

Life Cycle Assessment of Aluminium Cans and Glass Bottles

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Consumers are more concerned about the environmental impact related to their everyday actions. In general, there has been an awakening on the consumers mentality, making them willing to have more responsible and environmentally-friendly habits. However, it is quite common for a consumer to feel that he/she has not enough information about which product in their supermarket basket would have lower environmental impact. There are too many aspects to take into account: The origin of the product, the materials they are made of, the working conditions of the producer's employee, etc.

In addition to the lack of technical knowledge, a consumer has to take into account too that many companies are using the so-called "Greenwashing" marketing strategies. This means that the companies advertise their products are ecological without enough credibility for their statement, or, in many occasions, with fake information. Within this context, a good tool to improve the overall understanding of what products are more or less environmentally friendly is the Life Cycle Assessment (LCA).

In this work, we present a simplified LCA on two common products: an aluminum can and a glass bottle, both containing the same amount of beverage (1/3 L of beer). The work presented here seeks to find out which option would be less harmful to the environment by studying the CO₂ emissions produced by each container using a combined the cradle-to-cradle and cradle-to-grave approach, based on the current recycling rates in Spain.

Keywords

Life Cycle Assessment, IDEMAT, Circular Economy, Recycling.

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The functional unit is set to 1 m³ of beer, and the target consumer is someone purchasing beer at a supermarket. Therefore, according to the current waste management system in Spain, glass bottles are considered not reusable: This means that they are either disposed to landfill or deposited to the glass container for recycling. Recycling of glass would involve using the glass as raw material to produce new bottles. The free use database IDEMAT has been used in the work presented here to obtain the data necessary for the Life Cycle Inventory.

The results indicate that purchasing beer in aluminium cans have a lower environmental impact than non-reusable glass bottles. The main reason related to this result are the lower transport emissions related to the cans due to the lower weight. This means that, for the same amount of beer, the energy required to transport the bottles is higher than the cans, and therefore the CO₂ emissions are also higher. Additionally, aluminium is 100% and infinitely recyclable, while glass bottles made of recycled glass still need a certain intake of new raw material (of around 40%).

The results presented here do not contemplate the possibility to clean and reuse the bottles, which is expected to have a lower environmental footprint than the two scenarios discussed here.