Life Cycle Assessment of Wardrobe Made of Medium Density Particleboard (MDP)

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Abstract

This study aims to assess the environmental performance of a wardrobe made of medium density particleboard and propose environmental improvements focused on life cycle perspective. The Life Cycle Assessment technique was used based on ISO 14040 and 14044 standards, which has the following phases: Goal and Scope Definition, Life Cycle Inventory (LCI), Life Cycle Impact Assessment (LCIA) and Interpretation. The life cycle considered in this study was cradle-to-gate type which comprises obtaining raw materials, manufacturing and distribution of the wardrobe. The functional unit was 40 kg of stored goods for 5 years and the reference flow defined was one unit of wardrobe. The life cycle modeling was conducted in GaBi software, version Education 4.4, based on attributional modeling and EDIP-97 method was used for LCIA phase, including normalization step. The results shows that the most significant environmental impacts occur in obtaining raw materials and distribution of the wardrobe steps, and the categories of environmental impacts most relevant were Human Toxicity, Global Warming and Acidification, totaling 68,0% of total environmental impact of life cycle. The proposed actions for environmental improvement aim to optimize product distribution through the use of cleaner fuels and reducing distances of transport routes. Furthermore, a additional study was recommended to analyze and optimize the MDP panel consumption, for example, combining its use with alternative materials.

Keywords: Life Cycle Assessment (LCA), Environmental performance, Sustainability, Medium Density Particleboard (MDP), Environmental Impact.