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Abstract

Chemical and Nutritional Characterization of Various by-Products of the Industry *Olea europea* L. Source of Healthy Ingredients †

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Abstract: Currently, the food industry is facing a wide demand for natural foods that provide benefits for the consumer's health. In this sense, a trend in food technology is to obtain bioactive compounds from different food by-products with antioxidant, anti-inflammatory, and antiviral properties, among others, that allow their recovery through the circular economy model. In this study, the chemical and nutritional composition was evaluated in terms of phenolic compounds (PC), fatty acid profile (FA), and mineral composition in several by-products of *Olea europaea* L.: pomace, olive water, olive leaves, fiber crude, and an extract obtained by extraction with supercritical fluid (SCFE) at 20 and 24 MPa of the olive fiber. PC quantification was performed by liquid chromatography-mass spectrometry (LC-MS/MS), the fatty acid profile was obtained by gas chromatography coupled to a flame ionization detector (GC-FID), and the mineral content was determined By inductively coupled plasma optical emission spectrometry (ICP-OES). In all the byproducts studied, dihydroxybenzoic acid, hydroxytyrosol, and oleacein were found to be the main PCs. Olive fiber presented the highest content of hydroxytyrosol (171.2 mg/kg) and oleacin (150 mg/kg). Regarding the content of FA, a high concentration of monounsaturated fatty acids (MUFA), between 71 and 73%, was reported in all the by-products of the olive, highlighting oleic acid as the main FA. The fraction of polyunsaturated fatty acids (PUFA) corresponded to 10–12%, with α-linolenic acid being the main compound. With respect to the mineral profile, some differences were observed, the pomace and the fiber presented relevant values of calcium (4–6.5 g/kg), potassium (0.5 g/kg), and magnesium (0.5 g/kg), while the oily extract did not report significant levels of minerals. Taking into account the previous results, the by-products resulting from the olive industry can be considered a valuable source of bioactive molecules, including PC, AG, and minerals, which provide important beneficial effects for health, mainly for the prevention of diseases related to oxidative stress, and could be used as novel natural ingredients for incorporation into functional foods or nutraceuticals. However, both in vitro and in vivo studies are needed to confirm the potential in humans and demonstrate the safety of these ingredients.

Keywords: *Olea europaea* L.; by-products; bioactive compounds profile; LC-MS; GC-FID; ICP-OES

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