

Study of Sustainability Indicators in a Milk Production Process

Authors : E. Lacasa, J. L. Santolaya, I. Millán

Abstract : The progress toward sustainability implies maintaining and preferably improving both, human and ecosystem well-being, according to a triple bottom line that includes the environmental, economic and social dimensions. The life cycle assessment (LCA) is a method applicable to all production sectors that aims to quantify the environmental pressures and the benefits related to goods and services, as well as the trade-offs and the scope for improving areas of the production process. While using LCA to measure the environmental dimension of sustainability is widespread, similar approaches for the economic and the social dimensions still have limited application worldwide and there is a need for consistent and robust methods and indicators. This paper focuses on the milk production process and presents the analysis of the flows exchanged by an industrial installation through accounting all the energy and material inputs and the associated emissions and waste outputs at this stage of its life cycle. The functional unit is one litre of milk produced. Different metrics and indicators are used to assess the three dimensions of sustainability. Metrics considered useful to assess the production activities are the total water and energy consumptions and the milk production volume of each cow. The global warming, the value added and the working hours are indicators used to measure each sustainability dimension. The study is performed with two types of feeding of the cows, which includes a change in percentages of components as well. Nutritional composition of the milk obtained is almost kept. It is observed that environmental and social improvements involve high economic costs.

Keywords : milk production, sustainability, indicators, life cycle assessment

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