

## What do Consumers Understand and Perceive about Plastic Food Packaging? An Exploratory Study in Argentina

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Single-use plastic food packaging is a practical, safe, and economical solution to food transportation and conservation. However, there is growing concern about its environmental impact. In Argentina, discussions around sustainability and consumption habits have gained prominence, leading consumers to reconsider and reduce their use of fossil-based plastics in food packaging. However, it remains challenging to determine whether consumer perception reflects conditional acceptance or signals a paradigm shift.

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The successful introduction of eco-friendly products into the market depends on several factors, among which is consumer acceptance. Marketing, information availability, cultural and social context, product cost and accessibility, regulatory frameworks, and personal values (such as environmental awareness) influence consumer choice. Perception becomes even more relevant when considering a product that currently poses a significant problem for ecosystems, such as single-use plastic food packaging. It remains hard to assess public perception and to determine whether consumer actions reflect conditional acceptance or a genuine paradigm shift in plastic consumption. Conditional approval is more closely tied to social and cultural factors, making it more context-dependent and situational in each case. In contrast, a paradigm shift is systemic and structural.

To explore these two dynamics of plastic consumption in Argentina, an online survey was conducted among the Argentine population (adults over 18 years of age). The survey was available for 5 months, and participation was voluntary, yielding 501 responses. The results are shown below according to each topic.

### Knowledge Gaps

All participants agreed that there is excessive environmental waste, with 87.4% identifying plastic as the primary pollutant. The percentages of the other options were significantly lower: paper and cardboard (5.4%), organic waste (5%), metals (1.2%), and glass (1%). Although plastic waste is the second most common type of waste in Argentina, its accumulation in the environment could explain why Argentinians consider it the most significant pollutant. Furthermore, awareness campaigns about plastic pollution could influence the population's perception. As participants stated that a large part of the waste generated is plastic, they were asked to identify different plastic commodities: polystyrene, polypropylene, polyethylene, polyethylene terephthalate, and polyvinyl chloride. Most participants (56.3%) recognized all the plastics, with only 5.8% being unfamiliar with

them. The remaining respondents (37.9%) acknowledged some of them. Participants were also asked to identify two different bioplastics: polylactic acid (identified by 11%) and polyhydroxyalkanoates (only identified by 4%). Moreover, 11.6% could identify both bioplastics, and the rest (73.5%) showed no knowledge of any bioplastics. Bioplastic identification follows the global trend toward a limited understanding of these materials. For instance, most German consumers (56.7%) reported no familiarity with the existence of bioplastics (Blesin *et al.* 2017).

This lack of knowledge was also observed when discussing terminology related to product type and end-of-life options. The terms “bio-based” and “biodegradable” are often used to classify the different types of plastics. While the scientific community is widely aware of the meaning of both terms, society may not have a clear understanding. We presented participants with five statements to gauge their knowledge: “*bio-based implies being biodegradable*”; “*bio-based is derived from fossil fuels*”; “*bio-based is derived from renewable sources*”; “*biodegradable is rapid degradation*”; “*biodegradable is decomposed in any natural environment*”. More than half of them could not recognize the correct meaning of bio-based material; only 25.3% of participants answered that bio-based materials are not necessarily biodegradable, compared to 20.4% who incorrectly associated the two terms. Moreover, only 34.1% of participants correctly identified bio-based products as originating from renewable sources, while 56.7% of participants associated biodegradable with rapid degradation. These findings are similar to those of Brazilian consumers who understand the biodegradable characteristic as the ability to decompose quickly without harming the environment (Oliveira *et al.* 2023). However, 69.3% of respondents mistakenly believe that biodegradable products will degrade in any natural environment. The truth is that plastic materials require specific conditions to undergo biodegradation, and, in some cases, these conditions are not met in natural environments. This incorrect assumption could lead to further pollution and even consumer disappointment and loss of trust when they find out that bioplastic products fail to possess all the positive qualities they had believed.

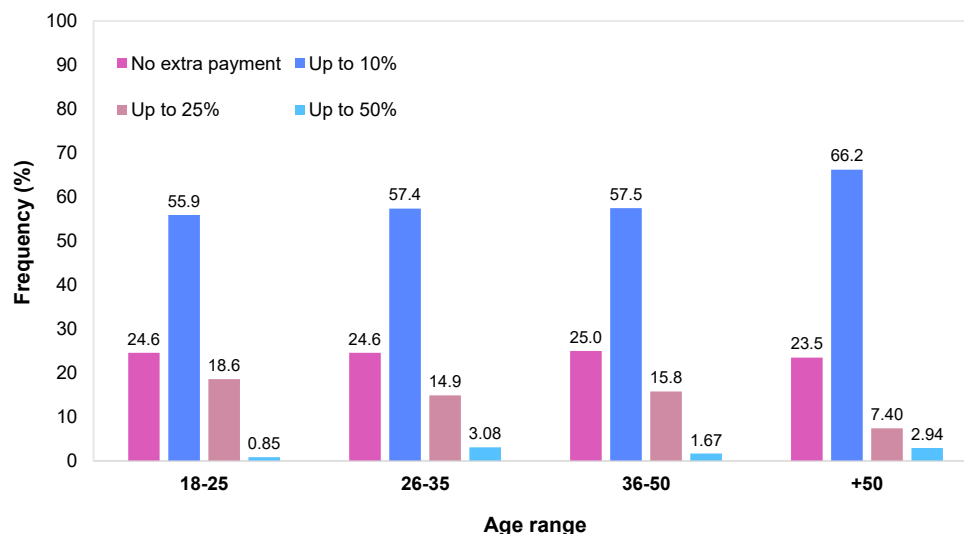
When we inquired about symbols on packaging, a fundamental tool for choosing products on supermarket shelves, this trend of lack of knowledge was also observed. The Mobius Loop symbol was recognized by only 37.7%. They understand that it simply means the packaging can be recycled. Most participants (56.5%) associated this symbol with the 3Rs concept for plastic: reduce, reuse, and recycle. Regarding the circular leaf symbol, most participants (40.5%) associated it with biodegradable packaging. Moreover, 30.3% of respondents stated the symbol also indicates that the packaging is obtained from renewable resources.

