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LCA, ECODESIGN AND ETHICS FOR A COMPLETE REVISED COFFEE LIFE CYCLE: A TASTE OF INNOVATION

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ABSTRACT

Malongo is a French roastery - founded in 1934. It evolved into a prominent company and became the French leader in fair trade and organic coffee markets, bringing its on supermarket shelves. Malongo prides itself on favoring quality over productivity, added a strong social commitment to its values in the early 1990s, joining Max Havelaar fair trade network.

With the entry into the market of ground coffee pods, and associated coffee makers, Malongo decided to differentiate itself with the association of its traditional values with a complete LCM (Life Cycle Management) of its products (coffee makers, pods, packaging, ...).

All these improvements redesigned the production lines and uses and offered Malongo a clear advance and coherence in the coffee sector.

INTRODUCTION

Malongo is a coffee roaster located in Carros in south of France. It is a serious actor of sustainable development. Its commitment starts in the '90s by joining the Max Havelaar fair trade network. The firm formalized its environmental commitment in the mid-2000s by obtaining ISO 14 001 certification and being a leader in organic coffee, developing water based decaffeinated and integer LCA (Life Cycle Assessment) and ecodesign in its strategy. Since 2009, écoeff realized LCA studies on boilers coffee makers, coffee markers complete system and coffee pods systems.

Thank to these studies, Malongo developed a new pod made of paper and a new coffee machine named *Ek'oh!*. This coffee maker is produced in France whereas the old one that was produced in China. Consequently, the three pillars of sustainable development are taken in account in the Malongo strategy.

MATERIALS AND METHODS

Malongo uses four main tools in order to apply its LCM strategy. These tools are environmental certification, life cycle assessment, production relocation and ecodesign and ecoinnovation.

Environmental certification

In the mid 2000s, Malongo's managers felt like extending the company commitment toward a greater environmental responsibility. It obtained ISO 14001 certification with its environmental management, and started to ecodesign its packaging.

New pod material choice is also based on certification with the selection of FSC and PEFC certified paper and cardboard.

Life cycle assessment

Since 2009, several life cycle assessment studies were realized by écoeff according to international standards ISO 14040 – 44.

A critical review was realized on boilers study and another one is being completed on pods full system study. The latter deals with coffee life cycle from the green coffee cultivation to the pod end of life (taking into account transports, pod production, use phase with a capsule coffee maker and cup use).

For the pods full system life cycle study, écoeff determined the following functional unit : "Serve a cup of 40 ml espresso coffee extract in a coffee machine from a pre-measured pod" and choose to realize this study with Simapro 7.3.3, which is the world most used LCA software, and EcoInvent V2.2 database.

Seven pods were chosen for comparison. Scenario 1: Malongo paper pod, Scenario 2: Malongo plastic pod, Scenario 3: aluminium pod, Scenario 4: biosourced plastic pod, Scenario 5: PP/PET (Polypropylene/Polyethylene terephthalate) pod, Scenario 6: PP soft pod and Scenario 7: PP hard pod.

ReCiPe V1.07 (H) methodology was used for this LCA according to ADEME (French environment agency) and European Commission recommendations. Calculation was realized with midpoint and endpoint model and a single score was calculated. A consistency check was realized with Impact 2002+ model in order to confirm the less impacting pod system.

Production relocation

Designing a new pod and new coffee maker, forced Malongo to rebuild all its production line. Moreover, Malongo decided to relocate the production in France, thanks to a partnership with different actors (SMEs in the field of household appliances, researchers in the field of plastic and boilers...).

Ecodesign and ecoinnovation

Many technological and social innovations were made by Malongo in the coffee sector: vacuum-packed metallic boxes, water based decaffeinated coffee, strong partnership with fair trade producers, biodiversity projects (in Haiti, Guatemala, Belize, Salvador, Honduras, Nicaragua, Costa Rica and Panama), NFC technologies (near field communication)...

Ecodesign takes both in account, coffee makers and pods.

This snap-on assembling enables a high reparability of the machine. As the LCA study pointed out some parts of the machine – such as the over-consuming boiler, Malongo has been able to radically minimize the environmental impact of a coffee cup. The start-and-stop boiler introduced by Malongo in its last machine is one of the most sophisticated boiler and lead to a tenfold difference in use-phase electricity consumption.

Malongo was thus able to design an innovative coffee maker, totally dismountable, repairable and recyclable. In order to make it easier to repair the machine, a screwless design has been worked out.

The plastic pod was also redesigned in collaboration with Nordic companies (Korsnäs and Walki). For the first time on the market, a paper based solution was developed, offering a new way to decrease environmental impacts associated to packaging and pod. That paper is also FSC and PEFC certified, and the pod keeps intact flavor and aroma of artisan roasted coffee.

RESULTS

Life cycle assessment

A comparative LCA was carried out on seven B to C products and the study on the coffee makers permits to redesign the coffee maker 1.2.3. Spresso and ecodesign Malongo Ek'oh! new coffee maker.

