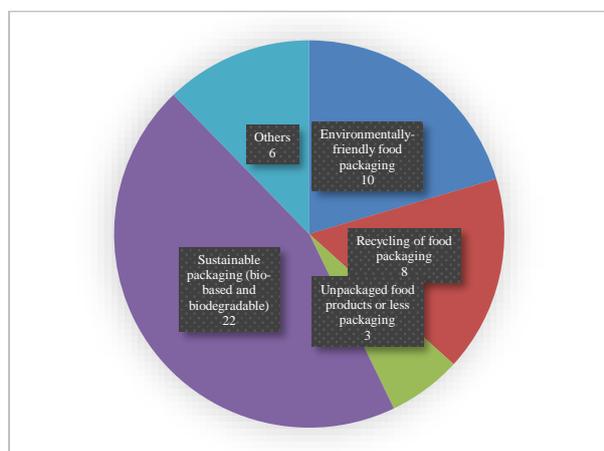


Fig. 4. The consumer incentives content

Source: Own development.

At the level of food packaging, there is an evolution towards more sustainable and healthier packaging. In this context, the implications of the design of food packages are examined and their role in the recycling measures completed by the final consumers. [25, 26, 4, 41].

Also, the role of the shape of food packages is examined in specialized literature [8, 30, 64, 2, 6].

Therefore, [6] extrapolate consumers' belief regarding the need for focused approaches targeting food packaging. This particular aspect will lead to the diminution of food waste at household level.

Consumers maintain an essential part in the market insight of sustainable food packaging given that the decision-making role on the purchase of food products is mainly at the

level of final consumers. [62, 44].

Simultaneously, consumers require guidance in recognizing sustainable packaging [16, 34]. Although they mostly assume the materials themselves, recycling symbols, and certain eco-certification, they also believe that other packaging elements, such as colors and images, can be misleading [28, 11, 49, 55, 56, 53, 23].

When it comes to purchasing food with sustainable packaging, consumers face various barriers, such as misperception of quality, lack of availability of products with sustainable packaging, and sometimes too high prices [32, 33, 59, 44].

Contrary to this findings, other studies [61, 1, 22, 13, 56, 48] identify that final consumers understand the consequences of packaging production and the non-recycling aspect on the environment. Nevertheless, consumers lack information when it comes to how to reuse food packaging or how recyclable it is [1, 39].

In a study led by [21], young consumers' viewpoints on sustainable packaging are related to issues such as recyclability, while other significant considerations include safety for human health and reuse of recycled materials.

*Associations between age, education, willingness to pay, and the recognized value of sustainable packaging*

When we consider how consumers can recall sustainable food packaging, labels, logos, and the type of packaging material, it is clear that these are the most important features in identifying and buying food products with sustainable packaging.

In contrast to the findings which report that a large proportion of final consumers succeed relatively well in identifying sustainable food packaging [50, 32, 31, 5, 42], an investigation led in Italy by [35] discovered that those consumers with an average level of education find it very difficult to perceive the symbolism of the various elements of sustainable food packaging design, such as logos or symbols.

[19] pinpoint disparities between the participants' insights in the United States of America (USA), Germany and France.

Consumers with different education and income levels were invited to mention aspects that make packaging more sustainable. Opinions were divided: German consumers were focused more on those characteristics from the beginning of the production process, such as the raw material. Consumers participating in the study in the USA and France are mainly concerned about those attributes at the end of the production process, such as reuse, recycling, and biodegradability). In a similar qualitative study performed in five countries from Europe, it is apparent that participating consumers have different views on sustainable food packaging. On the one hand, those consumers who are aware of the importance of sustainability and have positive feelings about this issue also show a higher willingness to pay for sustainable and intelligent packaging [27, 20].

On the other hand, consumers who do not consider sustainability a key issue or do not have extensive knowledge about it consider this situation an advantage that marketers use in promotion [52].

