

# ROSMARINIC ACID RECOVERY FROM LAMIACEAE PLANTS

**CIAL**

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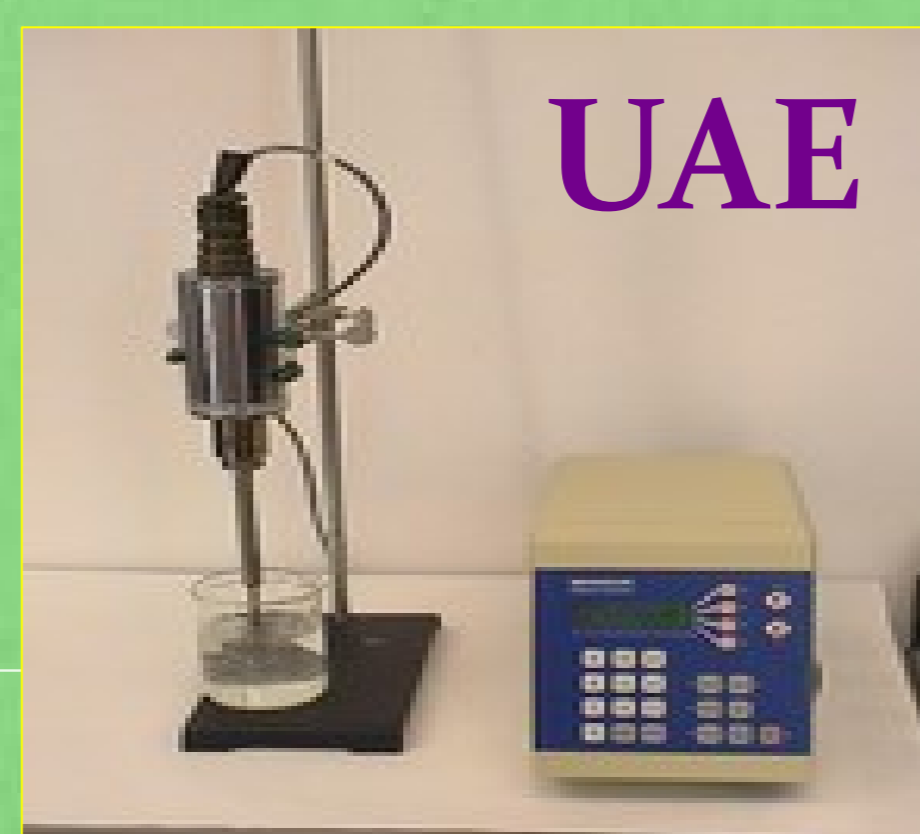


- Rosmarinic acid is a phenolic acid, very well known for its antioxidant, anti-inflammatory, anticarcinogenic and antibacterial properties [1] found in several species of the Lamiaceae family.
- Novel liquid solvent extraction methods to recover phytochemicals from plant matrix include the assistance of solid-liquid extraction using ultrasounds (UAE) and the use of high extraction temperatures, increasing also pressure so as to maintain the solvent in liquid state (PLE) [2].
- In this study rosmarinic acid (RA) was recovered from different Lamiaceae plants: rosemary (*Rosmarinus officinalis*), sage (*Salvia officinalis*), lemon balm (*Melissa officinalis*) and marjoram (*Origanum majorana*) using UAE and PLE. Due to the polar character of this phenolic acid, different polar solvents were examined, including methanol, ethanol, water and a methanol:water (1:1) mixture.