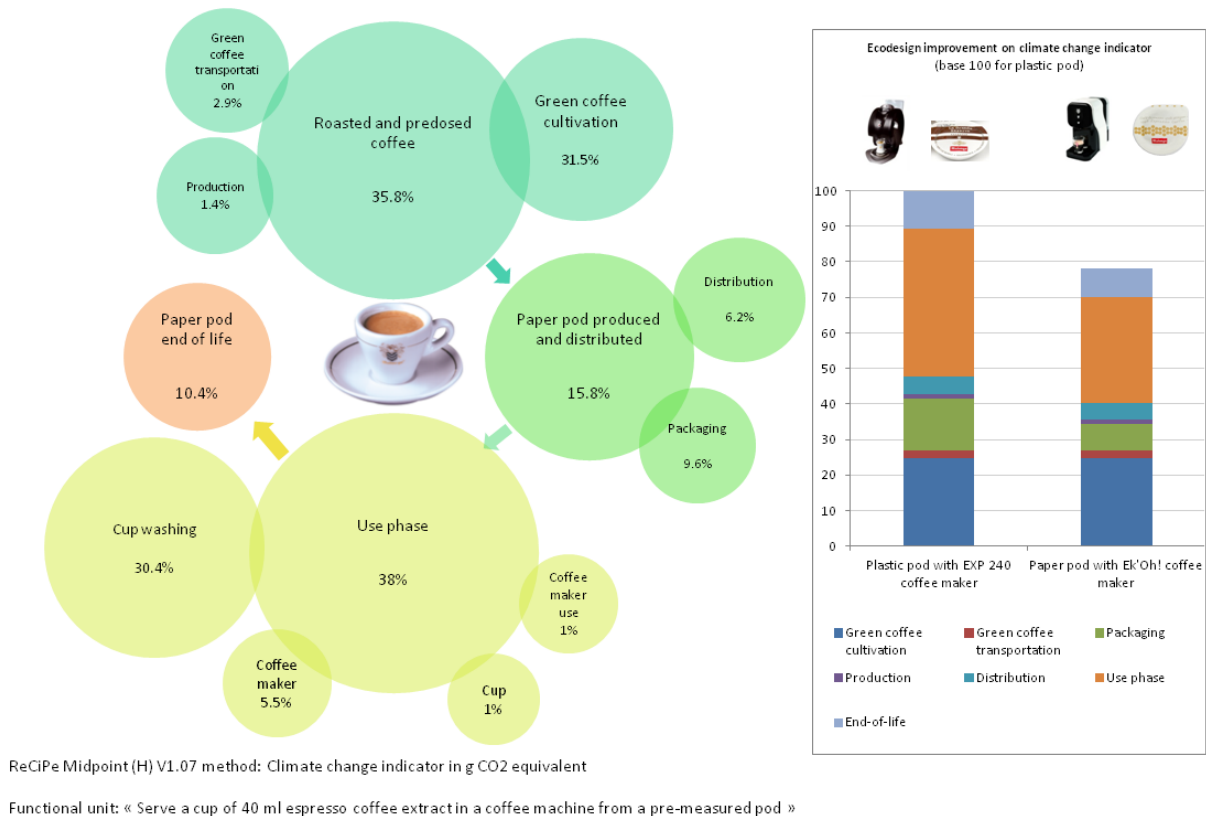


Figure 1 : Malongo natural fiber pod LCA results



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Figure 1 permits to compare Malongo pods scenarii for climate change. The pods comparative LCA realized with ReCiPe (H) methodology permits to calculate an environmental single score. The new paper pod comes with the minimum, meaning it is the more environmental friendly package. From the cradle – including organic and fair trade coffee – to the grave – end of life of the coffee pod machine and the packaging – it gave priority to sustainability.

Production relocation

Pods production has always been realized in France.

In order to increase our coffee pods system sustainability, Malongo works with a French SME to produce *Ek'oh!* its new coffee maker. That relocation enables to ensure reactivity and reliability of the coffee maker. It reduces upstream and downstream transports and it provides a better after sales services.

Ecodesign and ecoinnovation

With the LCA studies results, Malongo R&D team ecodesigned pods and coffee machine. Replacement of plastic pods by paper, coffee pods become recyclable and oxo(bio)degradable, and coffee machine become repairable, more recyclable. Life span of the coffee maker had been increased by adding a 5 years warranty. Paradigm shift is also being thanks to lease purchase contract and associated after sales service. Moreover, that ecodesign enabled Malongo to file some 40 patents.

DISCUSSION

This study point that Malongo thanks to its life cycle management strategy is a driver of ecoinnovation in coffee sector. Innovations carried out by the company impact every sustainable development pillars and stakeholders of the coffee life cycle.

CONCLUSIONS

From a production perspective, all these improvements redesigned the production lines, and are offering to Malongo a clear advance and coherence in the coffee sector. The new factory will be completely built according to the highest environmental standards, in the next months.

LCA study permitted to demonstrate the lowest impact of new paper pod versus plastic one and five other capsule system.

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