Extraction of Olive Leaves Polyphenols Using Natural Deep Eutectic Solvents: A Sustainable Approach Aligned with 2030 SDGs

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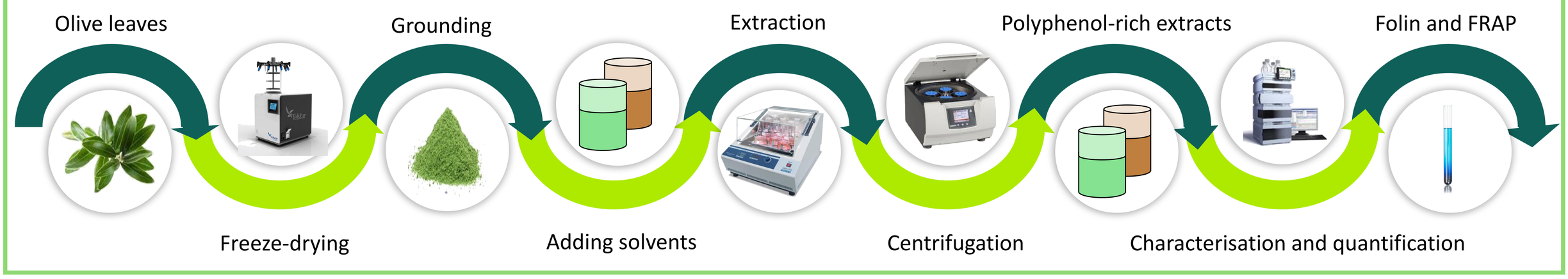
1. INTRODUCTION

The production of olive oil and olives generates a large amount of waste, including **olive leaves**, which are accumulated during the pruning of olive trees. The extraction of phenolic compounds from olive leaves in an environmentally friendly way, using natural deep eutectic solvents (NADES), is a sustainable alternative and aligns with the 2030 goals on the efficient use of natural resources and the environmentally sound management of chemicals and all wastes throughout their life cycle.

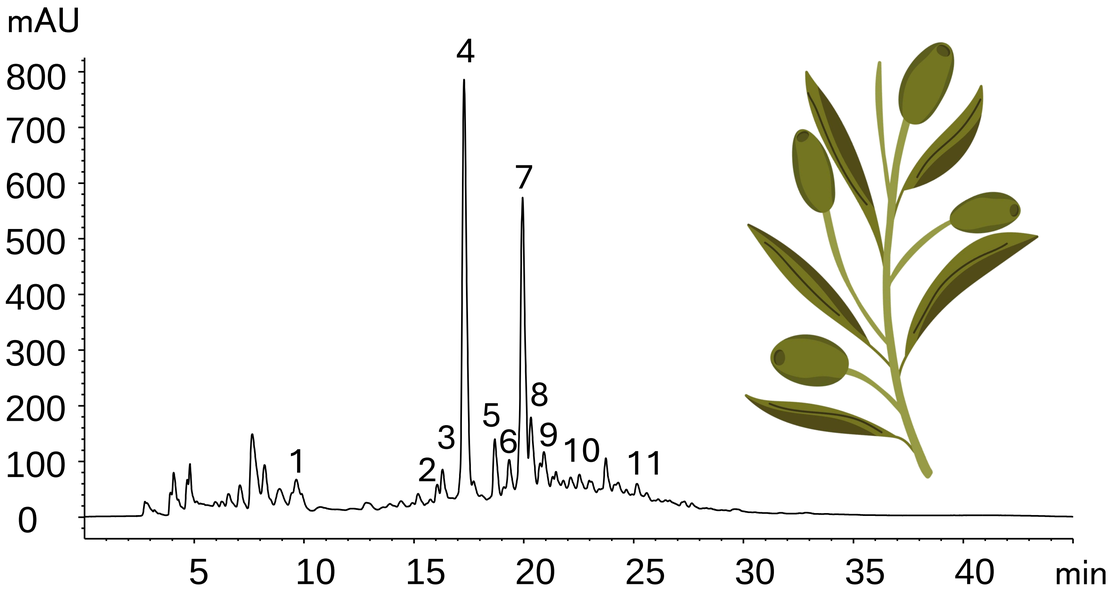
2. MATERIALS AND METHODS

Seven NADES, based on choline chloride, sucrose and glycine combined with different organic acids and alcohols, were tested to check the extraction efficiency of olive leaf polyphenols compared to conventional extraction with ethanol (70 %). The antioxidant activity of the obtained extracts was also measured.



