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# PROCEEDINGS

8<sup>TH</sup> INTERNATIONAL CONFERENCE ON

## LIFE CYCLE ASSESSMENT IN THE AGRI-FOOD SECTOR



OCTOBER 1-4  
2012  
SAINT-MALO  
FRANCE



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Please cite this publication as:

Corson, M.S., van der Werf, H.M.G. (Eds.), 2012. Proceedings of the 8<sup>th</sup> International Conference on Life Cycle Assessment in the Agri-Food Sector (LCA Food 2012), 1-4 October 2012, Saint Malo, France. INRA, Rennes, France.

Please cite a paper or abstract in this publication as:

Proust, V.L.G.E.M., 2012. In search of lost time, in: Corson, M.S., van der Werf, H.M.G. (Eds.), Proceedings of the 8<sup>th</sup> International Conference on Life Cycle Assessment in the Agri-Food Sector (LCA Food 2012), 1-4 October 2012, Saint Malo, France. INRA, Rennes, France, p. 20-25.

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## Welcome

*Soyez les bienvenus à LCA Food 2012 à Saint-Malo, France !  
Welcome to LCA Food 2012 in Saint Malo, France!*

*“Towards Sustainable Food Systems”*

The LCA FOOD conference series is the world’s premier scientific and technical forum on Life Cycle Assessment in the agri-food sector. We hope that you will find the conference interesting and enjoyable and that you will “harvest” new ideas and contacts. Your input to the conference will contribute to its success.

The previous conferences in this series took place in Brussels (1996, 1998), Gothenburg (2001, 2007), Horsens (2003), Zürich (2008) and Bari (2010). This year, for the first time, the conference takes place in France. It has been organised by INRA, the French National Institute for Agricultural Research, with the support of ADEME, the French Environment and Energy Management Agency.

### Objectives of the conference

The production, transformation, distribution and consumption of food and drink contribute strongly to human prosperity and health. However, the food and agriculture sector also contributes a large part of the environmental impacts caused by human activities. Because these impacts, in particular climate change and biodiversity loss, need to be reduced urgently, a shift towards sustainable food systems is essential.

Over the last two decades the Life Cycle Assessment (LCA) methodology has been developed and applied in the agriculture and food sectors to quantify environmental impacts and assist decision making. In recent years, LCA in the agri-food sector has developed rapidly, in particular for sustainability assessments of agricultural systems and their products, and for guiding consumers toward sustainable food-consumption patterns (e.g., via eco-labelling).

LCA Food 2012 will serve as a global forum in which to share recent developments in LCA methodology, databases and tools, as well as applications of LCA to food-production systems and food-consumption patterns. All of this will contribute, we hope, to achieving the 2012 conference motto: “Towards Sustainable Food Systems”.

From the 362 abstracts submitted, the conference is scheduled to have 121 oral presentations and 183 posters, and at the time of writing, we expect more than 420 participants from at least 42 countries. In addition to this book of abstracts, which contains 2-page abstracts for most oral presentations and posters, you will find 6-page papers for most oral presentations, along with the poster abstracts, in the conference proceedings, provided as a PDF file on the memory stick in your conference beach bag.

We want to thank the authors for their presentations and posters. We are very grateful to the 23 members of our scientific committee for their efforts in reviewing the abstracts and selecting the papers for oral presentations. We warmly thank our sponsors for supporting the conference. Last but not least, we want to thank our indefatigable INRA colleagues of the organising committee for their essential contribution to the success of the conference.

We hope you will appreciate the scientific and technical content of the conference, contacts with participants, the French and Breton cuisine during the lunches and Gala Dinner, and the city of Saint Malo and its seaside. We are delighted to welcome you to this beautiful region to join the rapidly growing LCA Food community and hope you will meet old friends and make new ones.

