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A COMPARATIVE LIFE CYCLE ASSESSMENT OF DIFFERENT PACKAGING OPTIONS FOR ALBUMIN DISTRIBUTION

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Background and importance

Traditionally, Albumin has been presented in glass vial packaging, but is it the optimal choice for its distributing?

In recent times, many pharmaceutical companies have shifted from glass vials to plastic bags to deliver their hospital products. Plastic bags have demonstrated clear advantages for both nurses (as glass carries a higher risk of breakage) and patients (since the bag does not require air inlet, so there is less risk of contamination). However, plastic bags are often perceived as harmful to ecosystems.

Life Cycle Assessment (LCA) (see figure 1) provides the scientific evidence on the actual impact of the entire process. Therefore, and commissioned by Grifols S.A., this study compares glass and plastic containers for the same product under the LCA methodology, thereby establishing scientific evidence regarding environmental impacts.

Aim and objectives

The goal of this study is to compare the environmental performance of **glass and plastic packaging options** for delivering Albumin 100 ml doses in the European market, considering **all their life cycle stages**.

Materials and methods

A cradle-to-grave LCA has been performed, considering the distribution of **10.000 units of Albumin (20%) served in 100 ml doses** to hospitals as a reference or functional unit.

The Product Environmental Footprint method (E.F. 3.0) has been used for the environmental assessment of the alternatives. However, only the more 9 relevant impact categories after normalizing the results plus water scarcity indicator have been analysed in further detail. The study has been conducted following ISO 14.044 standard, using LCA for Experts software GaBi and their relative databases (2023_1 update).

Figure 1. Lige Cycle stages included

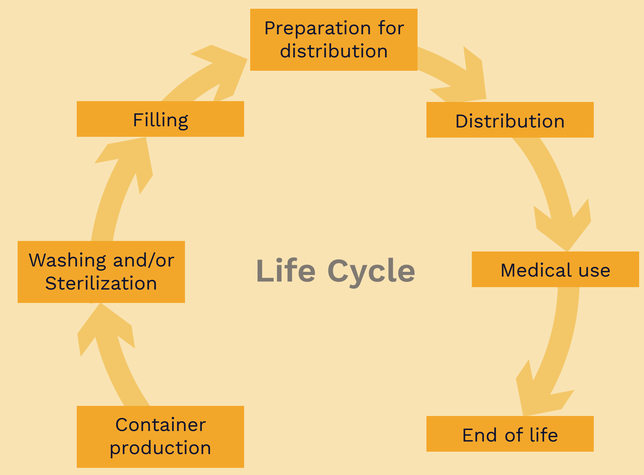
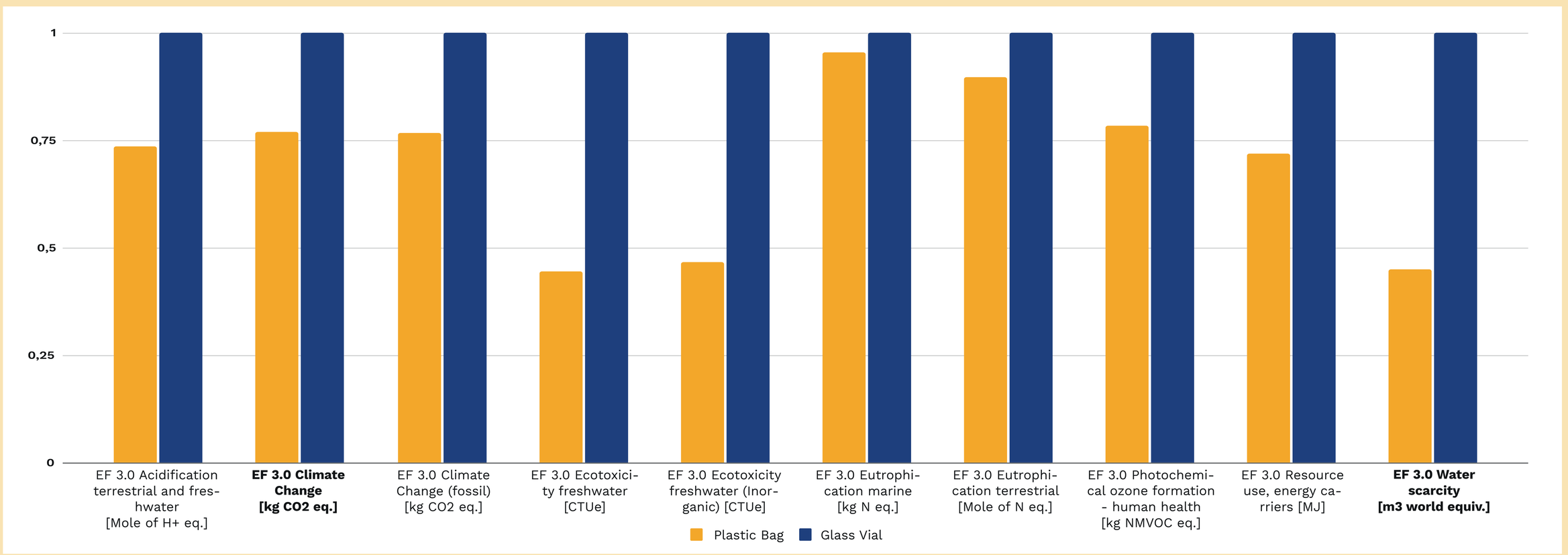


Figure 2. Products compared

Figure 3. Results obtained for impact categories



Results

Plastic bags perform better than glass vials in all the impact categories analysed. Regarding **climate change total (CC)** the improvement is **23%**. Also noteworthy is the **55%** reduction in **water scarcity** impact.

Conclusion and relevance

Although plastics are popularly considered harmful to ecosystems, **plastic bags have less environmental impact than glass vials**. So, for 10.000 units of Albumin (20%) served in 100ml dose with plastic bag instead glass vial, the emission of 655 kg of CO2eq and the consume of 355 m3 of water are avoided. This is equivalent to travelling about 3.930 km in an average car and to take 3.500 five-minute showers, respectively.

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