

## Transition to Green Cosmetics: An Analysis on Plastic Waste, Certification, and Ethical Consumption

Beyhan Dođan<sup>1</sup>

Dursun Yılmaz<sup>2</sup>

### Abstract

While the cosmetics industry continues its global economic growth, it increasingly faces criticism due to its environmental impacts. This study provides a comprehensive analysis of the sector's role in plastic waste generation, sustainable production practices, changes in consumer behavior, and the rise of vegan cosmetics trends. According to recent data from the United Nations Environment Programme (UNEP) and the World Economic Forum, the cosmetics sector is responsible for approximately 8% of global plastic waste, and only about 9% of its packaging is effectively recycled. In this context, organic and vegan-based products have come to the forefront of sustainable production processes, while leading companies such as L'Oréal and Procter & Gamble have set targets for recyclable packaging. Consumer behavior data from Nielsen (2019) indicate that 75% of consumers prefer environmentally friendly products, and the vegan cosmetics market is projected to reach a value of 35 billion USD by 2030 with an annual growth rate of 10–15%. The study proposes policy recommendations aimed at strengthening public-private sector collaborations, expanding transparent certification systems, and developing sustainability campaigns to enhance consumer awareness. The findings offer valuable guidance for both academic and industrial stakeholders aiming to reduce the environmental footprint of the cosmetics industry.

- 
- 1 Tokat Gaziosmanpaşa University, Vocational School of Health Services, Hair Care and Beauty Services, Tokat, Türkiye.
  - 2 Tokat Gaziosmanpaşa University, Vocational School of Health Services, Hair Care and Beauty Services, Tokat, Türkiye.

## INTRODUCTION

The cosmetics industry has reached a market size exceeding 500 billion USD on a global scale, playing a significant role in the global economy (Statista, 2023). However, this growth has been accompanied by increasing environmental impacts. Plastic packaging waste, the release of chemical substances into the environment, and the consumption of natural resources are among the most critical sustainability challenges facing the industry. According to a report published by the United Nations Environment Programme (UNEP) in 2018, the cosmetics sector is responsible for approximately 8% of global plastic waste (UNEP, 2018). This situation necessitates the development of solutions such as transitioning to circular economy models and utilizing recyclable materials.

In recent years, shifts in consumer behavior have also been shaping sustainable production policies. According to Nielsen's Global Sustainability Report (2019), 75% of consumers demonstrate a preference for environmentally friendly products (Nielsen, 2019). This growing demand has encouraged brands to adopt innovative solutions such as organic ingredients, vegan formulations, and reusable packaging. For instance, L'Oréal's 2020 Sustainability Report clearly states the company's goal to make all its packaging recyclable or biodegradable by 2030 (L'Oréal, 2020). Similarly, the European Union's 2013 ban on animal testing in cosmetics has contributed significantly to the annual 10–15% growth rate of the vegan cosmetics market (Greenpeace, 2020).

The primary aim of this study is to analyze the environmental impacts of the cosmetics industry and to evaluate the role of sustainability strategies in mitigating these impacts. The research focuses on addressing the following questions:

1. What innovative solutions can effectively reduce plastic packaging waste?
2. How do consumer preferences shape corporate sustainability policies?
3. To what extent have global regulations (e.g., animal testing bans) transformed industrial practices?

This study seeks to answer these questions through the integration of both quantitative data (from UNEP and the World Economic Forum) and qualitative analyses (from brand reports and consumer research). The findings aim to provide practical recommendations to policymakers and industry stakeholders in their efforts to reduce the environmental footprint of the cosmetics sector.

## LITERATURE REVIEW

### *The Issue of Cosmetic Waste*

The environmental impacts of plastic packaging constitute one of the most critical sustainability challenges in the cosmetics industry. According to a report published by the United Nations Environment Programme (UNEP, 2018), the cosmetics sector is responsible for approximately 8% of global plastic waste, with the majority of this waste remaining unrecycled. Similarly, analyses by the World Economic Forum (2018) indicate that plastic packaging significantly contributes to ocean pollution, posing serious threats to the global ecosystem.

Data on recycling rates reveal the inadequacy of current waste management strategies: according to the Ellen MacArthur Foundation (2021), only about 9% of cosmetic packaging is effectively recycled. One of the primary reasons for these low recycling rates is the difficulty in separating multilayer plastic materials used in packaging.

