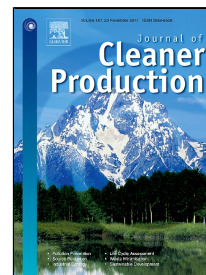


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G. Tassielli, B. Notarnicola, P.A. Renzulli, G. Arcese



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Environmental life cycle assessment of fresh and processed sweet cherries in southern Italy

Tassielli G., Notarnicola B., Renzulli P.A*., Arcese G.

Ionian Department of Law, Economics and Environment, University of Bari Aldo Moro, via Lago Maggiore angolo via Ancona, 74121 Taranto, Italy

*pietro.renzulli@uniba.it

Abstract

Italy is one of the major world cherry producers and over a third of its production takes place in the Apulian Region. This study aims to quantify and evaluate the environmental sustainability of the lifecycle of cherry production and transformation in the Apulia region in southern Italy. The paper presents the results of a pilot study commissioned by an Apulian consortium of cherry producers. The purpose is that of identifying the main hotspots of the implemented production practices and suggesting options for environmental improvement.

A Life Cycle Assessment approach is used for the quantification of the potential environmental impacts of cherry production. The lifecycle stages included in the study follow the cradle-to-gate approach, considering the agricultural processes, transports and the transformation system, which gives three types of intermediate products for the food manufacturing industry, namely *cherries in SO₂*, *cherries in alcohol* and *destoned cherries in alcohol*. A comparison of the environmental profile of the different cherry products has been carried out and possible alternative scenarios evaluated.

The assessment results show that, for most impact categories, as in many other agri-food systems, the agricultural lifecycle phase is environmentally more burdening compared to the transformation phase.

As regards the finished products, the cherry in SO₂ system has a better environmental profile compared to that of the cherries in alcohol. For instance, the GWP, referred to the whole life cycle (including the agricultural, transport and processing phases), amounted to 556.1 kg CO_{2eq} t⁻¹ cherries in alcohol, 725.7 kg CO_{2eq} t⁻¹ cherries destoned in alcohol, 298.9 kg CO_{2eq} t⁻¹ cherries in SO₂. For the cherry in alcohol system, part of the hydro-alcoholic solution is reused in the transformation process. This contribution has been evaluated and compared with the scenario without recycling of alcohol.

The results of the research indicate that different environmental improvements could be achieved for this cherry production system by reducing on-orchard emissions, focusing on the key contributors of energy and fertilisers-related emissions, by implementing more efficient transportation and by the recycling some of the solutions (such as the hydro-alcoholic one) in the industrial phase.

Keywords: LCA, cherry, life cycle assessment, fruit, agri-food systems, carbon footprint, cherries in alcohol, cherries in SO₂, Italy.

Abbreviations:

ADP	Abiotic resource depletion
AP	Acidification
EC	Energy consumption – primary
FAETP	Freshwater ecotoxicity

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