LCA FOR BABY WET WIPES

edana
THE VOICE OF NONWOVENS

Executive Summary

The overall goal of this study is 1) to provide the nonwovens industry an understanding of the environmental impacts associated with baby wipe products, and 2) to provide a relative comparison of these products with alternatives in the marketplace. Life cycle assessment (LCA) is used to achieve these goals.

This LCA study is intended to address the following points:

- To provide representative production figures for baby wet wipes (also referred to as baby wipes) within the industry (European industry average).
- To provide cradle to grave information on the environmental performance of baby wipes.
- To highlight those sectors of the baby wipes production chain that are most important for environmental performance, to enable improvements in disposable wipes manufacturing.
- To compare the environmental performance of an average baby wipe (European industry average) with alternative products, i.e. cotton wool balls and washable cotton cloths (wash cloths).

For the task of comparing alternative products a common function had to be chosen. Cleaning the baby along 1000 ordinary nappy changes was selected as this common function. The reference flows of material and energy needed to fulfil the function was defined with the help of a separately commissioned “habits and practice” study.

The LCA study is based on primary data collected for baby wipes and best available knowledge of the alternative systems. A highly representative data set for Europe was created for the production of baby wipes.

Production data for cotton fibres and wash cloths is taken from a reliable database. Figures are partly based on 2002 data. Environmental burdens by wash cloth production may therefore be slightly overestimated. However, this will be of no importance because 3,000 assumed use cycles will downscale this effect. Production of cotton wool balls from cotton fibres is based on current information provided by manufacturers, whereas cotton fibre production is of older origin.

Looking at the results resource use and environmental impacts are generally higher for cotton wool balls compared to baby wipes and wash cloths.

The comparison between cleaning babies with wipes or with wash cloths is less clear:

- Resource use: baby wipes perform better on water consumption and fossil energy demand, while they perform worse in the land use categories.

- The environmental impacts in favour of wash cloths are acidification, summer smog, ozone depletion, terrestrial eutrophication, aquatic eutrophication and carcinogenic risk potential. The AOX parameter, which relates to the impact on water bodies, is also lower for wash cloths.

- The environmental impact in favour of baby wipes is global warming potential

These relative assertions are also supported by the normalised figures. They are derived by scaling the use of baby wipes in Europe to the alternative systems applying the equivalent function. The normalised results provide quantitative information of the environmental impacts of cleaning a baby to the respective total impacts in Europe expressed in person equivalents.

The following impact categories represent environmental burdens which are caused by an equivalent of 10,000 people or more and can be regarded as significant (see red line in the figure above):

Land use, freshwater consumption, fossil resources, global warming potential, acidification, terrestrial and aquatic eutrophication, in addition to fine particulates emissions (AOX emissions could not be quantified).

The normalised results can be interpreted as follows:

- Cotton wool balls generally perform worse compared to the other products
- Baby wipes perform better for the freshwater consumption and the energy-related indicators cumulative energy demand and global warming potential.
- Wash cloths are better for land use, acidification, aquatic and terrestrial eutrophication.

A weighting procedure would be required to decide if any product system has on overall advantage over the others. This was not applied here, in line with requirements set by ISO on LCA. For many indicators, the differences in person equivalents amongst the cotton cloths and baby wipes are quite small except for agricultural+forest land use, water consumption and aquatic eutrophication potential.