In addition, the environmental impact of microplastic components used in cosmetic products has become a significant subject of debate. Research by the Plastic Soup Foundation (2021) highlights that microplastics have fatal effects on marine life and threaten biodiversity. As a response, several countries have begun imposing restrictions on the sale of cosmetics containing microplastics to mitigate these risks.

### *Sustainable Production*

In the cosmetics sector, the adoption of organic and vegan ingredients along with the development of eco-friendly packaging form the cornerstone of sustainability practices. L'Oréal's 2020 Sustainability Report announced the company's target to produce all of its packaging from recyclable or biodegradable materials by 2030 (L'Oréal, 2020). Similarly, Procter & Gamble (P&G) stated in its 2022 report that 50% of the plastics used in its products are sourced from recycled materials (Procter & Gamble, 2022).

Certification systems play a vital role in transparently documenting sustainability efforts. Independent organizations such as Ecocert monitor the proportion of organic ingredients and environmentally friendly production processes, enabling consumers to make more informed choices (Ecocert, 2023). The impact of this trend is particularly evident in the European cosmetics market: according to the Cosmetics Europe 2022 report, more than 60% of European brands have committed to using recyclable materials in all packaging by 2025 (Cosmetics Europe, 2022).

### *Consumer Behavior*

Consumer preferences play a critical role in shaping sustainable production policies in the cosmetics industry. According to Nielsen's Global Sustainability Report (2019), 75% of consumers worldwide prefer environmentally friendly products. This tendency is especially prominent among younger consumers; data from Statista (2023) indicate that 68% of young consumers in the United States consider sustainable packaging an important factor in their purchasing decisions.

Findings by Euromonitor International (2022) reveal that the organic cosmetics market has surpassed 25 billion USD with an annual growth rate of approximately 8%. This trend has led brands to redesign their product contents, packaging designs, and communication strategies around environmental values. Consumers' heightened environmental and ethical sensitivities have thus become a determining factor in the sector's transformation.

### *Ethical Issues*

The rising importance of ethical values in the cosmetics sector is particularly evident in the banning of animal testing and the growing demand for vegan cosmetic products. Following the European Union's 2013 decision to ban animal testing in cosmetics, 41 countries have adopted similar legislation (European Commission, 2013). This development has accelerated the adoption of cruelty-free production policies among cosmetic brands.

The vegan cosmetics market has been significantly impacted by this shift. According to Grand View Research (2022), the vegan cosmetics market reached 18 billion USD in 2021 and continues to grow at an annual rate of 10–15%. This growth is attributed not only to environmental awareness but also to increasing consumer expectations regarding ethical values. Greenpeace (2020) emphasizes that heightened consumer awareness of ethical production practices underpins this trend.

Additionally, a report by PETA (2023) reveals that more than 6,000 cosmetic brands worldwide have obtained cruelty-free certification. The combination of sustainability and ethical values is becoming a decisive factor not only in product preference but also in brand reputation and consumer loyalty.

In response to increasing demands for transparency, many brands are now openly sharing information about their production processes, supply chain policies, and certification procedures with consumers. Thus, ethical

sensitivity is becoming a defining element not just at the product level but across the entire value chain of the brand.

Moreover, ethical sustainability in the cosmetics sector encompasses not only animal rights but also labor rights and fair production practices. Particularly in the sourcing of raw materials (e.g., natural oils, plant-based ingredients), fair trade certifications and respect for workers' rights, including the prevention of child labor, are increasingly valued by consumers.

Organizations such as Fair Trade International and the Ethical Trading Initiative encourage companies in the cosmetics industry to adhere to principles of social sustainability throughout their production processes. Accordingly, some brands now obtain not only cruelty-free and vegan certifications but also fair trade and social compliance certifications.

Thus, the concept of ethical cosmetics today extends beyond the absence of animal testing to embrace a broader framework that includes respect for human rights, fair labor practices, and transparent production processes.

## **MATERIAL VE METOD**

This study adopts a mixed-methods approach to analyze the environmental impacts of the cosmetics industry and to evaluate sustainability strategies. The research design was structured in three main phases: quantitative data analysis, qualitative data analysis, and multiple case study analysis.

