

Consumer Awareness of the Eco-Labeling of Packaging

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Abstract

The paper describes the results of research on consumer awareness and attitudes in the field of the ecology and labelling of packaging products. The research was divided into two parts. The first one was related to the perception of the respondents regarding ecology, while the second one was related to the classification of the cosmetics packaging products presented. The results obtained were analysed statistically. The correlation analysis performed showed the existence of a relationship between the variables selected (consumer attitudes). Strong correlations were noticed. The research showed that consumers equate labelling to the properties of products and packaging. The labelling of packaging and products can be ambiguous, which results in a problem with classifying waste to the appropriate segregation and collection system.

Keywords

society, packaging, ecology, awareness, eco-trends, circular economy.

1. Introduction

Recently, ecological products that are environmentally friendly and have been produced in accordance with the principles of sustainable development are of great importance. New plastic products should not pollute the environment and will decompose or will be suitable for recovery through recycling or composting. The SUP Directive (EU) 2019/904 introduced is a reflection of the modern trends. The new regulations introduce restrictions on the placing on the market of products made of oxo-degradable plastics, because they are not properly biodegradable. In addition, Directive (EU) 2019/904 significantly increases the responsibility of manufacturers to bear the costs of single-use products made of artificial materials. These are costs related to waste cleaning, transport and processing. EU member states provide for the introduction of appropriate sanctions for failure to comply with the above requirements¹.

One of the main objectives of SUP Directive (EU) 2019/904 is to reduce plastics placed on the market which are considered to be the most widely used polymers, especially in packaging industry. In 2019, the global production of plastics amounted to 368 million tons, of which 58 tons were produced in Europe. The distribution of European,

Norwegian and Swiss plastic converters demand by segment in 2019 is shown in **Figure 1**. It should be highlighted that Packaging represents the largest end-use markets.

The chemical and physical properties of polymer materials determine their use in packaging applications. The conditions in which the product is transported or stored play a crucial role. Generally, the most relevant advantage of plastics is the ability of changing their properties according to the product requirement. Polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), polyvinyl chloride (PCV) and polystyrene (PS) are the most popular packaging plastics. Petroleum products obtained from refining processes are common raw materials for the production of plastics³

The majority of conventional fossil-fuel based plastics are non-biodegradable and can lead to environmental pollution. Due to growing interest in ecology, many researchers focus on bio-based materials, such as nanocomposites that are derived from biopolymers (polylactic acid PLA, polybutylene adipate terephthalate PBAT, polyhydroxyalkanoates PHA) with synthetic or inorganic nanofillers^{4,5}. Furthermore, biocomposites are an interesting alternative, as they can be made from cellulose fibers, coffee grind

or date stones⁶. The 'bio' prefix means they are naturally biodegradable by microorganisms and can be classified as green packaging.

The essential functions of packaging can be divided into primary and secondary functions. The first group is related to protection, storage and transport, and requires the packaging to be strong, tight and resistant to specific conditions. The secondary functions relate to the sales promotion and marketing tools, namely using aesthetically and physically attractive packaging which is considered to be a part of the product's branding⁷. In addition, information of the product's ingredients and their characteristics, such as recyclability, compostability or biodegradability, should be provided on the label. Eco-labels are the symbol on the product that shows that the product is environmentally safe and can be regarded as a green product. They are used as necessary instruments of communication in green marketing, but due to lack of appropriate information, sometimes they fail to achieve their goals^{8,9}. Currently, one of the most important problems in eco-labelling is the lack of transparent legislation, which is reflected in the great extent of packaging manufacturers in this area^{10,11}. Only a small number of eco symbols on packaging are supported by appropriate tests. The most common

