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JUTE ECOLABEL

Benchmarking Against Competing Product

www.jute.com/ecolabel
THE GOLDEN NATURAL FIBRE

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Background

In today's globally competitive market, it is essential that the products endeavor to achieve "best in class" performance levels and address gaps and opportunities for enhancements continually.
It is important to benchmark the product against its competing product/s in order to obtain an understanding of benefits or drawbacks of the product vis-à-vis its competing products in order to provide a specific service to the customer.
One of the objectives of the life cycle assessment study of jute was to identify the impacts across the life cycle from cradle to grave with respect to conventional and non-conventional practices that would have an implication for benchmarking the product under specific categories.

This document has been prepared as a background document to the Jute ecolabel document keeping in mind the intended application of the present life cycle assessment study – to prepare ecolabel and disposal protocols for select jute products. This document is intended to present a benchmarking overview for select jute products for which compatible life cycle information was available. A glossary of useful terms is included for ready reference.

Glossary of frequently used terms

Environmental aspect: element of an organization's activities, products or services that can interact with the environment

Functional unit: quantified performance of a product system for use as a reference unit in a life cycle assessment study

Input: material or energy which enters a unit process

Life cycle assessment, LCA: compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle

Life cycle impact assessment: phase of life cycle assessment aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts of a product system

Life cycle interpretation: phase of life cycle assessment in which the findings of either the inventory analysis or the impact assessment, or both, are combined consistent with the defined goal and scope in order to reach conclusions and recommendations.

Life cycle inventory analysis: phase of life cycle assessment involving the compilation and quantification of inputs and outputs, for a given product system throughout its life cycle

Output: material or energy which leaves a unit process

Waste: any output from the product system which is disposed of

Product system: collection of materially and energetically connected unit processes which performs one or more defined functions

Raw material: primary or secondary material , that is used to produce a product

System boundary: interface between a product system and the environment or other product systems

Elementary flow:

(1) material or energy entering the system being studied, which has been drawn from the environment without previous human transformation

(2) material or energy leaving the system being studied, which is discarded into the environment without subsequent human transformation

Unit process: smallest portion of a product system for which data are collected when performing a life cycle assessment

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Preamble

Consumers have been using jute products for a number of years for their aesthetic appeal as well as environmental attributes. However the prevailing situation of global competition in the jute products market vis-à-vis synthetics, paper and other plant based fibers makes it is imperative to know the position of the Jute products against its competing products with respect to life cycle environmental impacts, a key consideration for the discerning global consumer.

LCA's have been increasingly used by industry and the public sector to help reduce the overall environmental burdens across the entire life cycle of a product. The aim of inculcating life cycle considerations in product development is to contribute to the development of sustainable product life cycles. This also allows benchmarking of product system environmental attributes that involve source reduction, re-use, return, recycling or inclusion in energy recovery or landfill. Such comparisons demonstrate the environmental implications of different choices and the trade-offs that need to be made while choosing one product over the other for different types of impacts for example, eutrophication, global warming, air acidification etc. LCA allows benchmarking of product system options and can therefore also be used in decision making of purchasing and technology investments, product innovation, including innovations in environmental product design. LCA provides insight into the upstream and downstream environmental impacts associated with environmental stress, human health, and the consumption of resources.

For the purpose of benchmarking, two products, shopping bag and Hessian (as packaging material) have been selected.

Jute Shopping Bag

A jute shopping bag of specification 16.5 " x 6 "x 13.5 " with cane handle (7" radius) weighing 240 g has been selected as one of the products that has been benchmarked against the competing products under the same category. For a packaging application, the typical alternative to the shopping bag in Europe would be a disposable HDPE bag (High Density Polyethylene) or a reusable LDPE bag (low density polyethylene). To simplify we have considered virgin polyethylene (no recycled content) and have ignored that disposable bag could be further used as bin line. We have considered their main assumptions and reproduce them as follows:

Disposable PE bag. Average weight ~ 6.12 g, Useful volume 14 litres

Reusable PE bag. Average weight ~ 44 g. Useful volume 37 litres

The functional unit of the study correspond to the yearly demand of packaging by a typical consumer (45 visits to the supermarket), thus 9,000 litres of packed volume.

Jute Hessian

The Jute Sacking made of Jute Hessian has been selected as another product for benchmarking the jute packaging material against PP bag. Both these bags could carry 50 kg. The jute bag that carries 50 kg weighs about 540 g, whereas the PP bag that carries the same weight weighs about 100 g. We have considered virgin polyethylene (no recycled content). The main assumptions and reproduced as follows:

The functional unit of the study corresponds to the yearly demand of packaging by a typical cement packaging unit.