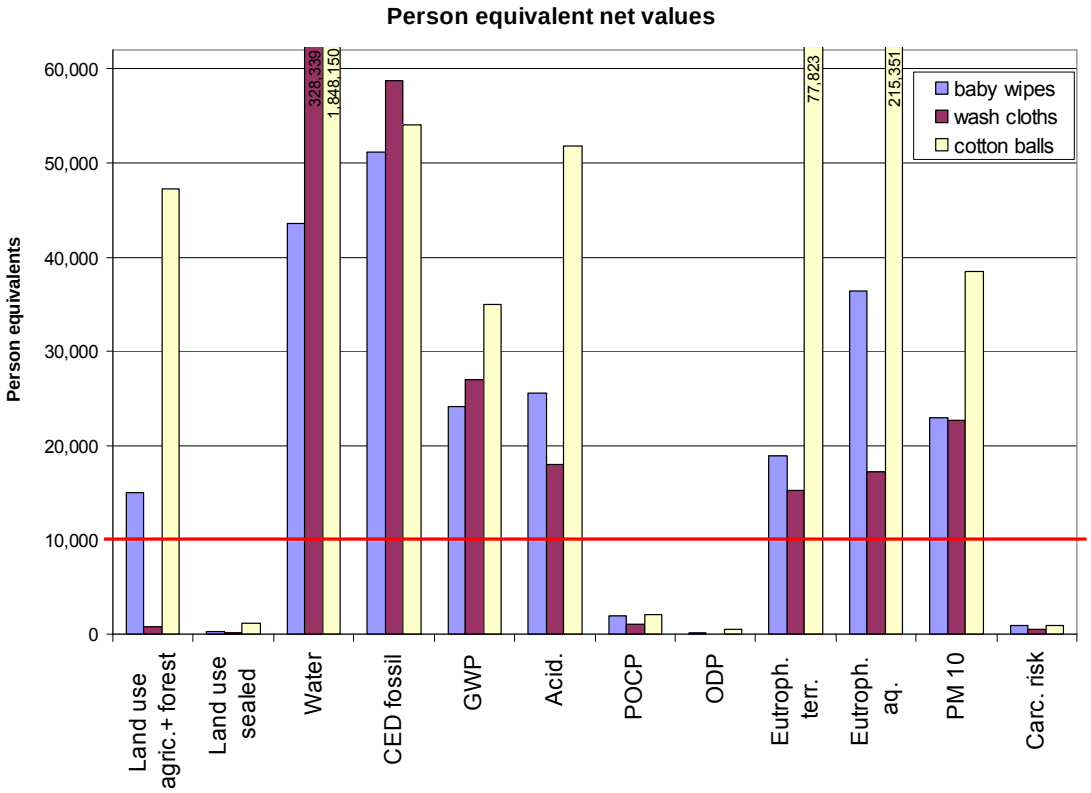

Figure: Normalised numbers for resource uses and impacts in person equivalents (vs. EU27 and for ref year 2008); the red line represents the chosen level of significance

From the normalization step, all relevant indicators and some key inventory indicators are presented in the below spiderweb chart, showing results relative to baby wipes. AOX additionally represents emissions to water.

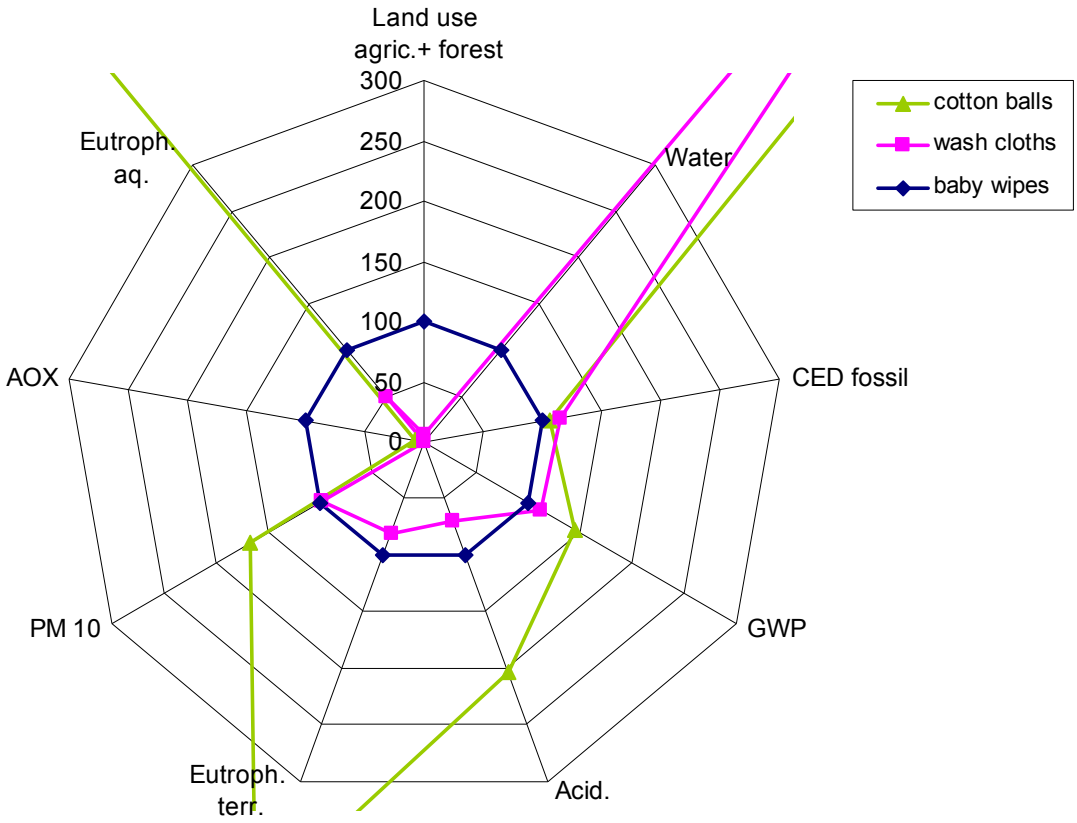

Figure: Results relative to baby wipes on the most relevant indicators following normalisation vs. an average EU-27 person (ref year 2008)