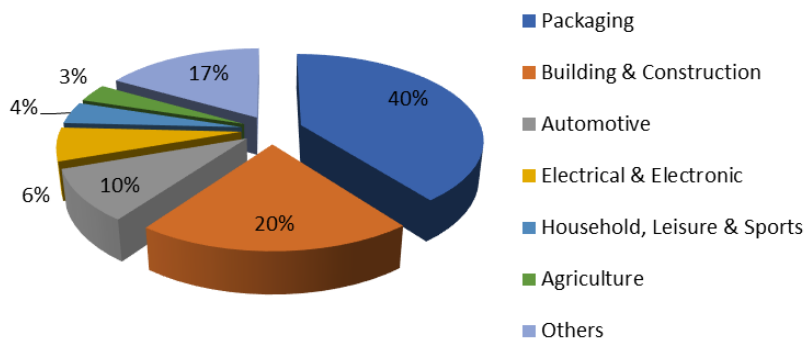


Fig. 1. Plastic demand by sector in 2019²

Symbol	Application
Packaging	
	Green product according to European Directive 94/62
	Suitable for recycling
	Keep clean
	Suitable for re-use
	Biodegradable packaging
Cosmetics and cleaning products	
	Cosmetics, food, wool and cotton products from biological and dynamic crops
	Laundry detergents, cleaning agents and cosmetics produced in a safe and ecological manner
	Not tested on animals
	Safe for ozone

Table 1. Most popular eco-labels¹²

eco-labels in the packaging industry are presented in Table 1.

Unfortunately, many of the symbols used are merely a marketing gimmick, which is called greenwashing. They are similar to certified marks and consumers confuse them with ease. Moreover, it is often not known whether the label relates to the package or product. Some consumer researches have revealed that eco-labelling is misunderstood¹³, unreliable or not trustworthy¹⁴. Additionally, the huge number of inconsistent eco-labels in the market increases consumer confusion and lack of clarity^{13,15,16}. Consumer knowledge, consciousness and commitment plays a crucial role in building trust, which at a later stage influences the taking of decisive steps in purchases^{17,18}. Ecolabels improve sales and strengthen product image only if consumers consider them as credible^{19,20}. Credible ecolabels show the preponderance of the product when compared with non-labelled products²¹.

Research revealed that customers could not recognise sustainable packaging or did not have an idea of what sustainability packaging involves^{22,23}. Additionally, it is more important for consumers to have some idea of what makes packaging sustainable (e.g. recycling) than other aspects of sustainability - the social and economic impact²⁴. Consumers make choices not necessarily based on rational principles, but on their own assumption about sustainable products²⁵.

Nevertheless, an increase in consumer awareness of ecology has been observed for several years, which is indirectly caused by green marketing. According to many studies, a large part of society is willing to pay more for eco products when they are functional²⁶⁻²⁸. On the one hand, consumers are not fully aware of the certification and control process, which has the effect of expressing their disquiet about the genuineness of the green product, but on the other they are willing to pay a higher price for eco-labelled products²⁹. Moreover, 48% of Poles believe that an ecological life involves additional expenses³⁰. The Ekobarometr Report stated that 58% of

Polish society declared that in the last month they had seen an advertisement or promotion of a product or service that used ecological elements. The Poles surveyed indicated very frequent contact with new, more ecological packaging (51%). Furthermore, for them an ecological product is primarily one that is recyclable (67%), is made without harm to the environment (62%), and is completely biodegradable (55%). Almost two-thirds of the people declare that they throw away the packaging of a hygiene or cleaning product as indicated (64%)³¹.

In the future, according to the report³², consumers will expect comprehensive information on the environmental impact of packaging. Such a task could be fulfilled by the carbon footprint index. It represents the total sum of greenhouse gas emissions related to the life cycle of a product, i.e. from production to transport to storage and disposal. However, knowledge of the carbon footprint among Poles is very limited: as many as 76% of Poles have never encountered this term³².

The main aim of this paper was to evaluate people's preferences and knowledge about ecology, the "zero waste" policy and recent trends in this field. Furthermore, the study investigated customer awareness of the eco-labels found on different types of cosmetics packaging in Poland.