## Extraction Methods



**PLE**



**UAE**



*Rosmarinus officinalis*



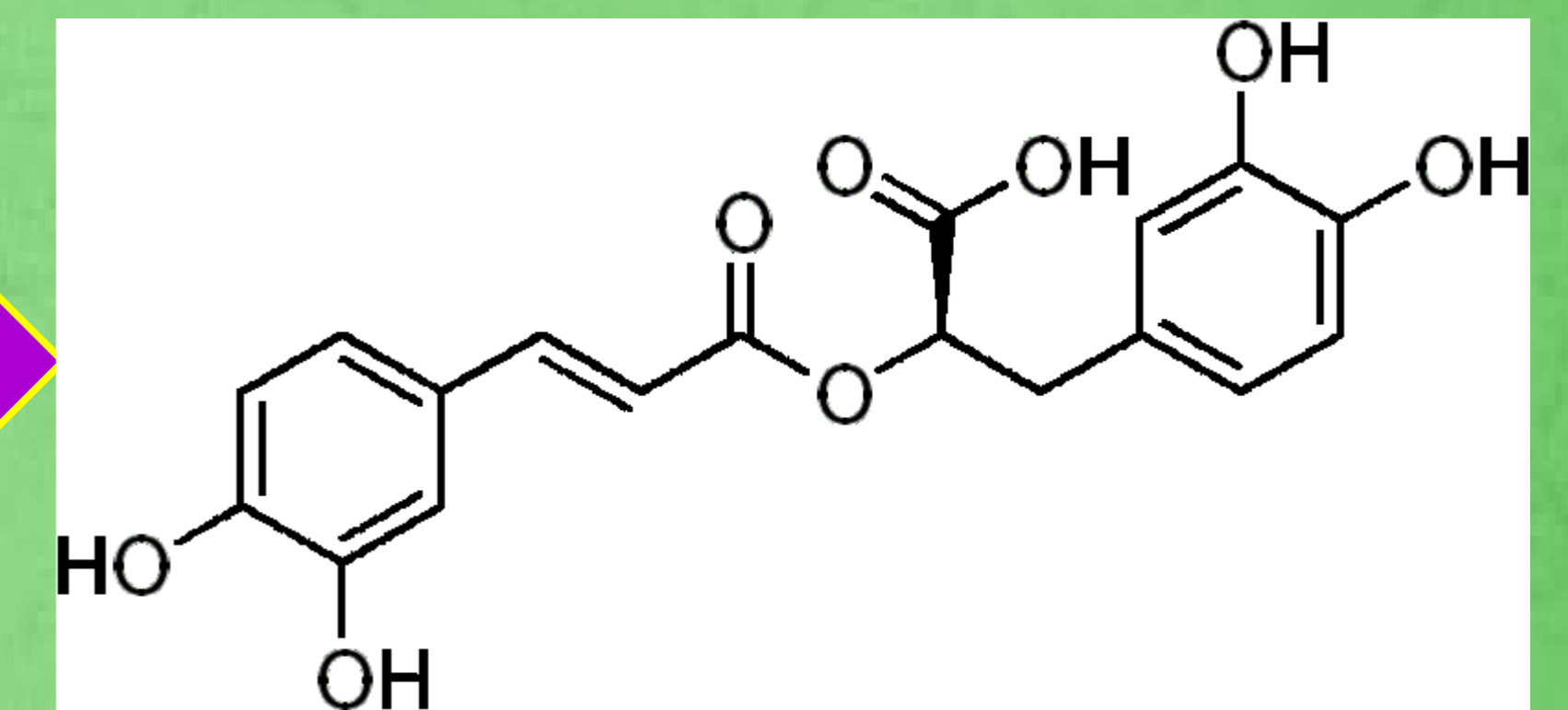
*Origanum majorana*



*Melissa officinalis*



*Salvia officinalis*



rosma

15 min, 1500 psi  
100, 150 and 200 °C,  
Solvent: methanol:water (1:1)  
Vegetal matrix: 1 g of sage.

15 min, 45 °C  
Solvents: ethanol, methanol, water and ethanol/water (1:1).  
Vegetal matrix: 30 g of rosemary, sage, lemon balm or marjoram  
Vegetal matrix / solvent ratio: 1/10

## Results

UAE	solvent	rosemary	sage	marjoram	lemon balm
yield %	methanol:water	16.93	14.23	19.57	18.57
	methanol	21.03	12.77	12.73	7.4
	ethanol	13.23	10.9	15.3	3.23
	water	11.57	14.87	14.24	17.47
RA content % weight	methanol:water	6.17	4.65	4.31	3.97
	methanol	3.16	1.78	2.38	2.68
	ethanol	0.76	0.6	0.07	2.26
	water	0.63	1.68	0.66	0.01
Recovery (mg/g)	methanol:water	10.44	6.61	8.43	7.38
	methanol	6.64	2.27	3.02	1.98
	ethanol	1.01	0.65	0.11	0.73
	water	0.74	2.5	0.95	0.02

PLE	Yield %	RA content (% weight)	RA recovery (mg/g)
100°C	31.3	3.39	12.34
150°C	45.1	2.44	11.02
200°C	60.9	1.39	8.50

sage extracts

## Conclusions

- ❖ *Rosmarinus officinalis* and *Salvia officinalis* varieties presented the higher contents of RA.
- ❖ The higher concentrations of RA were obtained in the extracts produced using methanol:water (1:1) solvent. This tendency was observed for all plants processed.
- ❖ The increase of temperature in PLE extractions did not increase RA recovery but decreased its concentration in the samples.
- ❖ PLE produced higher recoveries of RA in comparison with UAE: 12.34 mg/g in PLE at 100°C vs. 6.61 mg/g in UAE (sage extracts)

## References

- [1] Parnham, M.J, Kesselring, K. Rosmarinic acid. *Drugs of the Future* 10 (1985) 756-757.  
[2] Gahbor Janicsa, Imre Mahthe, Vilmos Miklossy-Vari, Gerald Blunden. *Biochemical Systematics and Ecology* 27 (1999) 733-738.

This work has been supported by project ALIBIRD-S2009/AGR-1469 from Comunidad Autónoma de Madrid.