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An LCA of Packaging materials considering their functions.

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abstract,

These case studies are described on the LCA consideration as tools for the envoronmental assessment to produce the environmentally friendly packaging products. The functional characters of the packaging materials generally involved mainly two differrent properties such as gas-barrier of plastics and conveniently distribution.

It is showed the result of LCA under the considering these packaging functions.

1.Introduction

Under the enhanced awareness of environmental protection ,the packaging industry in Japan has to respond to the need of protecting environment and conforming to pollution control act.

Not a single report has been published before relating to the function of packaging.

Many packaging have numerous functions which are exhibited by condition of the distribution and purpose of the multifarious goods.

It has been required to develope the new technology that put into practice the sustainable developement in the world.

We have been considering to develope the LCA methodology as the incentive tools under the market economy society.

However, at the ordinary calculation, LCA does not calculate these functions correctly, becouse of the intricately conversion to a numerical value.

Therefore, we tried at these evaluation of the packaging functions by life-cycle analysis.

2.An important matter of packaging functions.

Packaging materials are fundamentally a good parameter for distribution of goods, and the effects of packaging functions have exhibited their potentiality but they are also an effective indicator of municipal solid waste at large.

First of the their function is packaging materials are fundamentally distribution property that are showned by conveniently

transportation and the efficiency of warehouse.

Second is gas-barrier property that extends the length of food preservation period.

3.Case study:

3.1 High gas barrier plastic package

Single layer plastic package shows the specific gas-barrier property, high gas barrier plastic package was produced by the combination of the gas- barrier plastics such as NYLON, PVDC, EVAL and conventionally PE,PP.

One of the application is "miso" container. "Miso paste" turns brownish by oxidation during storage at room temperature.

High gas-barrier package makes it possible for "Miso paste" products to be distributed by long term distribution planning.

As a result, material and process energy increased (+6.12%) from 106.15 Kcal to 112.65Kcal, however, transportation energy decreased because of the extended preservation period to become 3 times.

In total,the energy consumed for "Miso-paste" packed in mulutilayer container decreases by 41.7% from 452,37Kcal to 319.19Kcal.

CO_2 decreases by 61.6% from 35.90g to 22.21g, SO_x decreases by 25.4% from 0.247g to 0.197g and No_x also shows 75.97% decreasing.

3.2 Introduction of high productivity package machine.

The old fashioned package machine replace with high productivity one, this matters contained important facts concerned with labor energy calculation for LCA.

The save in production time means the save in labor energy,which creates spare time allocatable to the production of extra products.

The assumption of these calculation will be showed as below.

① Man-powered production : 200unit/hr
12 persons labor energy : No count
Machine price : 1.0 million yen
Depreciation : for 8 years
Operation energy : 2.0kWh

② Man-powered production:200unit/hr
12 persons labor energy : count
Labor energy : 3,050Kcal/hr
Machine price : 1.0 million yen
Depreciation : for 8 years
Operation energy : 2.0kWh

③ Automatic-production : 500unit/hr
Machine price : 20.0 million yen
Depreciation : for 8 years
Operation energy : 15.0kWh

The summary of the result is :

Total energy of Case ① showed 0.77 Kcal/unit , it showed 183.76 Kcal/unit compared with Case ② which count the labor energy. and then automatically production of Case ③ was 78.83 Kcal/unit.