For instance, a study conducted by [51] in South Korea highlights how sustainable food packaging and natural food ingredients influence consumers' availability of payment. Conclusions relate to the fact that consumers are willing to pay a higher amount for sustainable food packaging. Following the same direction, a study conducted by [25] in the USA, explored how consumers are willing to pay and buy food with recycled packaging. The authors found that participants demonstrated an increased willingness to pay when it comes to recycled materials (glass or plastic) [25].

These aspects are also revealed in the investigation led by [12], where consumers state that they are willing to purchase food products with sustainable packaging and easy recyclable packages, like glass, aluminium, and paper.

[58] conclude that adult Indian consumers are concerned about the influence of packaging on the environment and therefore tend to choose sustainable food packaging. Going in the same direction, [22] identifies those

consumers who, with a caring attitude towards the environment, declare that they avoid purchasing food products that have packaging made of materials such as paper or plastic. Other results cast a new light on the age of consumers in terms of preference for sustainable food packaging.

[29 and 63] reveals that age is a factor that determines the preference of food with recycled packaging. Thus, consumers of the second and third ages are identified as those who purchase food with recycled packaging.

In a study conducted by [25], the age of consumers is also the determining factor influencing the availability of payment for recycled packaging. Regarding consumers' gender, [22] found that when it comes to recycling and degradation of packaging in the environment, women in this study are more concerned than men. As such, they express their preference for sustainable packaging that does not have as much impact on the environment when compared to standard food packaging. [45] concludes that women are more worried about the environment and therefore buy food with sustainable packages. Conversely, [37 and 66] found that environmental matters directly related to food products packaging stand more significant for men than women.

*The impact of the pandemic caused by COVID-19 on consumer perceptions regarding food packages*

Literature regarding the impact of the current pandemic caused by COVID-19 on consumer' perceptions of food packaging is making an appearance. These perceptions were affected during the COVID-19 pandemic. Food packaging impacts consumer perceptions caused by new food security concerns throughout the pandemic [24]. According to the Global Buying Green Report (2021) [14] when questioned about their perceptions and attitudes of sustainable packaging, almost one in three consumers from South America, USA and Europe said that COVID-19 led them to increase the importance of sustainable packaging. These results are in line with the fact that food security and hygiene have become extremely important for many consumers during 2020. However, it is

anticipated that apprehensions about environmentally friendly packages and the use of more sustainable packaging will be a priority for the post-pandemic society [36]. A study performed in the USA by [9] reveals that more than a half of the participants perceive food packaging in restaurants as a source of contracting COVID-19 and live more worried about the infection with COVID-19 from restaurant food than from supermarket food products. A recent study on consumer perceptions of food packaging during the pandemic shows that customers are more careful about food safety and have become more conscious of sustainable packaging when buying food [24]. There is also a need to reduce the production of plastic food packaging and promote sustainable technologies for the management and recycling of plastics [60], along with the desire of consumers to pay for biodegradable alternatives; thus, these two factors can constitute a potential for innovation in the food packaging sector [42].

## CONCLUSIONS

Our results demonstrate a significant barrier when it comes to sustainable packaging. The main aspects of these barriers reside in its price, availability, and the perceived quality of sustainable packaging versus standard packaging. This isn't the only significant barrier these types of packaging encounter, as there is another. This is the lack of supermarkets advertising. Supermarkets have shortcomings in promoting sustainable packaging that could help the current situation of worldwide waste by reducing food waste and creating better packaging that offers an easy and economical way to recycle the packaging materials.

It is believed that an element that should be present on all the food packaging is the symbol or icon that illustrates the package recycling level. As many companies have stringent brand guidelines such as colours, font, and illustrations, recycling symbols should be highlighted. The colour factor isn't relevant when speaking about packaging recycling because many people have visual

disabilities, which prevents them from correctly identifying the colours.

Our findings show mixed feelings between consumers' responses worldwide and between genders.

The feminine gender and the people with more positive feelings towards the environment have a more frequent intention in purchasing products with sustainable packaging.

The discrepancy between the results of the studies is given by the lack of advertising of products with sustainable packaging.

As these results show, starting with 2020, the year that COVID-19 led to a global crisis, hygiene has become the main objective when speaking about food security and consumption.