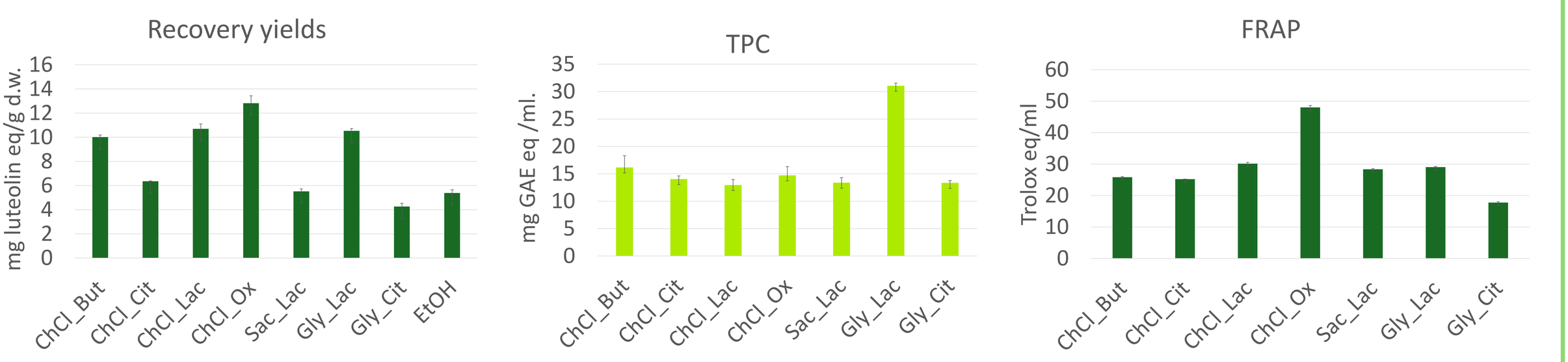
3. RESULTS

A. Phenolic profile



Peak	Rt (min)	λ (nm)	$[M-H]^-$	MS^2	Tentative identification
1	9,6	332	609	447,285	Luteolin-3′,7-di-*O*-glucoside
2	16,1	356	609	301	Quercetin-3-*O*-rutinoside
3	16,3	352	593	285	Luteolin7-*O*-rutinoside
4	17,3	342	447	285	Luteolin 7-*O*-glucoside
			623	461,315,161	Verbacoside
5	18,7	335	577	269	Apigenin 7-*O*-rutinoside
6	19,3	315	701	539,305,161	Oleuropein-3′-*O*-glucoside
7	19,9	335	447	285	Luteolin 7-*O*-glucoside isomer
8	20,3	346	461	299	Chrysoeriol-7-*O*-glucoside
9	20,9	329	539	491,434,361,150	Oleuropein isomer
10	21,5	331	539	377,307,161,113	Oleuropein isomer
11	25,2	340	285		Luteolin

B. Recovery yields, total phenolic content and antioxidant activity



The major compounds identified were luteolin-7-O-glucoside, verbascoside and oleuropein. The green extracts obtained had a higher polyphenol content than the ethanolic extracts, reaching values of 31.07 ± 0.48 mg GAE/ml in the case of those based on glycine and lactic acid. However, in terms of antioxidant activity, the extract with the highest activity was the one formulated with choline chloride and oxalic acid (48.02 ± 1.40 mg Trolox eq/ml).

4. CONCLUSIONS

NADES are a sustainable and highly effective alternative for the recovery of polyphenols from olive leaves. Further research is needed to assess the safety and potential application of the extracts obtained.

ACKNOWLEDGEMENTS

This research was funded by the European Union through FEDER-Interreg España-Portugal project TRANSCoLAB Plus (0112_TRANSCOLAB_PLUS_2_P).