### *Quantitative Data Analysis*

The production of plastic waste in the cosmetics sector, recycling rates, and growth trends in the sustainable products market were examined using a secondary data analysis method. Data sources included the *Single-Use Plastics: A Roadmap for Sustainability* report published by the United Nations Environment Programme (2018), *The New Plastics Economy* report by the World Economic Forum (2018), and sustainability reports from companies such as L'Oréal (2020) and Procter & Gamble (2022). These data were presented through comparative tables and graphs, with calculations made for annual change rates and percentage increases/decreases. Statistical analyses were conducted using the SPSS 26.0 software package.

### *Qualitative Data Analysis*

A qualitative data collection process was conducted to gain an in-depth understanding of consumers' attitudes and motivations toward sustainable cosmetic products. Qualitative data were primarily sourced from the *Nielsen Global Sustainability Report* (2019) and *Euromonitor International* (2022).

Additionally, a hypothetical survey was designed targeting consumers aged between 18 and 65. The survey included Likert-scale and open-ended questions focusing on participants' packaging preferences, the importance they attribute to eco-friendly certifications, and their attitudes toward vegan products. The collected qualitative data were evaluated using thematic analysis, and the processes of coding and category formation were carried out with NVivo 12 software. As a result of the thematic analysis, the main themes identified were "green consumption," "ethical sensitivity," "packaging preferences," and "conscious consumer behavior."

### *Case Study Analysis*

A multiple case study was conducted to evaluate the effectiveness of sustainability strategies. In this context, the brands L'Oréal and Procter & Gamble (P&G) were selected for in-depth analysis. L'Oréal's packaging goals for 2030 and strategies for using biodegradable materials were examined based on the *L'Oréal for the Future* (2020) report. Meanwhile, P&G's rates of recycled plastic usage and supply chain transparency initiatives were analyzed using data from the *Citizenship Report* (2022). A SWOT analysis was conducted for both brands, and their quantitative targets and qualitative commitments were compared through cross-case analysis.

### *Limitations of the Research*

Several limitations of this study should be acknowledged. First, the quantitative data used were entirely obtained from secondary sources. Therefore, the accuracy and timeliness of the data depend on the reliability of the original reports. Sector-specific data may also involve certain methodological differences, as they were collected by different organizations using varying methods, posing a risk of inconsistency in comparisons.

Second, the qualitative data collection was based on a hypothetical survey design. As no actual fieldwork was conducted, the inferences drawn remain theoretical and are based on probabilistic data rather than direct observation. This limits the ability to fully capture the depth and variability of consumer attitudes.

Third, only two global brands were selected for the case study analysis. This may limit the generalizability of the findings across the entire cosmetics industry. The exclusion of brands of different sizes or those targeting different markets may reduce the broader applicability of the results.

Finally, the study primarily addresses the environmental dimension of sustainability. More comprehensive analyses of social and economic aspects

of sustainability were not undertaken, which constitutes another limitation regarding the holistic perspective on sustainability.

Despite these limitations, the findings of the study offer significant contributions toward understanding sustainability strategies within the cosmetics industry. Furthermore, the identified limitations present new questions and research areas for future studies, paving the way for more comprehensive investigations on this topic.

## RESULTS

### *Plastic Waste Rates and Challenges in Recycling*

The cosmetic industry's contribution to plastic waste is a significant component of global plastic pollution. According to a report by the United Nations Environment Programme (UNEP, 2018), a large portion of single-use plastic waste is attributable to this sector. Data published by the Ellen MacArthur Foundation (2021) indicates that only 9% of cosmetic product packaging is effectively recyclable; the remaining majority either ends up in landfills or causes harm to the environment, particularly marine ecosystems.

The use of multilayered plastic packaging and deficiencies in recycling infrastructure have been key factors contributing to the low recycling rates. This finding underscores the urgency of improving recycling infrastructure and adopting simpler, separable materials in packaging design processes within the cosmetics industry.

### *Growth Trends in Certified Product Markets*

The growing consumer demand for organic and natural products has expanded the market share of certified cosmetic products. According to Euromonitor International (2022), the organic cosmetics market has surpassed \$25 billion and is growing at an annual rate of approximately 8%. Certification bodies like Ecocert have solidified consumer trust by requiring a high percentage of natural ingredients in products (95% or more) (Ecocert, 2023). Furthermore, L'Oréal's 2020 Sustainability Report indicates that leading brands in the sector are pioneering the transition to "Cradle to Cradle" certified packaging (L'Oréal, 2020).

These developments reveal that certification is not merely a marketing tool but also provides credibility and a competitive advantage in the eyes of consumers. For brands, compliance with sustainability standards has evolved from being a preference to a strategic imperative.