To be conservative, here we have compared the impacts for the overall jute life cycle against the impacts for the polypropylene manufacturing stage alone. It has been assumed that if we had considered the other stages of PP sacking manufacturing, it would have been added to the present impacts of only the manufacturing stage that has actually have been considered. Thus, if

Jute life cycle impacts is lesser than PP manufacturing stage impacts, then

The following is also true:

Jute life cycle impacts is lesser than PP all life cycle stage impacts

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Benchmarking of Jute Shopping Bags

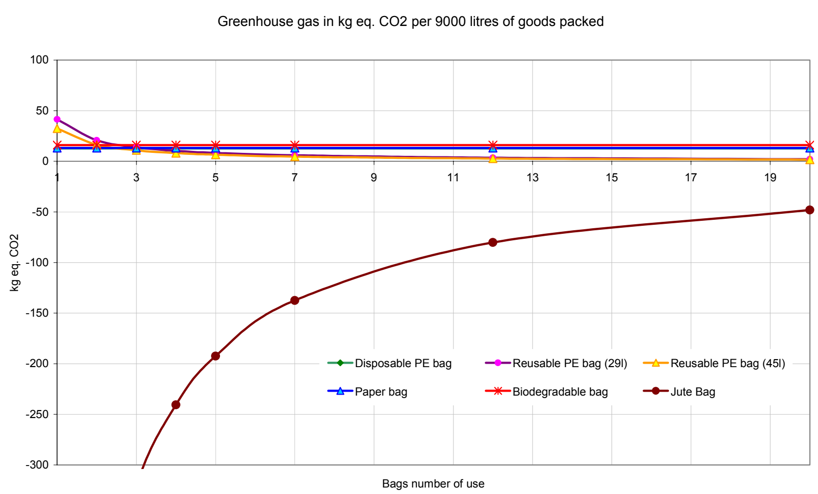
This streamline study considers the packing of 9,000 litres of goods from a supermarket (1 year needs of packing groceries by a typical European customer), by

- The single use of disposable polyethylene (PE) bags (14 litres - 6.04 grams)
- Larger polyethylene bags (29 litres - 44 grams and 45 litres) that can be re-used
- Disposable paper bags (from recycled paper - 21 litres, 52 grams) or disposable biodegradable bags (from corn starch - 25 litres, 17 grams)
- Jute bags that can also be re-used (14 litres, 240 grams with cane handle)

The disposal stage considers only the case of incineration with recovery of energy. The results are as follows:

Benchmarking as to Greenhouse Gas (GHG) Emission

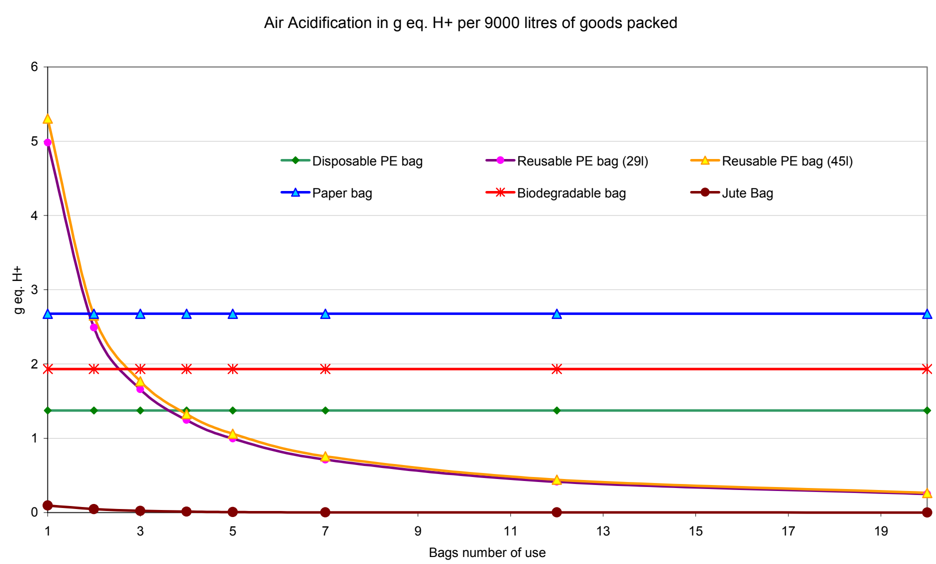
The green house gas (GHG) emission can be benchmarked as follows:



The above graph shows that the greenhouse gas emissions from jute are actually negative on account of the large sequestration that occurs during the jute growing stage. All other substitutes possess a net GHG emission whereas jute has a net negative emission. This attribute of jute would make jute products particularly attractive as greenhouse gas emissions is a matter of great concern under the Kyoto Protocol and all developed European countries (Annex I) countries have to demonstrate commitments by way of reduction of GHGs.

