## P-BB-22

# Cradle-to-Gate Assessment of Bacterial Cellulose Production

Ana Forte, Fernando Dourado, Miguel Gama, Eugénio Campos Ferreira*

CEB –Centre of Biological Engineering, University of Minho, Braga PORTUGAL
*E-mail: ecferreira@deb.uminho.pt

**Abstract**

In an increasing environmental conscious world, Life Cycle Assessment (LCA) is an important tool for estimate environmental impact of processes and products. This work aims to determine the environmental impacts of the production of bacterial cellulose (BC) intended to be used as a food additive.

BC is a biopolymer produced mainly by Gram-negative acetic acid bacteria such as Glunoacetobacter xylinum. BC structure consist in glucose monomers arranged in a unique nanostructure, exhibiting numerous great properties, leading to wide range of applications in different areas including as a food product or as food addictive, and in high-value-added niche markets such as medical applications and cosmetic industry[1].

The LCA (cradle-to-gate) was simulated in GaBi Software (ThinkStep), using ReCiPe 2016 method to estimate the Life Cycle Impact Assessment (LCIA). LCIA translates emissions and resource extractions into a limited number of environmental impact scores (environmental impact categories) by means of the so-called characterization factors. The study includes not only the production of BC, the energy and the equipment used, but also the extraction of natural resources and their transformation and the disposal of the produced waste (Cradle-to-gate). The functional unit of this LCA was defined as 1 kg of BC packed in a plastic container and a carton box.

Results presented in 18 midpoints impact categories show that the sodium hydroxide, carton package, and plastic package productions are responsible for considerable impacts. The production of sodium hydroxide and carton package are also responsible for considerable amount of water resources and emissions to the environment.

**Keywords:** Bacterial cellulose; Cradle-to-gate; Life cycle assessment; ReCiPe

**Selected References:**

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