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Evaluating the Aqueous Extraction of Phenolic Compounds from Olive Tree Pruning

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Introduction

Olive-derived biomass, including olive tree pruning (OTP), is abundant in the Mediterranean region. This type of biomass contains interesting bioactive phenolic compounds with applications in food, cosmetics and pharmacy [1]. Its recovery depends on the extraction technology, which determines the yield, phenolic profile and industrial viability [2]. This work aims to evaluate and compare three aqueous extraction strategies (Soxhlet, autoclave and pressurized reactor) for obtaining phenolic compounds from OTP.

Methodology

Raw material

Olive tree pruning: Jaén, Spain
Drying and milling
Particle size: 1 cm
Moisture: 5.8 %

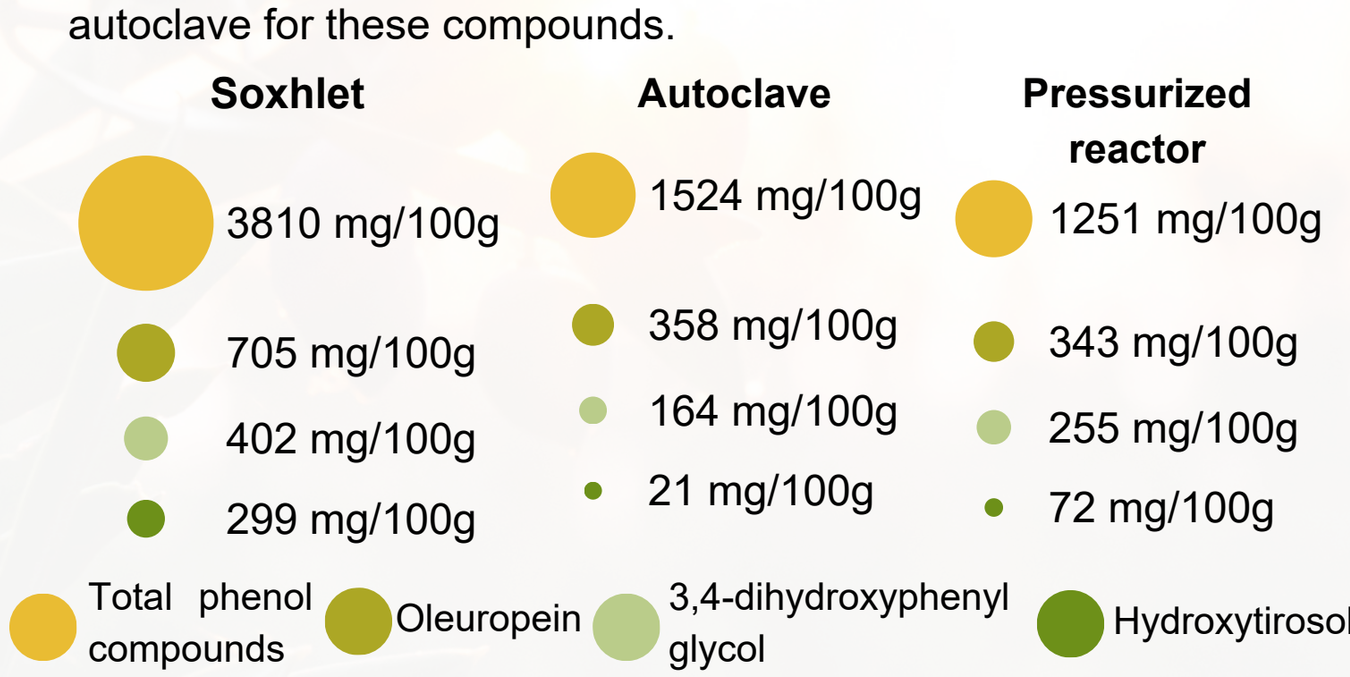
Soxhlet	Autoclave	Pressurized reactor
		
0.25 L	1 L	20 L
4% w/v	15% w/v	20% w/v
Boiling, 24 h	120 °C, 1 h	120 °C, 1 h

Conclusions

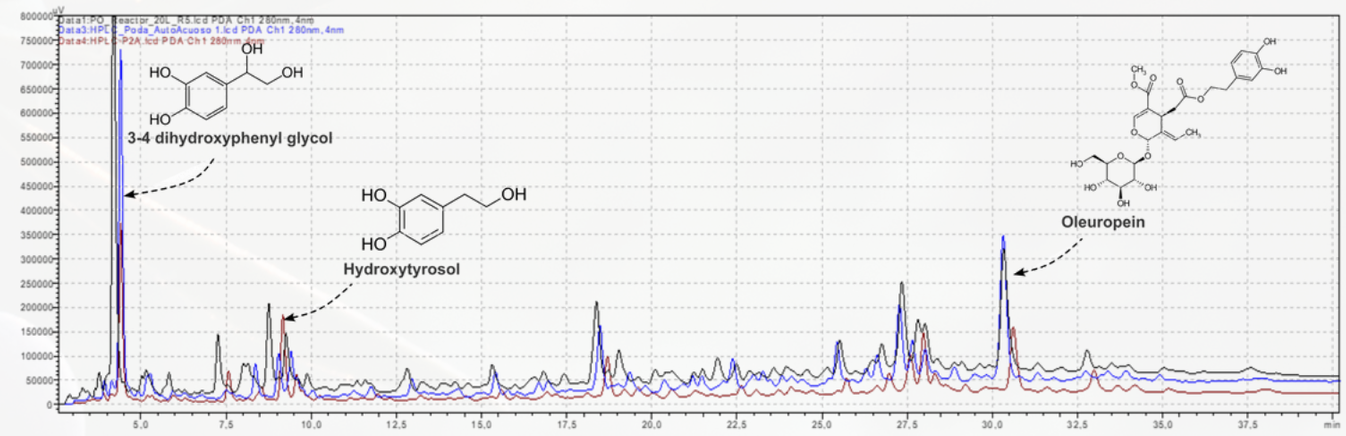
- Aqueous extraction at 120 °C enables the recovery of phenolic compounds from OTP in shorter times than Soxhlet.
- Higher solid loads enhance the scalability of the process.
- This operation can be integrated into biorefinery schemes to obtain high-value phenolics along with other bioproducts.

Results

- Soxhlet achieved the highest total phenolic compounds (TPC) (~3800 mg GAE/100 g).
- Reactor and autoclave showed lower TPC yields, but present potential for scalability.
- Soxhlet favored the extraction of 3,4-dihydroxyphenyl glycol (3,4-DHPG) and hydroxytyrosol; the reactor outperformed the autoclave for these compounds.



- The chromatograms showed similar phenolic profiles among the extraction strategies, highlighting key compounds such as hydroxytyrosol, 3,4-DHPG, and oleuropein.



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