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Management Prospects of Winery By-Products Based on Phenolic Compounds and Antioxidant Activity of Grape Skins: The Case of Greek Ionian Islands

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Abstract : The aim of this work was to recover phenolic compounds from grape skins produced in Greek varieties of the Ionian Islands in order to form the basis of calculations for their further utilization in the context of the circular economy. Isolation and further utilization of phenolic compounds is an important issue in winery by-products. For this purpose, 37 samples were collected, extracted, and analyzed in an attempt to provide the appropriate basis for their sustainable exploitation. Extraction of the bioactive compounds was held using an eco-friendly, non-toxic, and highly effective water-glycerol solvent system. Then, extracts were analyzed using UV-Vis, liquid chromatography-mass spectrometry (LC-MS), FTIR, and Raman spectroscopy. Also, total phenolic content and antioxidant activity were measured. LC-MS chromatography showed qualitative differences between different varieties. Peaks were attributed to monomeric 3-flavanols as well as monomeric, dimeric, and trimeric proanthocyanidins. The FT-IR and Raman spectra agreed with the chromatographic data and contributed to identifying phenolic compounds. Grape skins exhibited high total phenolic content (TPC), and it was proved that during vinification, a large number of polyphenols remained in the pomace. This study confirmed that grape skins from Ionian Islands are a promising source of bioactive compounds, suggesting their utilization under a bio-economic and environmental strategic framework.

Keywords : antioxidant activity, grape skin, phenolic compounds, waste recovery
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