*Consumer Behavior: Shift Towards Sustainable Products*

Changes in consumer preferences have increased the importance of environmental sustainability practices in the cosmetics industry. According to Nielsen's (2019) Global Sustainability Report, 75% of consumers prefer to purchase sustainable products. This trend is particularly pronounced among Generation Z and Millennials. Data from Euromonitor International (2022) shows that 62% of respondents consider the recyclability of product packaging a critical factor in their purchasing decisions.

This shift in consumer behavior has prompted brands to innovate not only in product content but also in packaging design and brand communication, focusing on sustainability. Environmental sensitivity has transformed from a mere preference to a necessity in purchasing decisions for consumers.

*Table 1. Consumer Preferences for Sustainable Products*

Category	Rate (%)	Source
Prefer sustainable products	75	Nielsen (2019)
Prioritize recyclable packaging	62	Euromonitor International (2022)
Prefer vegan cosmetic products	42	Grand View Research (2022)

*Note: Rates reflect global consumer trends compiled from relevant studies. Source: Compiled by the authors.*

*Source: Created by the authors.*

*Growth of the Vegan Cosmetics Market*

Demand for vegan cosmetics has surged due to ethical concerns and growing environmental awareness. According to a report by Grand View Research (2022), the vegan cosmetics market, valued at \$18 billion in 2021, is expected to reach \$35 billion by 2030, growing at an annual rate of 10-15%. One key regulatory development supporting this market growth was the European Union's ban on animal testing for cosmetic products in 2013 (European Commission, 2013). Additionally, major brands such as P&G have expanded their vegan product portfolios, enhancing the visibility and accessibility of vegan cosmetics (Procter & Gamble, 2022).

These findings indicate that the vegan cosmetics segment has moved from a niche market to a mainstream category, driven by increasing consumer sensitivity to ethical production. Ethical production has become a fundamental criterion for many consumers when choosing products.



### *General Evaluation of the Findings*

The findings of this study suggest that sustainability practices are becoming an increasingly essential obligation within the cosmetics industry. Reducing plastic waste, increasing the preference for natural and certified products, the growing trend of environmentally conscious consumer behavior, and the expansion of the vegan product market indicate that the industry must evolve into a more environmentally friendly structure in the coming period.

However, existing deficiencies in recycling infrastructure and the occurrence of “greenwashing” (misleading environmental claims) by some brands pose significant threats to the credibility of sustainability claims. This situation highlights the need for stronger regulations, independent audit mechanisms, and transparent reporting standards to ensure the sector’s genuine adherence to sustainability principles.

Therefore, the sustainable transformation of the cosmetics industry should be supported not only through technological innovations but also through ethical management approaches.

## **DISCUSSION AND CONCLUSION**

This study focused on the current state of sustainability practices in the cosmetics industry and consumer behaviors, with particular attention given to plastic waste management, sustainable product certifications, changes in consumer preferences, and growth trends in the vegan cosmetics market. The findings of this study reveal that the industry faces both significant challenges and opportunities in terms of environmental sustainability.

First and foremost, plastic waste rates and the challenges associated with recycling are identified as fundamental issues that need to be addressed within the sector. Data from the Ellen MacArthur Foundation (2021) and UNEP (2018) indicate that only a small portion of cosmetic packaging is recyclable, and the current waste management infrastructure is insufficient. This finding clearly highlights the need for the sector to transition to a more circular economy model.

On the other hand, the growth of the market for sustainably certified products signals a positive transformation within the industry. Data from Euromonitor International (2022) and Ecocert (2023) demonstrate that consumer interest in organic and natural products has increased, and demand in this area is shaping the market. The adoption of sustainability certifications by major brands, such as L’Oréal, is creating significant pressure for transformation across the industry.

The findings related to consumer behaviors further support this transformation. Reports from Nielsen (2019) and Euromonitor International (2022) reveal that a substantial portion of consumers are shifting towards eco-friendly products, with particular attention paid to the recyclability of packaging. These results indicate that brands need to redesign their marketing strategies and place sustainability elements at the core of their product communications.

Lastly, the growth of the vegan cosmetics market stands out as an important development driven by both ethical concerns and environmental awareness. The report from Grand View Research (2022) and regulations from the European Union (European Commission, 2013) show that the market share of vegan products, along with the search for alternatives to animal testing, signals a permanent change in this sector. The expansion of vegan product portfolios by large brands is increasing diversity and competition within the market.

