

Sustainability Evaluation of Soy Milk Production With Red Ginger Extract Using A Life Cycle Assessment Approach

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Abstract

Energy consumption and environmental impacts are major concerns in maintaining sustainability in agriculture and food systems. The soy milk production with red ginger extract is a relevant example of a sustainability trade-off in such a system. Soy milk production is an essential part of the human diet. However, it is also responsible for significant emissions of waste and by-products. This study examines the environmental aspects of a lab-scale ginger soy milk product using a life cycle approach. The study considered three subsystems: postharvest handling of ginger and soybeans, extract production, and ginger soy milk production. The results showed that the extraction and production of soy milk is a hotspot in the production of ginger soy milk in terms of energy consumption. On the other hand, postharvest handling of ginger and soybeans is a significant water use point, both of which have environmental burdens and economic costs. The highest cost in making ginger soy milk is the preparation of powdered ginger extract. In terms of by-products, the ginger pulp can be used for processed food, animal feed, and biomass. In addition, soybean dregs that contain nutrients can be processed into high-value food products, which promotes a circular economy in the industry.

Keywords: Dairy, Soy milk, Red ginger extract, Life cycle assessment, Environmental performance