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20.4 ENVIRONMENTAL BENEFITS: CONVENTIONAL VS INNOVATIVE PACKAGING FOR OLIVE OIL

Ilaria Fiorindo, Andrea Casson, Roberto Beghi, Valentina Giovenzana, Alessio Tugnolo, Riccardo Guidetti*

Department of Agricultural and Environmental Sciences (DiSAA), Università degli Studi di Milano, via Celoria 2, 20133 Milano, Italy.

**Presenting author: Ilaria Fiorindo, Department of Agricultural and Environmental Sciences (DiSAA), Università degli Studi di Milano, via Celoria 2, 20133 Milano, Italy, ilaria.fiorindo@studenti.unimi.it*

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Abstract

In the last years, different issues as costs and lower availability of materials and resources became a driving force to increase the sustainability of agro-food activity. In this scenario, the olive oil industry is characterized by different processes that could affect the environment. Moreover, the plastic packaging used in the sector could have a relevant environmental impact referred both to the production phase and to the disposal scenario. Therefore, the aim on the work was the evaluation of the environmental impact of two different mono-use olive oil packaging. This study is part of the project “Sustainability of olive oil System (S.O.S.)”, funded by AGER.

A conventional packaging composed by polyethylene (PE), polyethylene terephthalate (PET), polyurethane (PU) and aluminium was compared to a bio-based packaging composed by bio-polyethylene (Bio-PE), polylactic acid (PLA) and a thin layer of aluminium.

A Life Cycle Assessment (LCA) was performed to identify the environmental profiles of the two packaging. The functional unit was defined as one mono-use packaging (10 mL volume). The study considered the environmental performance related to all the activities from the raw material extraction, through the transformation phases, till the disposal scenario.

The comparison of the two packaging showed that the conventional packaging affects more in the impact category “climate change” (1,5 times), “human toxicity” (1,4 times) and in “resource depletion” where the results are 4 times higher respect to the innovative packaging due to the extraction of non-renewable raw materials. Nevertheless, higher impacts are attributable to the bio-based packaging for ecosystem quality categories as “eutrophication” (1,2 times), “freshwater ecotoxicity” (1,5 times) and “acidification” (1,2 times).

Analysing the waste management scenario, it is not possible to identify a clear disposal procedure due to the composition of the packaging, the consumers’ behaviour and the regional regulations. Therefore, in this study it was supposed the incineration of both the products.

In conclusion it is not possible to confirm that the bio-based olive oil packaging is more environmentally friendly respect to the conventional one, due to the land use and to the need as well of impacting chemical processes also to produce the bio-based films.

Keywords: polyethylene, polylactic acid, LCA, bio-based, sustainability