Life Cycle Assessment of Red Grape Production in the La Rioja Designation of Origin

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Abstract

The need for basic resources such as water, energy and food are key requirements linked to a growing world population. Agriculture is the main water demander and accounts for up to 80% of the freshwater withdrawn, mainly for irrigation of food crops, which clearly affects the overexploitation of water resources and deterioration of water quality. One of the solutions to mitigate this water consumption, especially in small and medium-sized agricultural areas, is the use of reclaimed water, which, in addition to meeting irrigation needs, can be an important source of nutrients for crops. The aim of this work is to evaluate from an environmental point of view the benefits linked to the use of reclaimed water compared to the conventional irrigation system, considering as a case study a vineyard in La Rioja (Spain).
The Life Cycle Assessment methodology has been considered through a cradle-to-gate approach, following the ISO 14040 standard guidelines.

To this end, all field operations carried out during the growing season have been considered within the system boundaries, considering the requirements for machinery, fossil fuels and agrochemicals. In addition, attention has been paid to the quantification of these field emissions derived from the application of agrochemicals, as well as those derived from direct and indirect land use change.

The environmental profile has been calculated considering the characterization factors of

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the ReCiPe v1.07 (H) impact method considering 1 ha as a functional unit.
Taking into account our preliminary results, environmental benefits can be achieved in terms of reduction of greenhouse gases and eutrophicating emissions due to the use of reclaimed water.

Keywords: reclaimed water, vineyard, life cycle assessment, agriculture, crop