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ENVIRONMENTAL IMPACTS QUANTIFICATION OF PVC PRODUCTION

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Abstract

Due to the increasing and hazardous level of plastic pollution in our planet, many researchers and experts from the public and private sector have been working in order to promote and implement solutions overcoming this global issue.

The present project joins the scientific community in this discussion by focusing on polyvinyl chloride (PVC), which is considered one of the most used polymers in engineering infrastructures. The goal of the paper is to quantitatively assess environmental impacts of the PVC production with the aim of proposing cleaner industrial solutions and more environmentally sound products.

To this end, a Life Cycle Assessment analysis was used to evaluate the environmental performance of the PVC manufacturing process. The functional unit considered was 1 kg of PVC granules. The modelling was facilitated by the Gabi software developed with three different characterization methods: CML 2001, EDIP 2003 and ReCipe 1.08. Fossil fuels depletion, climate change and human toxicity resulted to be the most significant impact categories due, respectively, to the huge quantity of crude oil extracted, the big amount of emission released into the atmosphere and the intensive toxic substances involved during the whole process.

In the last section, a number of recycling and raw material alternatives were suggested to reduce the environmental impact obtained from the analysis.

Key words: Life Cycle Assessment, Polyvinyl Chloride, PVC granules, PVC recycling

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