

## OLIVE POMACE: FROM AN AGRO-WASTE TO A VALUABLE SOURCE OF BIO-COMPOUNDS

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Over the last years, olive oil production increased worldwide. Along with the growth of this agro-industry sector, a high rate of residues has been produced. Olive pomace is the major output of olive oil processing. This olive by-product is a solid residue with high water and oil contents, being phytotoxic, due to its significant phenolics amount [1]. Nonetheless, phenolics are bioactive compounds with well-recognized benefits for human health and well-being [2]. Therefore, there is an increasing awareness to recover and apply these compounds on innovative food and/or cosmetic products. In order to assess the biocompounds composition of olive pomace, the proximate composition (total protein and lipids, ash, and moisture) and the profiles of vitamin E (HPLC-DAD-FLD), fatty acids (GC-FID) and phenolics (HPLC-DAD-FL/MSn) were determined. Furthermore, a sustainable process for antioxidants extraction-Multi-frequency Multimode Modulated (MMM) ultrasonic technique – and a conventional solid-liquid extraction were performed and compared [3]. The total phenolics content and antioxidant activity (ferric reducing antioxidant power and DPPH• scavenging ability) of the extracts were analyzed in order to assess the efficacy of both extraction methodologies [4]. The vitamin E profile of olive pomace comprised the vitamers  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\alpha$ -tocotrienol and  $\gamma$ -tocopherol.  $\alpha$ -Tocopherol was the major form present (2.63 mg/100 g olive pomace). The fatty acid analysis showed that the lipid fraction of olive pomace was especially rich in oleic acid (75%), followed by palmitic (10%), linoleic (9%), and stearic (3%) acids. The major phenolic compounds identified were distributed as follows: hydroxytyrosol > comselogoside > elenolic acid derivative > tyrosol > oleoside riboside. Hydroxytyrosol content was 238.4 mg/100 g d.w. of olive pomace, while tyrosol was present in lower amount (9.6 mg/100 g). Concerning the antioxidants extraction, the MMM technique allowed a faster (5 min) and higher recovery ( $p < 0.05$ ) of the compounds, compared to the conventional solid-liquid extraction (60 min) (Figure 1). Hence, it seems to be a very promising green and effective methodology to extract antioxidants from olive pomace. Attending to the profile and content of the bioactive compounds present either in lipid fraction or

in the aqueous fraction of the olive pomace, this residue is an exploitable source to recover bioactive compounds. Olive pomace valorization is, at this moment, mandatory, and the added-value products that can be obtained from it allow to foreseen new innovative industrial applications in a circular economy perspective.

## BIOGRAPHY

M. Antónia Nunes is a PhD. student in Pharmaceutical Sciences (Nutrition and Food Science Speciality) at the Faculty of Pharmacy of the University of Porto, Portugal. She has a Degree in Nutritional Sciences and an MSc in Consumer Sciences. Since 2012, she is a researcher of REQUIMTE (Rede de Química e Tecnologia), the largest network in Chemistry and Chemical Engineering established in Portugal, which is focused on the development of Sustainable Chemistry. She has professional training in Environmental Management and Quality Management Systems. Her research activities have been developed at the Department of Chemical Sciences of the Faculty of Pharmacy of the University of Porto in the food chemistry and nutrition fields. The central work that she has been developing is related to olive oil quality evaluation and olive oil processing by-products valorisation. In 2014, she joined to a co-promotion project funded by the National Innovation Agency, whose work plan included the characterization and valorisation of the olive oil processing industry by-products intending their application to the development of innovative food and cosmetic products. From this work, it was developed an international patent related to olive pomace valorisation. She integrates also projects in the area of agro-industry by-products valorisation working with by-products of almond, pumpkin and pistachio processing. She has publications in international indexed Scientific Journals in food chemistry area as author and co-author (10), chapter books (8), national publications and conference proceedings (10), and an international patent.

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