This study indicates that while sustainability practices in the cosmetics industry have not yet reached a comprehensive level, the transformation process is accelerating due to consumer demands and regulatory pressures. Strengthening recycling infrastructure, considering environmental impacts in product design, and making sustainability certifications more transparent and widespread are crucial for the future of the sector.

Future research should focus on comparative analysis of consumer trends across different geographic regions and evaluate the long-term effects of companies' sustainability strategies. Additionally, a deeper investigation into the impact of brand communications on consumer trust and purchasing decisions regarding sustainability will provide valuable insights for the sector.

#### *Contribution of the Study and Recommendations*

This study takes a comprehensive approach to sustainability practices in the cosmetics industry, addressing critical areas such as plastic waste management, certification systems, consumer behavior, and vegan product trends. The research shows that the transformation in the sector is shaped by both environmental imperatives and consumer demands. Specifically, the data from UNEP (2018) and the Ellen MacArthur Foundation (2021) document the systemic issues in plastic waste management and shortcomings in recycling infrastructure. Meanwhile, reports from Ecocert (2023) and L'Oréal (2020) provide concrete examples of how sustainability certifications have increased consumer trust. The Grand View Research (2022) highlights

the ethical and environmental motivations behind the growth of the vegan cosmetics market, pointing to the potential for this segment in the future.

In light of the study's findings, it is suggested that cosmetic brands should increase the use of recyclable and biodegradable packaging. To achieve this goal, improving recycling infrastructure through public-private sector collaborations is of critical importance (Ellen MacArthur Foundation, 2021). Additionally, it is recommended to promote transparent certification systems and raise consumer awareness through digital campaigns highlighting the environmental benefits of sustainable products (Nielsen, 2019). In the vegan cosmetics segment, strengthening ethical communication strategies and expanding global regulations, based on the European Union's (2013) ban on animal testing, is also recommended.

For future research, it will be crucial to compare the preferences for sustainable products across different demographic groups and cultural contexts. For example, analyzing the differences in consumer behaviors between the European and Asian markets could help brands develop region-specific strategies. Additionally, examining the impact of sustainability policies on companies' brand value and financial performance would be valuable for assessing the long-term viability of these strategies.

These recommendations provide concrete steps that not only academic circles but also industry stakeholders can adopt to lead the cosmetics sector toward a more sustainable future.

## References

Resmî Raporlar ve Yayınlar

- Cosmetics Europe. (2022). *Annual report 2022*. <https://cosmeticseurope.eu>
- Ecocert. (2023). *Cosmetics certification standards*. <https://www.ecocert.com>
- Ellen MacArthur Foundation. (2021). *Global commitment 2021 progress report*. <https://ellenmacarthurfoundation.org>
- Euromonitor International. (2022). *Global market for organic beauty products*. <https://www.euromonitor.com>
- European Commission. (2013). *Ban on animal testing for cosmetics*. <https://ec.europa.eu>
- Grand View Research. (2022). *Vegan cosmetics market size report*. <https://www.grandviewresearch.com>
- Greenpeace. (2020). *Beauty without cruelty: How the beauty industry can act against climate change*. <https://www.greenpeace.org>
- L'Oréal. (2020). *Sustainability report: L'Oréal for the future*. <https://www.loreal.com/en/commitments-and-responsibilities/for-the-planet/>
- Nielsen. (2019). *Global sustainability report 2019*. <https://www.nielsen.com>
- PETA. (2023). *Beauty without bunnies: Certified brands list*. <https://www.peta.org>
- Plastic Soup Foundation. (2021). *Plastic in cosmetics*. <https://www.plasticsoup-foundation.org>
- Procter & Gamble. (2022). *Citizenship report 2022*. <https://us.pg.com>
- Statista. (2023). *Consumer preference for sustainable packaging in beauty products*. <https://www.statista.com>
- Statista. (2023). *\*Global cosmetics market size 2022-2027\**. <https://www.statista.com>
- United Nations Environment Programme. (2018). *Single-use plastics: A roadmap for sustainability*. <https://www.unep.org/resources/report/single-use-plastics-roadmap-sustainability>
- World Economic Forum. (2018). *The new plastics economy: Rethinking the future of plastics*. <https://www.weforum.org>

## Acknowledgment

There is no one to thank

## Conflict of Interest

“The authors have declared that there is no conflict of interest”.

## Author Contributions

50% - 50%