

Life cycle assessment of fermented milk: yogurt production

Cristina GHINEA* and Ana LEAHU

Stefan cel Mare University of Suceava, Faculty of Food Engineering, 13 Universitatii Street, 720229 Suceava, Romania

Abstract. Yogurt is a fermented milk product, resulted through milk acidification by lactic acid bacteria, highly appreciated worldwide. In this study, life cycle assessment (LCA) methodology was applied for modelling of environmental impacts associated with yogurt production. The system boundaries include the following activities: milk processing, transport, solid waste and wastewater treatments. Functional unit set for this study is 1 kg of produced yogurt. The input and output data were collected from various sources like reports, databases, legislation. All these data were used further in the impact assessment stage performed with GaBi software which includes LCA methods like CML2001 - Jan. 2016, ReCiPe 1.08, UBP 2013, EDIP 2003 and others. Results showed that the global warming potential (GWP) determined for yogurt was 2.92 kg CO₂ eq. per kg of yogurt, while acidification potential (AP) was approximately 0.014 kg SO₂ eq. per kg of yogurt. It was observed that the main contributor to all impact categories is consumption of electricity during the yogurt production, mainly in the pasteurization, evaporation and cooling stages. 61.4% of the emissions resulted from transportation of raw materials contributes to GWP, while 38.3% to photochemical ozone creation potential (POCP). Emissions from wastewater treatment are contributing especially to the eutrophication potential (EP), while emission from solid waste landfilling are contributing mainly to POCP.

Keywords: environmental impacts; food products; milk; life cycle.

* Corresponding author. *E-mail address:* cristina.ghinea@fia.usv.ro (Cristina Ghinea)