Extraction and Valorization of Antioxidant Polyphenols from Olive Leaves Using Environmentally Friendly Solvents

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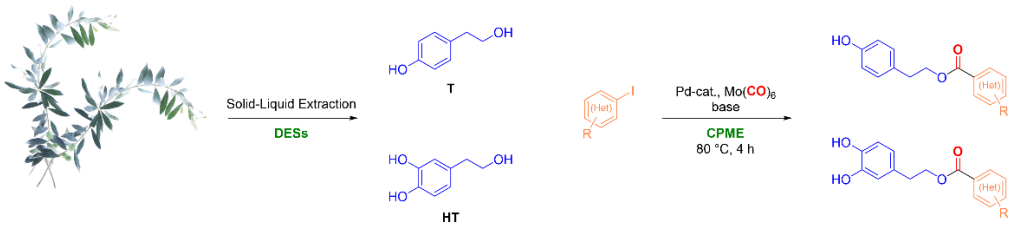
Tyrosol (T) and hydroxytyrosol (HT) are olive-derived phytochemical polyphenols with a great biological activity related to their biological properties.[1] In particular, HT exhibits numerous pharmacological activities and benefits for human health such as antioxidant, anti-inflammatory, anti-tumor, anti-viral, anti-bacterial and anti-fungal activities.[2] Traditionally the extractions of these polyphenolic compounds have been carried out with Soxhlet techniques, using water or hydroalcoholic solutions as the solvent. However, the high temperatures reached in the process affect the thermolabile molecules of HT and T. Furthermore, due to the high affinity between water and polyphenols, the following purification step becomes complex. A valid alternative to classical extraction solvents was represented by Deep Eutectic Solvents (DESs), a promising class of eco-friendly extraction media composed by at least two constituents, which mixed in suitable stoichiometric ratios, generate a eutectic mixture liquid at room temperature.[3]

In this communication, we present an eco-friendly solid-liquid extraction of T and HT from olive leaf as wastes, mediated by DESs as solvents. The use of DES favors a very selective and environmentally friendly extraction, preserving the stability of the polyphenols. Moreover, to valorize the polyphenols extracted, they were subjected to a "green" alkoxycarbonylation reaction, using $Mo(CO)_6$ as a solid and safe to handled CO source.[4,5] The methodology was carried out in cyclopenthyl methyl ether (CPME) as a bio-derived reaction media (Scheme 1). The antioxidant properties of the novel synthetized ester derivatives were also assessed.



Scheme 1. Ecofriendly extraction of tyrosol (T) and hydroxytyrosol (HT) from olive leaves with DESs and their "green" alkoxycarbonylation in the bio-derived CPME.

References

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