Bioactive compounds extraction from olive leaves by subcritical water extraction

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Olive leaves characterization

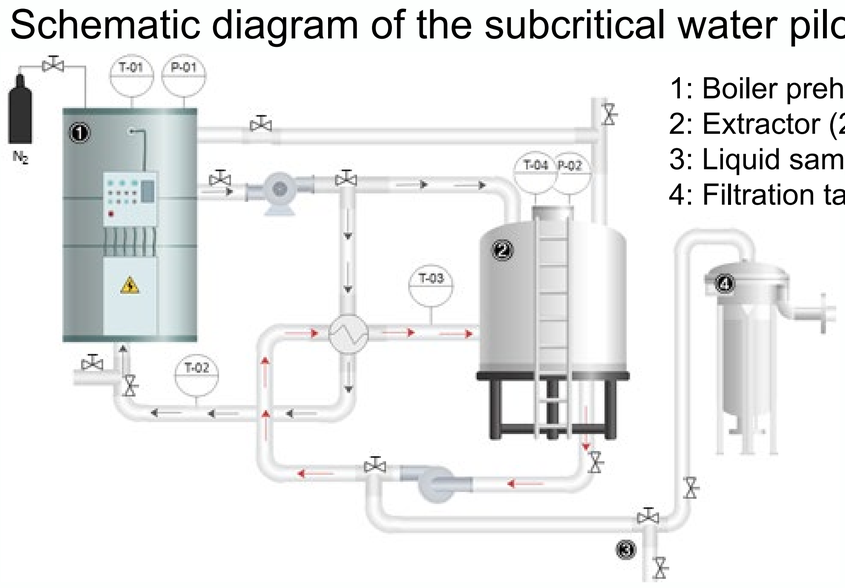
Olive leaves (OL) are one of the by-products generated during the pruning of olives tress and during separation process in olive processing.
OL are lignocellulosic biomass with important amounts of extractives and lignin

Chemical composition of OL "Serrana de Espadán" variety, weight percentage in a dry basis.

Extractives	Cellulose	Hemicellulose	Lignin insoluble	Lignin soluble	Ash	Proteins	Lipids
25 ± 2	17.5 ± 0.6	11.0 ± 0.5	10.8 ± 0.1	6.2 ± 3	5 ± 1	10.3 ± 0.2	2.3± 0.5

Subcritical water extraction pilot plant

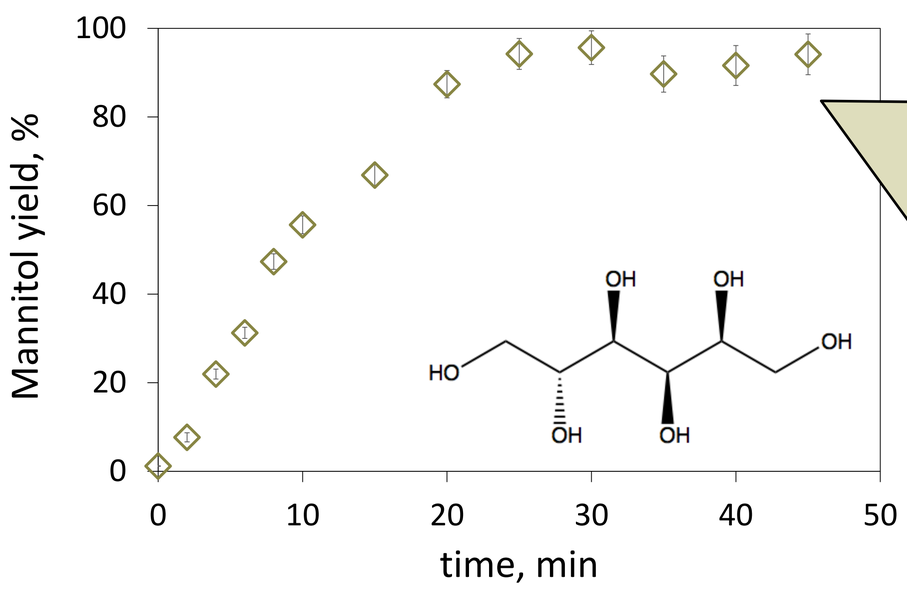
Schematic diagram of the subcritical water pilot plant



