

## **Revalorization of two-phase olive mill wastewater: Recovery of antioxidant, bioactive compounds from a phytotoxic residue**

**Carmen M. Sánchez-Arévalo\***

Research Institute for Industrial, Radiophysical and Environmental Safety (ISIRYM), Universitat Politècnica de València, Spain.

**M. Cinta Vincent-Vela, Silvia Álvarez-Blanco**

Research Institute for Industrial, Radiophysical and Environmental Safety (ISIRYM), Universitat Politècnica de València, Spain.

Department of Chemical and Nuclear Engineering, Universitat Politècnica de València, Spain.

\*Corresponding author: ISIRYM, Universitat Politècnica de València, Camino de Vera, s/n, 46022, Valencia, Spain. [carsana5@upv.es](mailto:carsana5@upv.es); phone: +34 963876396

### **Abstract**

The countries from the Mediterranean area produce tons of two-phase olive mill wastewater (TPOMW) each year. This major waste is significantly rich in bioactive compounds that are highly valued by industry, such as phenolic and triterpenic compounds. The retirement of those molecules from the residue results in a reduction of the organic load and, complementary, the collection of high-added value compounds that can be exploited by cosmetic, pharmaceutical and food industry.

The process of a solid-liquid extraction has been optimized to extract the olive minor fraction from the TPOMW. The most convenient solvent and temperature has been

thoughtfully investigated, in order to achieve the recovery of the maximum concentration of these compounds according to economic and environmentally feasible conditions. The effect of ultrasounds has been also considered. To evaluate the effect of the applied operational parameters, it has been conducted an extensive characterization of the extracts by high-performance liquid chromatography coupled with electrospray ionization-quadrupole-time of flight-mass spectrometry (LC-ESI-qTOF-MS). 44 compounds have been found in the wastewater. They have been identified and classified in their corresponding chemical families. At the optimum experimental conditions (EtOH 50% (v/v), 40°C, ultrasound-assisted), more than 6.8 mg/g of bioactive content was recovered from TPOMW.

These findings underlined the potential of this wastewater to be revalorized and further utilized after its production. The extraction of the phenolic compounds also contributed to reduce the organic load and phytotoxicity of the residue, thus protecting the flora and fauna existing in the final disposal zone of the waste.

**Keywords:** Two-phase olive mill wastewater, revalorization, bioactive compounds, solid-liquid extraction, ultrasounds, LC-MS.