2. Materials and methods

The study was conducted in a group of respondents ($n = 33$) aged > 25 years, both men and women. The survey was divided into 3 subgroups: 1. data related to gender, age and place of residence (city/village); 2. ecological attitudes; 3. evaluation of the packaging presented on the basis of visual assessment. The products presented included: face cream, body lotion, lip balm, shampoo bar, and cotton buds. Table 2 presents characteristics of the materials tested. All of the products had many logos suggesting their ecological character, including '100% biodegradable;', 'plastic free'; and 'zero waste' labels.

product	packaging material	marking
face cream	monomaterial: plastic	Loop leaf pictogram
body lotion	tube: monomaterial; plastic cork: monomaterial; plastic	Loop leaf pictogram
lip balm	monomaterial: paper	"Zero Waste"; "Cardboard Recycling"; Eco Friendly"; "Plastic Free"
shampoo bar	monomaterial: coated paper	"Handmade"; "Vegan lovers"; Save the Planet"; "Palm Oil Free"; "100% Biodegradable"; "Plastic free"; "100% Essential Oils"; "Certificated Oils"
cotton buds	multi-component: paper and plastic	"100% Biodegradable"

Table 2. Characteristics of tested products

Data were evaluated using a statistical analysis package (StatSoft, Poland STATISTICA, version 9.0.). The Shapiro-Wilk test was used to check for normal distribution of the results. When non-parametric, the Mann-Whitney U test was used to determine differences between results in both groups (men and women). The level of statistical significance was defined as $p < 0.05$. Correlation analysis was performed.

3. Results

The study was divided into two categories. The first part was devoted to research related to the ecological attitude of the respondents and the relationships between the variables studied. The second was related to the attribution of characteristics to the packaging products presented based on visual assessment.

The study revealed that there is negative correlation between gender and the declaration of knowledge of eco-trends (-0.46), paying attention to the composition of the product (-0.37), the biodegradability / compostability of the product (-0.37), and the willingness to pay more for an ecological product (-0.43). Knowledge of the "zero waste" policy factor was positively correlated with age and the composition of a product. The study conducted showed that respondents who declared knowledge of eco-trends are willing to pay more for an ecological / natural product,

pay attention to the biodegradability / compostability of the packaging, as well as know the assumptions of the "zero waste" policy. A significant relationship was also demonstrated for variables related to paying attention to product labelling and the possibility of paying more for an ecological / natural product, paying attention to the biodegradability / compostability of the packaging, and the possibility of reusing the packaging. The correlation matrix is presented in Table 3.

To better illustrate the results obtained, a cluster analysis using Ward's method was also performed (Figure 2.). The Euclidean distance was used as the measure of distance. In this method, the basis for combining clusters is to minimise the total sum of squared deviations. The analysis of the dependencies obtained is consistent with the above-described results of the correlation analysis.

The next step was to compare the group of men and women studied. In order to select an appropriate statistical test, the normality of the distribution was examined. The application of the Mann-Whitney U test allows to compare two independent groups. The value of test probability $p < 0.05$ obtained allows to reject the hypothesis tested, which means that the group of women and men differs significantly in terms of the consumer attitudes presented. In Table 4 the results obtained are presented.