The COVID-19 psychological impact on the consumers led to new concerns about food security. During COVID-19, product packaging has become one of the most important factors when purchasing food products.

The pandemic leads consumers to rethink the importance of sustainable packaging and to choose safer and healthier alternatives.

Furthermore, there is an urgent need for information campaigns to educate the consumers about the implications of their purchase decision regarding their packaging choice and its impact on the environment.

Our review does have certain limitations. The search approach may have overlooked relevant data, which could affect our conclusions to a specific degree.

The impact of the pandemic caused by the new COVID-19 on consumer' behaviour towards sustainable food packaging is a topic of novelty in the literature.

Because of this, a complete picture of how final consumers relate to sustainable packaging in a pandemic context could not be presented.

For this reason, it is believed that additional studies are needed to capture and study consumer insights regarding sustainable food packaging under the influence of the pandemic context.

## ACKNOWLEDGEMENTS

This work has no external funding.

## REFERENCES

- [1]Banterle, A., Cavaliere, A., Ricci, E. C., 2012, Food labelled information: an empirical analysis of consumer preferences. *International Journal on Food System Dynamics*, 3(2), 156-170.
- [2]Barska, A., Wyrwa, J., 2016, Consumer perception of active intelligent food packaging. *Problems of Agricultural Economics*, (4).
- [3]Bemporad, R., Hebard, A., Bressler, D., 2012, Re: Thinking consumption—Consumers and the future of sustainability. *BBMG, Globe Scan, and Sustainability*.
- [4]Borgman, I., 2018, The influence of packaging design features on consumers' purchasing & recycling behaviour, Master's thesis, University of Twente, Netherlands.
- [5]Boz, Z., Korhonen, V., & Koelsch Sand, C. (2020). Consumer considerations for the implementation of sustainable packaging: A review. *Sustainability*, 12(6), 2192.
- [6]Brennan, L., Langley, S., Verghese, K., Lockrey, S., Ryder, M., Francis, C., Phan, T., Hill, A., 2021, The role of packaging in fighting food waste: A systematised review of consumer perceptions of packaging. *Journal of Cleaner Production*, 281, 125276.
- [7]Brouwer, I. D., McDermott, J., Ruben, R., 2020, Food systems everywhere: Improving relevance in practice. *Global Food Security*, 26, 100398.
- [8]Buelow, S., Lewis, H., Sonneveld, K., 2010, The role of labels in directing consumer packaging waste. *Management of Environmental Quality: an international journal*.
- [9]Byrd, K., Her, E., Fan, A., Almanza, B., Liu, Y., Leitch, S., 2021, Restaurants and COVID-19: What are consumers' risk perceptions about restaurant food and its packaging during the pandemic? *International Journal of Hospitality Management*, 94, 102821.
- [10]Campos, S., Doxey, J., Hammond, D., 2011, Nutrition labels on pre-packaged foods: a systematic review. *Public health nutrition*, 14(8), 1496-1506.
- [11]Carter, K., 2014, Product and consumer characteristics as moderators of consumer response to sustainable products, Doctoral dissertation, University of South Carolina.
