Effective production of bioactive phenolic compounds from olive stones

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Olive stones (OS) are a by-product generated in the olive oil production process. This residue is obtained in the industries after the oil extraction process and it is recognized as an interesting feedstock for the production of bioenergy and value-added products. Nevertheless, currently it is only used as low-cost solid biofuel for combustion.

An alternative valorization approach has been developed based on an acid catalyzed process for the solubilization of hemicelluloses [1] and the production of furfural [2]. This process yields a solid cellulose and lignin-rich material, that can be further upgraded.

In this work, an organosolv process for delignification of the material and improvement of the enzymatic digestibility was applied and optimized. The organosolv stage was carried out with an ethanol:water ratio (50:50, w/w) in a Parr reactor, varying the temperature (140-190 °C) and the addition of catalyst (0-100 mM H_2SO_4). The liquid fraction obtained was analyzed to evaluate the presence of value-added products, such as phenolic compounds with antioxidant activity.

The total phenolic content was determined by the Folin-Ciocalteu method, obtaining a phenol concentration between 5 and 12 g GAE/L, of which between 2 and 6 g/L are tannins, corresponding to a phenol yield of 7 g GAE/100 g of processed material, which ranks is in the range of the obtanided from other plant sources, in other olive by-products such as exhausted olive pomace, up to 9 g GAE/100g of extract have been reported [3]. Phenolic profile was obtained by capillary electrophoresis analysis, allowing the identification, among others, of vanillin and syringaldehyde as naturally occurring flavor components exhibiting antioxidant and antimicrobial properties.

Therefore, with the present study, we were able to determine that the liquor obtained after organosolv pretreatment of olive stones can be also valued as a bio-source of non-synthetic preservatives and additives for the food industry.

Keywords: Olive stones; phenolic compounds; organosolv; capillary zone electrophoresis; agro-industrial residue valorization.

References

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