	gender	age	city/ country	tracking trends	„zero waste” policy	pay attention to labels	appearance of product	composition	pay more for ecological/ natural product	biodegradability/ compostability of product	reuseability
gender		0.18	0.11	-0.46	-0.34	-0.26	0	-0.40	-0.43	-0.37	-0.30
age	0.18		0.52	0.18	0.38	0.03	0.29	0.26	0.16	0.16	-0.08
city/country	0.11	0.05		-0.28	-0.13	-0.21	0.17	0.12	-0.11	0.18	-0.18
tracking trends	-0.45	0.18	0.28		0.53	0.36	0.06	0.52	0.59	0.52	0.27
„zero waste” policy	-0.33	0.38	-0.13	0.53		0.22	0.34	0.59	0.34	0.43	0.02
pay attention to labels	-0.26	0.03	-0.21	0.36	0.22		-0.30	0.22	0.40	0.44	0.42
appearance of product	0.00	0.29	0.17	0.06	0.34	-0.28		0.03	-0.15	0.09	-0.18
composition	-0.37	0.26	0.12	0.52	0.59	0.22	0.03		0.71	0.50	-0.05
pay more for ecological/natural product	-0.43	0.16	-0.11	0.59	0.34	0.40	-0.10	0.71		0.37	0.14
biodegradability/ compostability of product	-0.37	0.16	0.18	0.52	0.43	0.41	0.09	0.50	0.37		0.26
reuseability	-0.30	-0.10	-0.18	0.27	0.02	0.42	-0.20	-0.10	0.14	0.26	

Table 3. Correlation matrix for results obtained

variable	p- value
following eco-trends	0.009
composition of product	0.035
willingness to pay more for ecological/ natural product	0.016
pay attention to biodegradability/ compostability of product	0.035

Table 4.

The second part of the research was related to assigning selected packaging products to specific features related to their properties. Product qualification was based on visual evaluation. The following packaging was selected for the research: bar shampoo, face cream, body lotion, lipstick, and cotton buds.

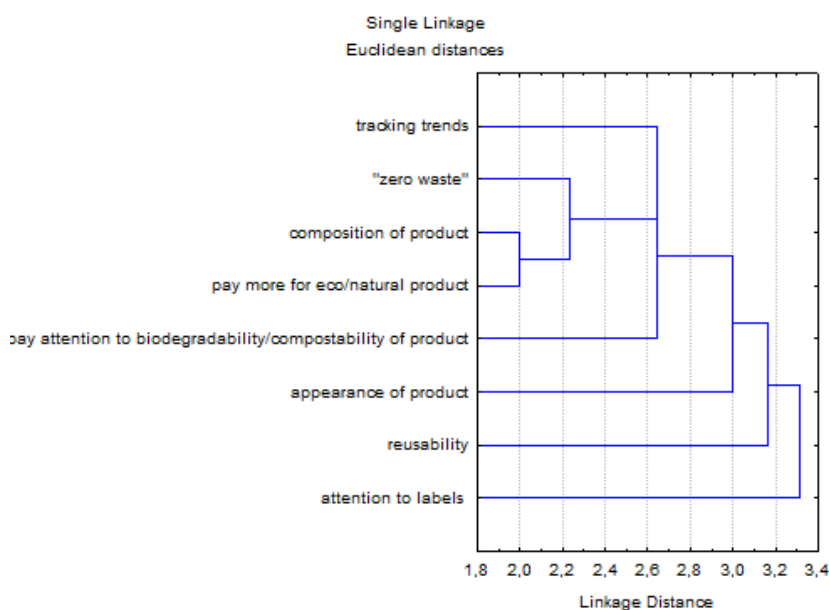


Fig. 2. Cluster analysis (the Ward's method)