- [12]Conner, C., 2021, Consumer Perceptions of Plastic-Free Food Packaging. *Human Nutrition and Hospitality Management Undergraduate Honors Theses*, <https://scholarworks.uark.edu/hnhuht/18>, Accessed on 02/02/2022
- [13]Ertz, M., François, J., Durif, F., 2017, How consumers react to environmental information: an experimental study. *Journal of International Consumer Marketing*, 29(3), 162-178.
- [14]Global Buying Green Report, 2021, Sustainable Packaging in a Year of Unparalleled Disruption. <https://triviumpackaging.com/sustainability/2021BuyingGreenReport.pdf>, Accessed on 02/02/2022
- [15]Glogoveţan, A. I., Dabija, D. C., Fiore, M., Pocol, C. B., 2022, Consumer Perception and Understanding of European Union Quality Schemes: A Systematic Literature Review. *Sustainability*, 14(3), 1667.
- [16]Grönman, K., Soukka, R., Järvi-Kääriäinen, T., Katajajuuri, J. M., Kuisma, M., Koivupuro, H. K., Ollila, M., Pitkänen, M., Miettinen, O., Silvenius, F., ThuN, R., Wessman, H., Linnanen, L., 2013, Framework for sustainable food packaging design. *Packaging Technology and Science*, 26(4), 187-200.
- [17]Grunert, K. G., Aachmann, K., 2016, Consumer reactions to the use of EU quality labels on food products: A review of the literature. *Food Control*, 59, 178-187.
- [18]Gustavo Jr, J. U., Pereira, G. M., Bond, A. J., Viegas, C. V., Borchardt, M., 2018, Drivers, opportunities, and barriers for a retailer in the pursuit of more sustainable packaging redesign. *Journal of cleaner production*, 187, 18-28.
- [19]Herbes, C., Beuthner, C., Ramme, I., 2018, Consumer attitudes towards biobased packaging—A cross-cultural comparative study. *Journal of Cleaner Production*, 194, 203-218.
- [20]James, F., Kurian, A., 2021, Sustainable Packaging: A Study on Consumer Perception on Sustainable Packaging Options in E-Commerce Industry. *Nveo-Natural Volatiles & Essential Oils Journal|Nveo*, 10547-10559.
- [21]Jerzyk, E., 2016, Design and communication of ecological content on sustainable packaging in young consumers' opinions. *Journal of Food Products Marketing*, 22(6), 707-716.
- [22]Jeżewska-Zychowicz, M., Jeznach, M., 2015, Consumers' behaviours related to packaging and their attitudes towards environment. *Journal of Agribusiness and Rural Development*, 37(3), 447-457.
- [23]Ketelsen, M., Janssen, M., Hamm, U., 2020, Consumers' response to environmentally-friendly food packaging—A systematic review. *Journal of Cleaner Production*, 254, 120123.
- [24]Kitz, R., Walker, T., Charlebois, S., Music, J., 2021, Food packaging during the COVID-19 pandemic: Consumer perceptions. *International Journal of Consumer Studies*.
- [25]Klaiman, K., Ortega, D. L., Garnache, C., 2016, Consumer preferences and demand for packaging material and recyclability. *Resources, Conservation and Recycling*, 115, 1-8.
- [26]Klaiman, K., Ortega, D. L., Garnache, C., 2017, Perceived barriers to food packaging recycling: Evidence from a choice experiment of US consumers. *Food Control*, 73, 291-299.
- [27]Koenig-Lewis, N., Palmer, A., Dermody, J., Urbye, A., 2014, Consumers' evaluations of ecological packaging—Rational and emotional approaches. *Journal of environmental psychology*, 37, 94-105.
- [28]Kong, Y., Zhang, A., 2013, Consumer response to green advertising: the influence of product involvement. *Asian journal of communication*, 23(4),