These results suggest that consumers are still largely in a phase of conditional acceptance: although the problem of plastic pollution is recognized, there is limited understanding of plastic types, packaging symbols, and the distinction between bio-based and biodegradable bioplastics. Based on these survey results, we can project that the paradigm shift still requires significant changes in consumer education regarding the plastic found on store shelves. However, despite what we have observed here, this paradigm shift involves more than just this factor; it requires a comprehensive change that engages various sectors, not just the consumer.

## Extended Producer Responsibility and Consumer Tolerance

Extended producer responsibility assumes that producers are responsible for the environmental impact of their products, which aligns with the obtained answers. There were 41.4% of the respondents who voted that producers should offer sustainable alternatives. This trend follows the previous one and represents conditional acceptance. Consumers are searching for sustainable alternatives but are not yet aware of the options. However, 34.6% of respondents selected the option involving government intervention through new regulations on plastic production and use, indicating that, alongside conditional acceptance, early signs of a paradigm shift involving other societal actors are emerging. Interestingly, the response identifying consumers as part of the solution was selected less frequently (23.3%). These figures show that the trend is not solely based on conditional acceptance, but rather that individuals are seeking the integration of all sectors of society in addressing this problem.

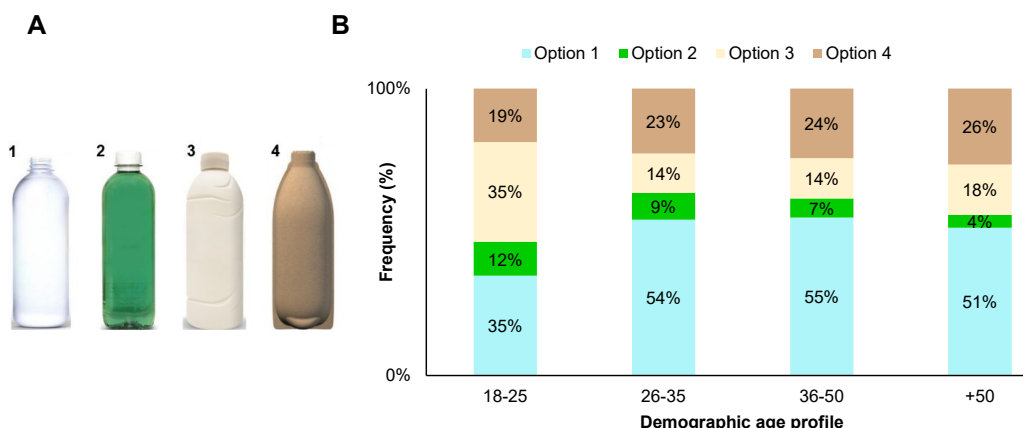
Although 94.5% of participants indicated they want to find more sustainable packaging on the market, willingness to pay varied by age group. Overall, consumers are willing to pay 10% more for food packaged with sustainable materials (58.3% of the total) (Fig. 1). Furthermore, some participants were willing to pay up to 25% more (15%), and only 2.2% were willing to pay up to 50% more. In contrast, 24.5% of participants were not willing to pay for bioplastic food packaging. These results suggest a prevailing state of conditional acceptance, while also pointing to a potential transition toward a paradigm shift: 94.5% of respondents support change, although approximately 25% remain resistant. More than half would accept a moderate surcharge, suggesting that sustainability is increasingly perceived as a value-added attribute rather than an added cost. Despite this, we identified one of the limitations of the paradigm shift: prices.



**Fig. 1.** Willingness to pay for bioplastic food packaging by demographic age profile

An additional, but less studied aspect is visual appearance. Four beverage packaging alternatives were evaluated (Fig. 2). The most popular bottle (49.5% of all respondents) was the traditional clear one (option 1), which could be explained by familiarity with this type of container. Here we can see this predisposition towards the traditional existing bottles. The consumer seeks what they already know. The second most popular option was Option 4 (with 22.6%), the paper container, which is interesting

because it is a material obtained from renewable sources, recyclable, and biodegradable. With very close values, the third position went to option 3 (19.4%). Finally, the green bottle was the least chosen (8.6%).



**Fig. 2. A)** Options presented to participants and **B)** Results by demographic age profile

Here is where the generational aspect becomes apparent. Younger consumers actively seek new alternatives, whereas older generations continue to prefer traditional polyethylene bottles, pointing to a cultural shift toward innovation accompanied by growing environmental commitment. This makes sense, since younger generations have grown up with the plastic pollution problem created by previous generations. The question that concerns us is whether this generational exchange of ideas is enough to bring about a paradigm shift.

### Final Remarks

It is almost evident that the success of biobased and biodegradable plastics in packaging will rely on the consumers. Educating consumers is a good starting point, but is conditional acceptance enough? A paradigm shift is a promising option and involves other sectors of society. Education is a key aspect; many consumers are open to new, more sustainable alternatives, but it is relevant to ensure they understand their environmental benefits.

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