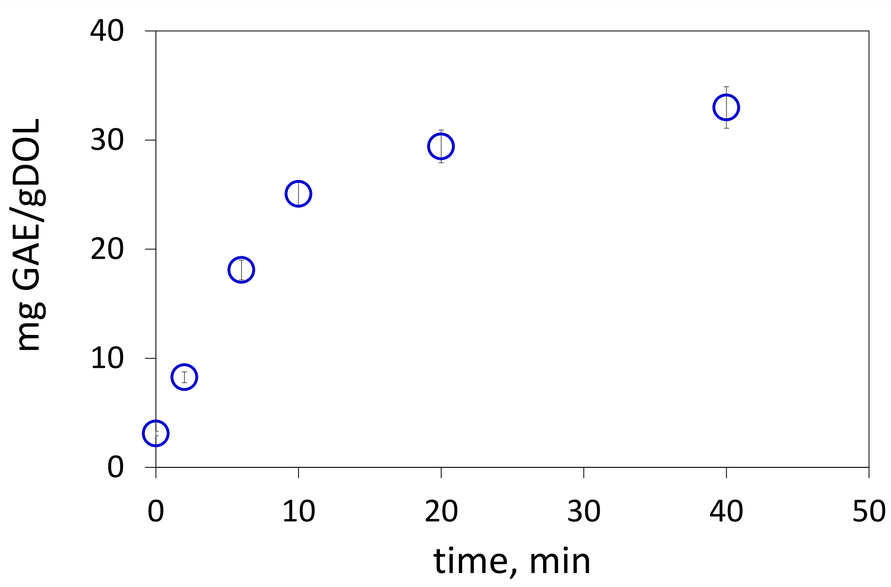
1: Boiler preheater and water tank
2: Extractor (25 L)
3: Liquid sample collector
4: Filtration tank

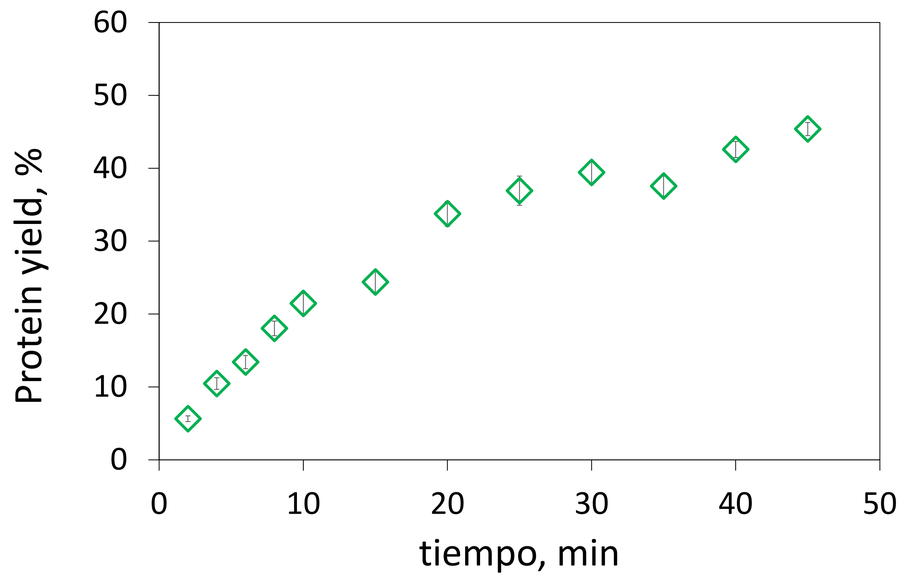
Experiments were carried out at 15 % biomass loading, 181.1 ± 0.6 ºC and a working pressure of 20 bar.
The extraction/hydrolysis kinetics were followed.

Biocompounds extraction



Mannitol production depends on the sorbitol market.
By SW treatment, mannitol extraction yield was nearly 100 % (OL has 99 mg mannitol/ g DOL).





Comparison with conventional solvent extraction.
TPC: total phenolic compounds

Component	Water, 50 ºC	80 % etanol, 50 ºC	Subcritical water, 185 ºC
TPC, mg GAE/g_{DOL}	26.5 ± 0.5	37.6 ± 0.8	33 ± 1
Mannitol, mg/g_{DOL}	4.8 ± 0.1	4.5 ± 0.9	5.3 ± 0.4

Conclusions

Higher extraction yields were obtained for mannitol by using subcritical water hydrolysis. Furthermore, the amount of total phenolic compounds was higher than using water at 50 ºC, although it was slight lower than by using 80 % ethanol aqueous solvent.
Hydrolysis of other components such as the protein fraction was also achieved by subcritical water treatment.

AGENCIA ESTATAL DE INVESTIGACIÓN

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Hiperbaric HIGH PRESSURE PROCESSING

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