428-447.

- [29]Koutsimanis, G., Getter, K., Behe, B., Harte, J., Almenar, E., 2012, Influences of packaging attributes on consumer purchase decisions for fresh produce. *Appetite*, 59(2), 270-280.
- [30]Langley, J., Turner, N., Yoxall, A., 2011, Attributes of packaging and influences on waste. *Packaging technology and science*, 24(3), 161-175.
- [31]Lindh, H., Olsson, A., Williams, H., 2016, Consumer perceptions of food packaging: contributing to or counteracting environmentally sustainable development? *Packaging Technology and Science*, 29(1), 3-23.
- [32]Magnier, L., Cri , D., 2015, Communicating packaging eco-friendliness: An exploration of consumers' perceptions of eco-designed packaging. *International Journal of Retail & Distribution Management*.
- [33]Magnier, L., Schoormans, J., Mugge, R., 2016, Judging a product by its cover: Packaging sustainability and perceptions of quality in food products. *Food quality and preference*, 53, 132-142.
- [34]Mai, L. W., 2014, Consumers' willingness to pay for ethical attributes. *Marketing Intelligence & Planning*.
- [35]Mancini, P., Marchini, A., Simeone, M., 2017, Which are the sustainable attributes affecting the real consumption behaviour? *Consumer understanding and choices*. *British Food Journal*.
- [36]McKinsey & Company (n.d.). Sustainability in Packaging: Inside the Minds of Global Consumers. <https://www.mckinsey.com/industries/paper-forest/products-and-packaging/our-insights/sustainability-in-packaging-inside-the-minds-of-global-consumers>. Accessed on 09/02.2022.
- [37]Muratore, G., Zarba, A. S., 2011, Role and function of food packaging: What consumers prefer. *Italian Journal of Food Science*, 23, 25.
- [38]Neff, J., 2012, As more marketers go green, fewer consumers willing to pay for it. *Advertising Age*, 83(34), 6.
- [39]Neill, C. L., Williams, R. B., 2016, Consumer preference for alternative milk packaging: The case of an inferred environmental attribute. *Journal of Agricultural and Applied Economics*, 48(3), 241-256.
- [40]Nekmahmud, M., Fekete-Farkas, M., 2020, Why not green marketing? Determinates of consumers' intention to green purchase decision in a new developing nation. *Sustainability*, 12(19), 7880.
- [41]Nemat, B., Razzaghi, M., Bolton, K., Rousta, K., 2019, The role of food packaging design in consumer recycling behavior - A literature review. *Sustainability*, 11(16), 4350.
- [42]Nguyen, A. T., Parker, L., Brennan, L., Lockrey, S., 2020, A consumer definition of eco-friendly packaging. *Journal of Cleaner Production*, 252, 119792.
- [43]Nordin, N., Selke, S., 2010, Social aspect of sustainable packaging. *Packaging Technology and Science*, 23(6), 317-326.
- [44]Oloyede, O. O., Lignou, S., 2021, Sustainable paper-based packaging: A consumer's perspective. *Foods*, 10(5), 1035.
- [45]Orset, C., Barret, N., Lemaire, A., 2017, How consumers of plastic water bottles are responding to environmental policies? *Waste management*, 61, 13-27.
- [46]Orzan, G., Cruceru, A. F., Bălăceanu, C. T., Chivu, R. G., 2018, Consumers' behavior concerning sustainable packaging: An exploratory study on Romanian consumers. *Sustainability*, 10(6), 1787.
- [47]Otto, S., Strenger, M., Maier-N th, A., Schmid, M., 2021, Food packaging and sustainability– Consumer perception vs. correlated scientific facts: A review. *Journal of Cleaner Production*, 298, 126733.
- [48]Popovic, I., Bossink, B. A., van der Sijde, P. C., 2019, Factors influencing consumers' decision to purchase food in environmentally friendly packaging: what do we know and where do we go from here?. *Sustainability*, 11(24), 7197.
- [49]Riley, D., da Silva, P. M., Behr, S., 2015, The impact of packaging design on health product perceptions. In *International Conference on Marketing and Business Development (Vol. 1, No. 1, pp. 81-89)*. Bucharest University of Economic Studies Publishing House.
- [50]Scott, L., Vigar-Ellis, D., 2014, Consumer understanding, perceptions, and behaviours with regard to environmentally friendly packaging in a developing nation. *International journal of consumer studies*, 38(6), 642-649.
- [51]Seo, S., Ahn, H. K., Jeong, J., Moon, J., 2016, Consumers' attitude toward sustainable food products: Ingredients vs. Packaging. *Sustainability*, 8(10), 1073.
- [52]Sijtsema, S. J., Onwezen, M. C., Reinders, M. J., Dagevos, H., Partanen, A., Meeusen, M., 2016, Consumer perception of bio-based products—An exploratory study in 5 European countries. *NJAS-Wageningen Journal of Life Sciences*, 77, 61-69.
- [53]Steenis, N. D., 2019, Consumer response to sustainable packaging design (Doctoral dissertation, Wageningen University and Research).
- [54]Steenis, N. D., van der Lans, I. A., van Herpen, E., van Trijp, H. C., 2018, Effects of sustainable design strategies on consumer preferences for redesigned packaging. *Journal of Cleaner Production*, 205, 854-865.
- [55]Steenis, N. D., van Herpen, E., van der Lans, I. A., van Trijp, J. C. M., 2016, Consumer response to packaging design: the role of packaging materials and visuals in sustainability perceptions and product judgments.
- [56]Steenis, N. D., van Herpen, E., van der Lans, I. A., Ligthart, T. N., van Trijp, H. C., 2017, Consumer response to packaging design: The role of packaging materials and graphics in sustainability perceptions and product evaluations. *Journal of Cleaner Production*, 162, 286-298.
- [57]Thakkar, R., 2021, Green marketing and sustainable development challenges and opportunities. *International Journal of Management, Public Policy and Research*, 1(1), 15-23.
- [58]Trivedi, R. H., Patel, J. D., Acharya, N., 2018,