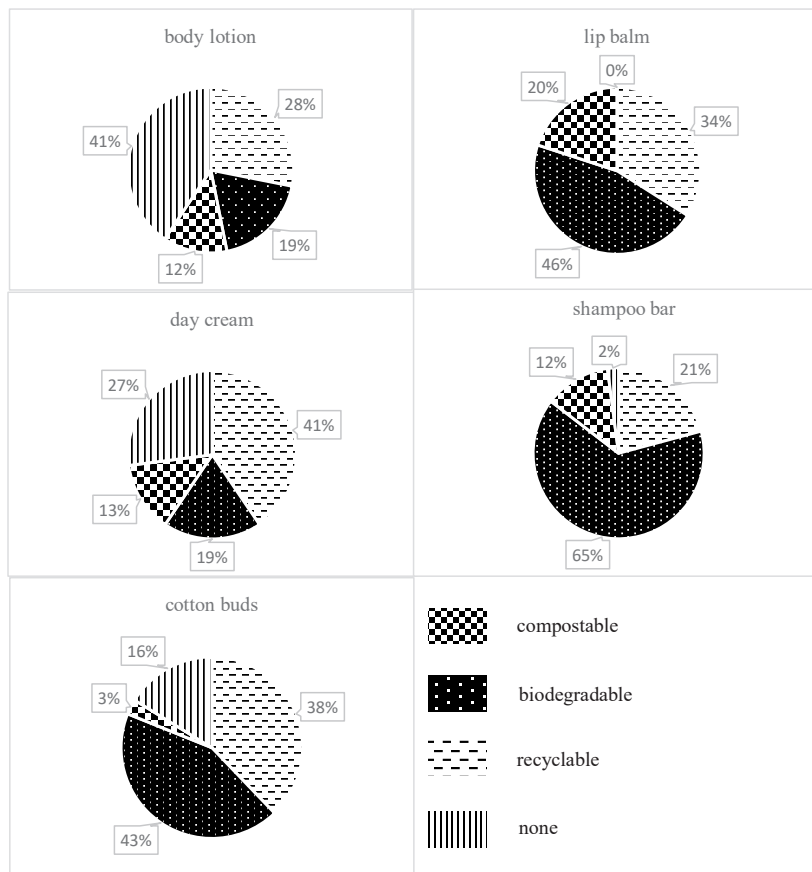


Fig. 3. Results of the consumer survey obtained in terms of the evaluation of the packaging products presented for A) body lotion, B) day cream, C) lip balm, D) shampoo bar, and D) cotton buds

The cosmetic products purchased were selected for the research due to the appearance of the packaging suggesting their ecological character. The materials purchased had a number of pictograms and declarations of the producers related to ecology (“zero-waste”, “100% Biodegradable”, “Plastic Free”, etc.). The respondents were asked to classify the product packaging for a specific separate collection system and indicate connected properties, such as prone to recycling, biodegradation, compostability, and none of the above. Figure 3 presents the results obtained.

In the case of body lotion the majority of respondents remarked on the lack of an ecological character of the packaging (none: 41%). Twenty seven percent found it as prone to recycling. The appearance of the day cream packaging suggested to the respondents that it was a recyclable product. The packaging of the lip balm sample had a great number of pictograms

and slogans. As a result, the product was assessed as ecological: recyclable (34%), biodegradable (46%) or compostable (20%). Similar trends were observed in the case of the shampoo bar packaging. The packaging of the cotton buds was multi-component (plastic bonded with paper). On its surface was marked “100% biodegradable”. This allowed most of the respondents to consider the packaging as biodegradable (43%).

The research conducted clearly highlights the significant problem of consumers as to indicating the target place in the segregation and collection system of everyday products. In addition, in the case of the products presented, the information contained on the packaging was presented in a way that made the average user unable to clearly judge whether it referred to the product itself or its packaging.

4. Discussion

The present study focused on the awareness of the consumer towards ecolabeling in cosmetic products and the influence of this type of labelling at the moment of purchase of these products. Among the most relevant findings, although the research was carried out in a small population, are those that confirm the social phenomena known as “The Eco Gender Gap”³³. These findings showed a tendency for women to be more interested in ethical consumption in favor of the environment. This social phenomena is described as the disparity between the ethical choices made by men and women. Referring to the research from Mintel in 2018³³ this term reveals that men are less likely to pursue environmentally-friendly behaviors than their female counterparts. The reasons for this may vary; one explanation is that men are afraid of being perceived as homosexual or effeminate when they carry a reusable shopping bag or doing any environmentally-friendly activity, as claimed by Swim et al. 2020³⁴. There is a constant fear in some men of being perceived as feminine, produced due to fact that some men think that doing any environmentally-friendly activity is a female trait that will compromise their masculinity. There are an abundant number of ways to care for the planet, some of which are classified as feminine roles and others as masculine roles. Private sphere pro-environmental behaviors that focus on household activities, such as recycling or sustainable food purchasing, align with feminine roles as stated by Hunter et al. 2004³⁵.

