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CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY OF A POLYPHENOLIC EXTRACT OBTAINED BY GREEN SUPERCRITICAL CO₂ EXTRACTION FROM RED GRAPE POMACERocío FERNÁNDEZ-PÉREZ¹

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Upgrading wine industry solid wastes is considered as one of the main strategies to support the circular economy. Red grape pomaces constitute a rich source of polyphenols, which have been shown to possess antioxidant properties and to provide benefits for human and animal health. The objective of this work was to obtain and characterise polyphenolic extracts from red grape pomaces via green supercritical CO₂ extraction using ethanol as a co-solvent, and to evaluate their antibacterial activity against susceptible and multidrug-resistant *Escherichia coli* strains of animal intestinal origin.

Pomaces obtained from the vinification of red grapes of *Vitis vinifera* L. cv. Graciano were lyophilised and grinded. Effect of various values of ethanol concentration (10 - 70 %), extraction time (1 - 5 h), temperature (30 - 50°C), particle size (1.25 - 0.2 mm) and pressure (150 - 600 bar) were investigated. Total phenolic quantification and antioxidant activity were assessed by rapid in vitro spectrophotometric assays. Phenolic profiles were identified using ultra-high performance liquid chromatography coupled to a triple quadrupole/ion trap mass spectrometer and by GC-MS analysis. The antibacterial activity of the extracts was tested by the microtiter dilution assay against a collection of *E. coli* strains and minimal inhibitory concentration (MIC) values were determined.

Results showed that the extract obtained under the optimal conditions exhibited the highest value of antioxidant activity (3.79 mg Trolox equivalents/g) in the assay, and the highest antimicrobial activity (MIC value of 2 mg/mL) against all the studied antibiotic susceptible and resistant *E. coli* strains. Chemical analyses enabled the identification of 32 volatile compounds and phenolic compounds belonging to the groups of flavonols and hydroxybenzoic acids, and the contents of these phenolic compounds were positively correlated with the antibacterial activity.

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