Causality analysis of media influence on environmental attitude, intention and behaviors leading to green purchasing. *Journal of cleaner production*, 196, 11-22.

[59]van Herpen, E., Immink, V., van den Puttelaar, J., 2016, Organics unpacked: The influence of packaging on the choice for organic fruits and vegetables. *Food Quality and Preference*, 53, 90-96.

[60]Vanapalli, K. R., Sharma, H. B., Ranjan, V. P., Samal, B., Bhattacharya, J., Dubey, B. K., Goel, S., 2021, Challenges and strategies for effective plastic waste management during and post COVID-19 pandemic. *Science of The Total Environment*, 750, 141514.

[61]Venter, K., van der Merwe, D., De Beer, H., Kempen, E., Bosman, M., 2011, Consumers' perceptions of food packaging: an exploratory investigation in Potchefstroom, South Africa. *International Journal of Consumer Studies*, 35(3), 273-281.

[62]Wells, L. E., Farley, H., Armstrong, G. A., 2007, The importance of packaging design for own-label food brands. *International Journal of Retail & Distribution Management*.

[63]Wikström, F., Williams, H., Vergheze, K., Clune, S., 2014, The influence of packaging attributes on consumer behaviour in food-packaging life cycle assessment studies-a neglected topic. *Journal of Cleaner Production*, 73, 100-108.

[64]Williams, H., Wikström, F., Otterbring, T., Löfgren, M., Gustafsson, A., 2012, Reasons for household food waste with special attention to packaging. *Journal of cleaner production*, 24, 141-148.

[65]Zaharia, A., Diaconeasa, M. C., Maehle, N., Szolnoki, G., Capitello, R., 2021, Developing Sustainable Food Systems in Europe: National Policies and Stakeholder Perspectives in a Four-Country Analysis. *International Journal of Environmental Research and Public Health*, 18(14), 7701.

[66]Zekiri, J., Hasani, V. V., 2015, The role and impact of the packaging effect on consumer buying behaviour. *Ecoforum Journal*, 4.