Other relevant findings include the strong relationship between the people who are willing to pay more for eco/natural products and those who pay attention to the product’s composition. This relationship can be affected by the level of income. The simple correlation can be observed that the higher the income, the higher the purchasing power. Consumers who have low income do not consider spending more money. Additionally, according to research³⁶, the level of income was correlated with the lack of knowledge on how to reduce the amount of waste (41.6% of responses, while in the

group of the highest earners this answer was indicated by 27.3% of respondents). Simultaneously, for the highest earners, the main reason for not taking action to reduce the amount of generated waste is the fact that it is not important to them (29.5% of respondents with the highest income indicated this answer, while among the lowest earners—only 10.4%)³⁶. The moderate relationship among the people who acquire products advertised with biodegradability and “zero waste” labels showed their interest and concern regarding taking care of the planet and their willingness to spend more money on this cause.

The relationship among the people who are tracking trends and those who pay attention to the biodegradability/compostability of the product indicates that for them it may be a temporary attitude, and in a short time they could lose interest in this topic, as a result of which they stop acquiring eco-friendly products. As mentioned by Olaf Tschimpke, President of NABU – The Nature and Biodiversity Conservation Union, “about nine in ten Europeans believe they can play a role in protecting the environment. But they need to trust independent labels, especially with regards to the fact that more and more companies display (often misleading) own labels or environmental claims on their products”³⁷. It is highly supported that if marketers wish to encourage consumer green purchase behavior, they have to deeply comprehend the determinant factors of this green behavior³⁸. In this context, the Theory of Planned Behavior (TPB) has been widely used in green marketing as a framework to study how consumers’ beliefs, attitudes, and intentions predict green purchase behavior³⁹⁻⁴². Despite the fact that TPB can considerably predict purchase behavior based on consumer attitude and intention, a gap between attitude and actual green purchase behavior is detected in a variety of green marketing studies^{43,44}. Even though

ecolabels are exponentially studied from a marketing point of view, most studies concentrate on the concept of ecolabels in general or investigate ecolabels within the scope of ecolabel knowledge or ecolabel trust^{39,40,45}. Despite their strengths and potential effectiveness, in recent years ecolabels have been facing severe challenges in guaranteeing and improving their ability to achieve high environmental sustainability standards in the globalised and widely ramified value chains⁴⁶. Eco-labels are essential for informing consumers about products’ environmental characteristics. However, the many different labels consumers encountered can be confusing, which makes assessing environmental quality associated with each label difficult⁴⁷. Our research clearly highlights the significant problem connected with the appearance of a product. The study revealed that consumers cannot clearly recognise whether the labelling refers to the product itself or its packaging.

5. Conclusion

The research conducted has shown that consumers have a problem not only with the identification of symbols on packaging but also with unambiguous indication as to which product element they refer to (packaging / product inside). The results also showed that consumers are susceptible to the greenwashing used by producers. The statistical analysis performed showed a relationship between the variables examined in terms of consumer attitudes, including, for example, the ability of paying more and paying attention to the composition of a product. The research was carried out on a small group of respondents and needs to be continued on a larger scale. Nevertheless, the results show the need to educate the public not only about labeling and ecology but also raise awareness of greenwashing.

Declarations

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none

Conflicts of interest

The authors declare that there is no conflict of interest.

Availability of data and material (data transparency): All data generated or analysed during this study are included in this published article.

Code availability

not applicable

Additional declarations for articles in life science journals that report the results of studies involving humans and/or animals:

not applicable

Ethics approval

not applicable

Consent to participate (include appropriate statements)

not applicable

Consent for publication (include appropriate statements)

not applicable

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