Michael Corson  
LCA Food 2012 co-chair

Hayo van der Werf  
LCA Food 2012 co-chair

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# 141. Comparative LCA of reconstituted milk and recombined milk processing

Farroudja Younsi<sup>1,\*</sup>, Krim Louhab<sup>2</sup>, Chawki Belblidia<sup>3</sup>

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The Algerian dairy industry operates mainly on the basis of milk powder and anhydrous milk fat (AMF). Technologically, two transformation processes allow us to obtain pasteurised milk: reconstitution and recombination. The first process involves rehydrating the whole milk powder while in the second process, the finished product is obtained from a mixture of reconstituted milk, based on skim milk powder and AMF.

This study, carried out in a dairy processing situated in Boudouaou (Algiers), aims to provide a comparative analysis of environmental impacts generated by these two processes. The approach used here is based on the life cycle assessment (LCA). This powerful and recognised method, standardised in the International Organization for Standardization (ISO 14040 to 14043) is used in practice.

Only the most significant impacts were considered in this study: Respiratory inorganic, terrestrial ecotoxicity, terrestrial acidification, land occupation, global warming and non-renewable energy consumption. The results obtained demonstrate the advantage of the recombination process compared to the reconstitution of milk. Indeed, the addition of AMF in the transformation process has reduced the impact by a factor of 3 to 6%. These results can be explained by the substitution in the scenario 2 a volume (5 tons) of milk powder by the AMF and also by its nature. Since it is a co-product, the impacts attributed to the AMF are negligible compared to those assigned to the milk powder, which is the main product. In the light of the obtained results, it seems more optimal to favour the recombination of milk-based AMF.

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Table 1. AMF contribution to different impact categories. (for 1 kg of milk)

Impact category	Unit	Scenario1	Scenario2	Difference	%
Respiratory inorganic	kg PM2.5 eq	6.93E-04	6.67E-04	2.64E-05	3.82
Terrestrial ecotoxicity	kg TEG soil	2.38E+00	2.22E+00	1.59E-01	6.67
Terrestrial acidification	kg SO <sub>2</sub> eq	6.39E-02	6.13E-02	2.58E-03	4.04
Land occupation	m <sup>2</sup> org.ara	4.33E-01	4.15E-01	1.77E-02	4.10
	ble	5.22E-01	4.96E-01	2.65E-02	5.08
Global warming	kg CO <sub>2</sub> eq	01	01	02	7
Non-renewable energy	MJ primary	3.84E+00	3.62E+00	2.18E-01	5.67

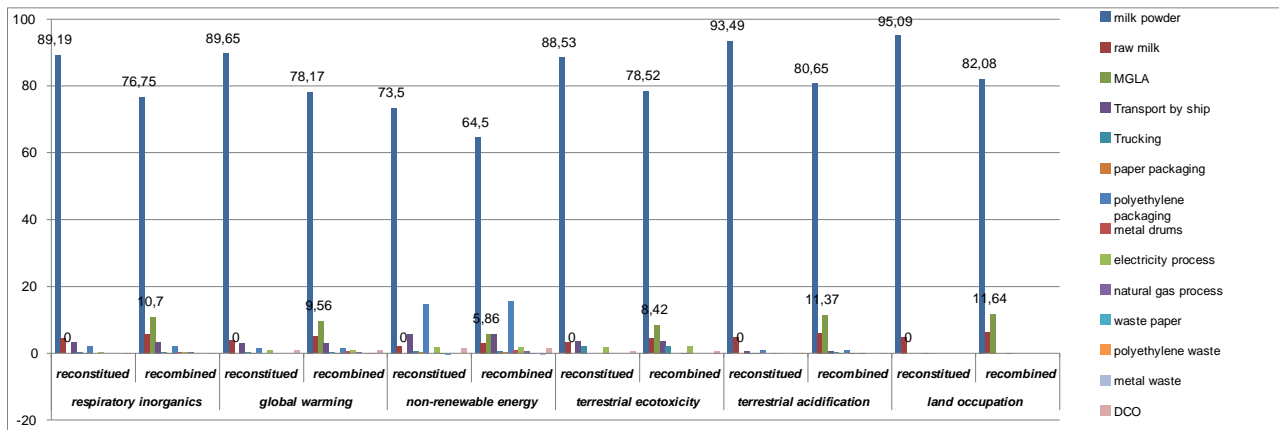


Figure 1. Contribution of the two processes to various impacts