Benchmarking as to Air acidification

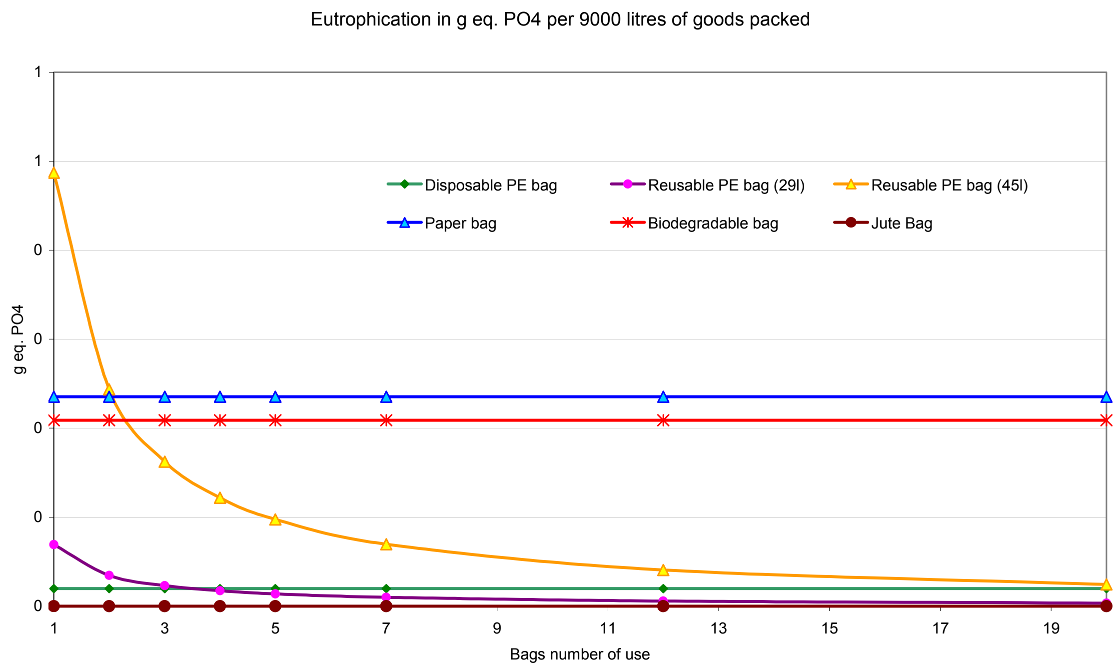
The Air Acidification can be benchmarked as follows:



The above figure demonstrates that jute bag's air acidification potential is negligible as compared to other alternatives.

Benchmarking as to Eutrophication

The Eutrophication impact can be benchmarked as follows:



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Benchmarking of Jute Sacking

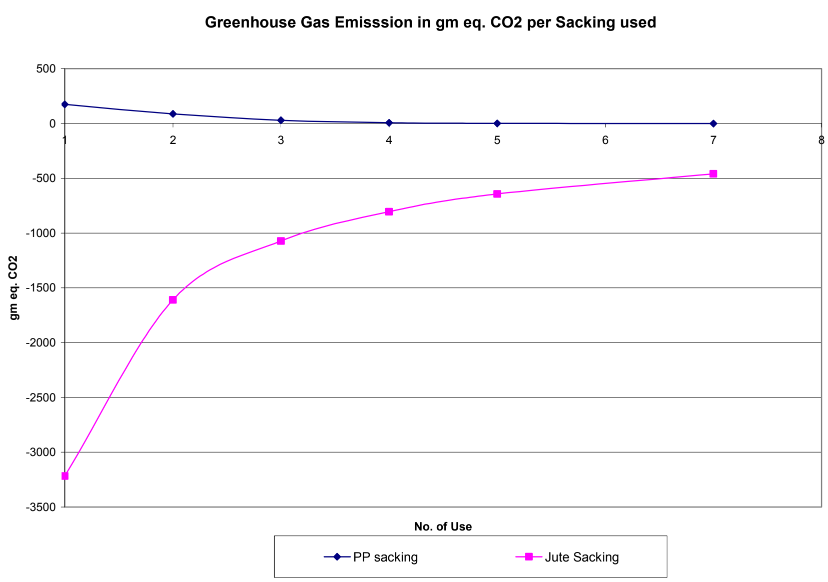
This present study considers the packing of 50 kg of cement, by

- Reusable Poly Propylene (PP) sackings (100 gm). Here we would consider impacts for manufacturing of 98 gm of PP. [1]
- Jute sackings that can also be re-used (540 gm)

The results are as follows:

Benchmarking as to Greenhouse Gas (GHG) Emission

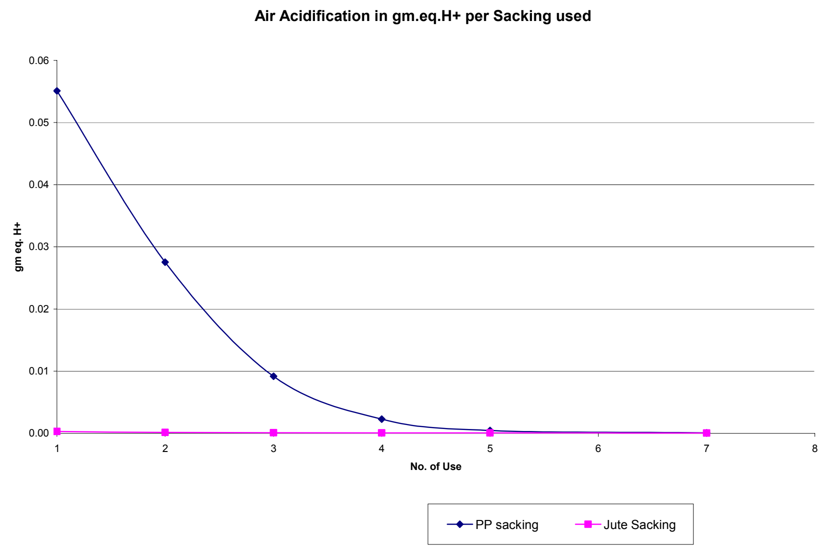
The green house gas (GHG) emission of Jute Sacking can be benchmarked against that of PP Sacking bag as follows:



[1] 0.98 kg of PP granules is required to produce 1 kg of PP sacking. Source: Comparative Stydy of Jute and Polypropylene in respect of their relative costs and advantages; Report by IIT Kharagpur, February, 2000 and submitted to Jute Manufactures Development Council, Ministry of Textiles, Govt. of India, Kolkata

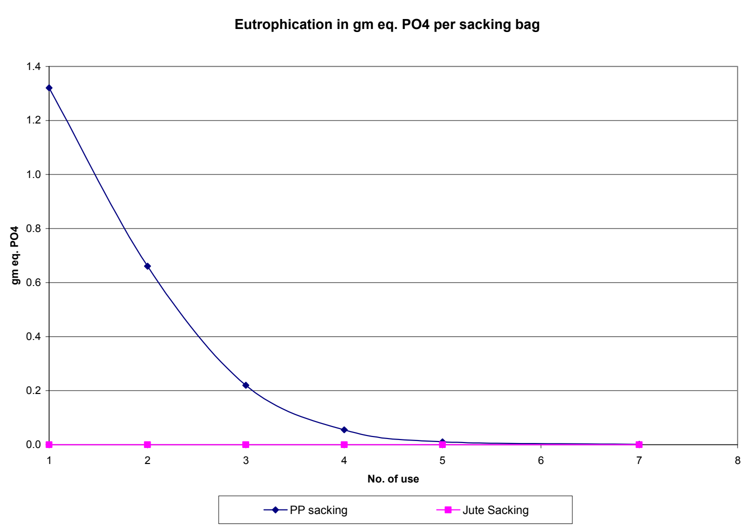
Benchmarking as to Air acidification

The Air Acidification impact of Jute sacking can be benchmarked against that of PP sacking as follows:



Benchmarking as to Eutrophication

The Eutrophication impact of Jute sacking can be benchmarked against that of PP sacking as follows:



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Conclusions:

This benchmarking study considers Jute shopping bag and Jute sacking with respect to major environmental impacts like GHG emission, Air Acidification and eutrophication against their competing products made from synthetic, paper etc. The jute bags and their alternatives were compared for similar functional characteristics.

Since, jute is a natural fibre; it sequesters a significant amount of carbon during its agricultural stage. Therefore the GHG emission of jute life cycle was found to be negative. Since there is a great concern for global warming emissions and most developed countries have a commitment to reduce GHG emission, popularizing the use of jute products in those countries would yield benefits to the consumer beyond product quality and aesthetic appeal.

It is also observed that throughout the jute product life cycle, issues like eutrophication and air acidification is also much lower as compared to the competing products such as paper bags, Disposable PE bag, biodegradable PE bag and reusable PE bags. This is in spite of considering only the impacts from the production phase of Polypropylene granules which is a raw material for Polypropylene (PP) sacking bag. Had we considered the entire life cycle of PP sacking, there would have been a more significant difference in environmental impacts between the jute and PP – strongly favouring the use of jute bags over PP.

While reaching the above conclusions, we have relied on the public domain information on other products whose authenticity and conservativeness was not verifiable under the scope of the present study. Likewise, a lot of information for the jute lifecycle has been sourced from secondary sources that we have referenced in the life cycle study.