



A LIFE-CYCLE ASSESSMENT OF INJECTABLE DRUG PRIMARY PACKAGING



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Introduction

This study compares two packaging options in the pharmaceutical field where products have a high added value but where environment is not the most important factor affecting the decisions.

This comparison is based on the life cycle assessment of these both options.

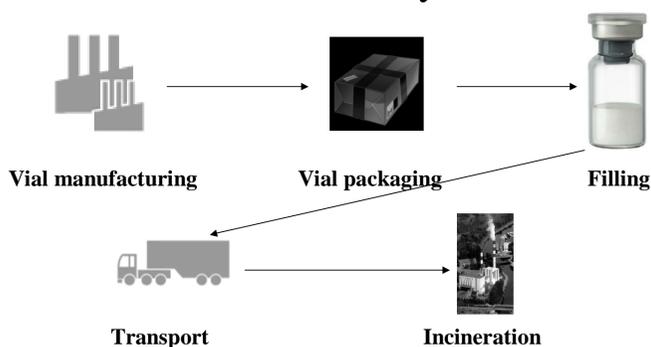
Materials & Methods

Both systems considered in this study are :

- The most traditional one with glass vials
- The alternative one with polymer vials

The studied vials have a capacity of 1 mL for both systems.

The boundaries of the systems include :



Two methodologies (Impact 2002+ and Eco-Indicator 99) were utilized to make the LCA study.

This study is in accordance with the international standards (ISO 14040 and ISO 14044).

Conclusions

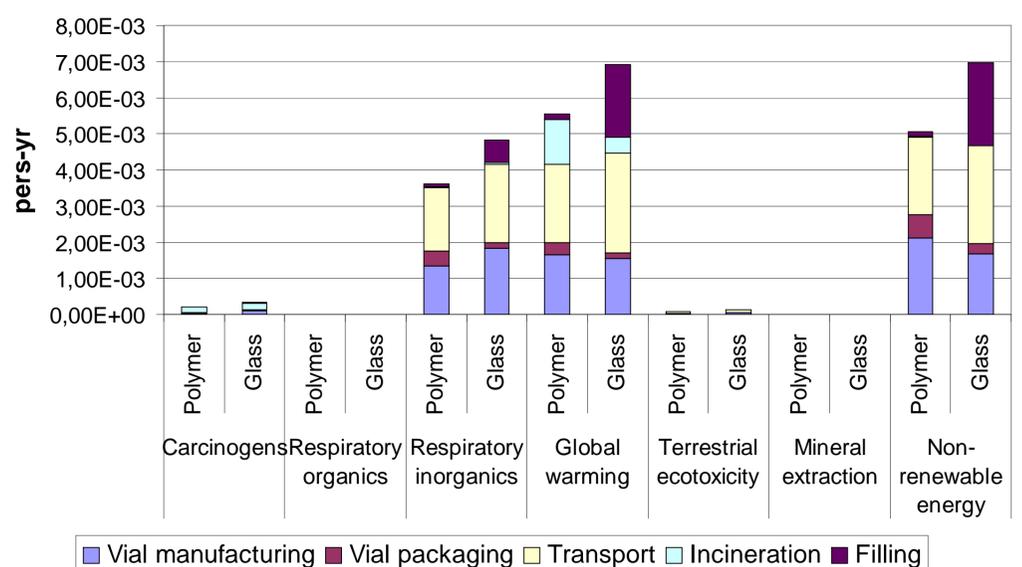
The Life Cycle Assessment methodology has been successfully applied to both systems of production, filling, distribution and end-of-life of vials for injectable drugs. For identical disclosers, the polymer vials system reaches better environmental results than the glass vials system.

Results & Discussions

The figure below shows normalization results of both scenarios for 7 categories of IMPACT 2002+. For all mid-points categories, polymer system obtains a more environmental-friendly impact than glass system.

Impact is reduced by 20% for global warming, 27% for primary energy and 25% for respiratory inorganics.

Normalization impacts - Importance of the steps



Environmental impact of both technologies for each production step is nearly the same except for three of them :

- Manufacturing of the material** which leads to a more important impact for the polymer vials.
- Filling step** which allows the elimination of preparation and sterilization steps for the polymer vials and leads to an important impact for glass vials.
- Transportation step** leads to a more important impact for glass system especially when distances are long because of the weight.