Key contributing life cycle stages for the majority of life cycle indicators are the production of the basic raw materials for baby wipes and cotton wool balls and the use of warm water for wash cloth and cotton wool balls.

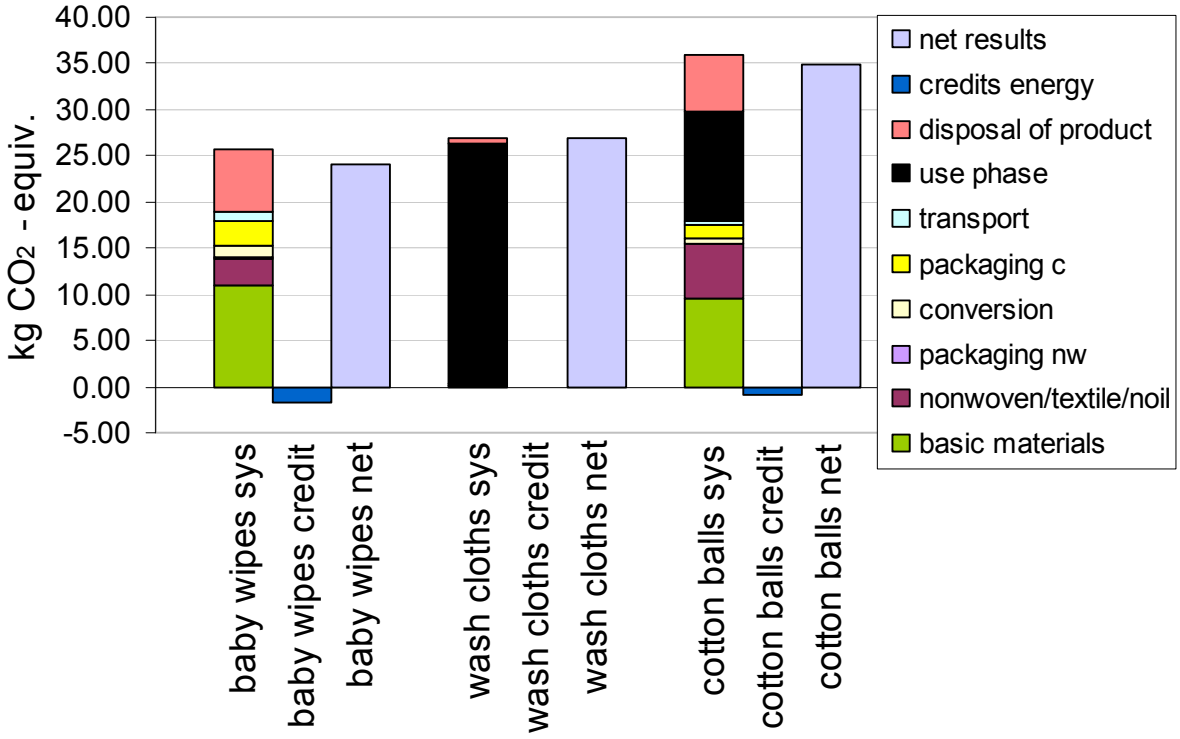

Figure: Key contributing life cycle stages for baby wipes, wash cloth and cotton wool balls (example given for global warming potential).

In general, the use phase of the wash cloth greatly influences the outcome of the environmental comparison. Lower use of warm water for baby cleaning and efficient washing processes can change the whole picture.

Consumer research studies on washing habits and practices using wash cloths show that the amount of warm water used differs considerably between families. Additionally, the respective domestic hot water boilers and the corresponding energy sources are different, leading to differences in energy use and associated environmental impacts.

The weights of the cotton wool balls vary but without consequences for the final conclusions. The same holds true for choosing other allocation methods for the production of cotton wool balls.

Since, the sector with the greatest influence on the environmental performance of the life cycle of baby wipes is the production of basic materials, careful selection and production of these materials will contribute to reducing resource use and environmental impacts.