Appendix

Title	Journal name	Year
Consumers' willingness to pay for ethical attributes	Marketing Intelligence & Planning	2014
The role of labels in directing consumer packaging waste	Management of Environmental Quality: an international journal	2010
Reasons for household food waste with special attention to packaging	Journal of Cleaner Production	2012
Attributes of packaging and influences on waste	Packaging Technology and Science	2011
Perceived barriers to food packaging recycling: Evidence from a choice experiment of US consumers	Food Control	2017
Consumer preference for alternative milk packaging: The case of an inferred environmental attribute	Journal of Agricultural and Applied Economics	2016
Consumer preferences and demand for packaging material and recyclability	Resources, Conservation and Recycling	2016
How consumers react to environmental information: an experimental study	Journal of International Consumer Marketing	2017
Consumer Perceptions of Plastic-Free Food Packaging	Human Nutrition and Hospitality Management	2021
The influence of packaging attributes on consumer behaviour in food-packaging life cycle assessment studies-a neglected topic	Journal of Cleaner Production	2014
Sustainable paper-based packaging: A consumer's perspective	Foods	2021
Social aspect of sustainable packaging	Packaging Technology and Science	2010
The role of packaging in fighting food waste: A systematised review of consumer perceptions of packaging	Journal of Cleaner Production	2021
Consumer perception of active intelligent food packaging	Problems of Agricultural Economics	2016
The influence of packaging design features on consumers' purchasing & recycling behaviour	Industrial Design Engineering	2018
The role of food packaging design in consumer recycling behavior—A literature review	Sustainability	2019
Consumer considerations for the implementation of sustainable packaging: A review	Sustainability	2020
Framework for sustainable food packaging design	Packaging Technology and Science	2013
The importance of packaging design for own-label food brands	International Journal of Retail & Distribution Management	2007
The role and impact of the packaging effect on consumer buying behaviour	Ecoforum journal	2015
Sustainable Packaging: A Study on Consumer Perception on Sustainable Packaging Options in E-Commerce Industry	Nveo-Natural Volatiles & Essential Oils Journal	2021
Role and function of food packaging: What consumers prefer	Italian Journal of Food Science	2011
Consumers' behaviours related to packaging and their attitudes towards environment	Journal of Agribusiness and Rural Development	2015
Organics unpacked: The influence of packaging on the choice for organic fruits and vegetables	Food Quality and Preference	2016
Consumers' attitude toward sustainable food products: Ingredients vs. Packaging	Sustainability	2016
Consumers' evaluations of ecological packaging—Rational and emotional approaches	Journal of Environmental Psychology	2014
Consumer perception of bio-based products—An exploratory study in 5 European countries	NJAS-Wageningen Journal of Life Sciences	2016
Consumer attitudes towards biobased packaging—A cross-cultural comparative study	Journal of Cleaner Production	2018
Design and communication of ecological content on sustainable packaging in young consumers' opinions	Journal of Food Products Marketing	2016
Judging a product by its cover: Packaging sustainability and perceptions of quality in food products	Food Quality and Preference	2016
Which are the sustainable attributes affecting the real consumption behaviour? Consumer understanding and choices	British Food Journal	2017
Food packaging and sustainability—Consumer perception vs. correlated scientific facts: A review	Journal of Cleaner Production	2021
Factors influencing consumers' decision to purchase food in environmentally friendly packaging: what do we know and where do we go from here?	Sustainability	2019
Consumers' behavior concerning sustainable packaging: An exploratory study on Romanian consumers	Sustainability	2018
Product and consumer characteristics as moderators of consumer response to sustainable products	ProQuest Dissertations & Theses	2014
Consumer response to green advertising: the influence of product involvement	Asian Journal of Communication	2013
Consumer response to packaging design: the role of packaging materials and visuals in sustainability perceptions and product judgments	Journal of Cleaner Production	2016
Consumer response to sustainable packaging design	ProQuest Dissertations & Theses	2019
Consumer understanding, perceptions, and behaviours with regard to environmentally friendly packaging in a developing nation	International Journal of Consumer Studies	2014
The impact of packaging design on health product perceptions	Bucharest University of Economic Studies Publishing House	2015
Effects of sustainable design strategies on consumer preferences for redesigned packaging	Journal of Cleaner Production	2018
Consumers' response to environmentally friendly food packaging-A systematic review	Journal of Cleaner Production	2020
Consumer response to packaging design: The role of packaging materials and graphics in sustainability perceptions and product evaluations	Journal of Cleaner Production	2017
Communicating packaging eco-friendliness: An exploration of consumers' perceptions of eco-designed packaging	International Journal of Retail & Distribution Management	2015
Consumer perceptions of food packaging: contributing to or counteracting environmentally sustainable development?	Packaging Technology and Science	2016
Challenges and strategies for effective plastic waste management during and post COVID-19 pandemic	Science of The Total Environment	2021
Restaurants and COVID-19: What are consumers' risk perceptions about restaurant food and its packaging during the pandemic?	International Journal of Hospitality Management	2021
Food packaging during the COVID-19 pandemic: Consumer perceptions	International Journal of Consumer Studies	2021
A consumer definition of eco-friendly packaging	Journal of Cleaner Production	2020

