

# Thymus zygis and Thymus pulegioides as a source of phenolic compounds



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## INTRODUCTION

*Thymus* are important genera of the Lamiaceae family that are well adapted to the climate of the Mediterranean region and are widespread in the arid parts of the Iberian Peninsula. Many species of *Thymus* are used for culinary confection and for medicinal applications [1]. *Thymus* plants are rich in phenolic compounds, particularly in phenolic acids and flavonoids [2]. Albeit that, the specific phenolic composition of *T. zygis* (Fig. 1) and *T. pulegioides* (Fig. 2) remains unknown up to the present.



Figure 1. *T. zygis*

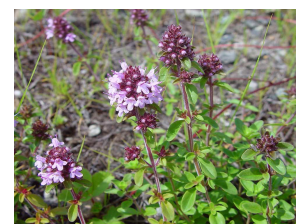


Figure 2. *T. pulegioides*

**AIM:** Determination of the phenolic composition of *T. zygis* and *T. pulegioides*.

## METHODS

- ✓ Extracts of the aerial parts of *T. zygis* and *T. pulegioides* species were prepared by extraction with hot water [3];
- ✓ Total phenolic contents were determined according to the adapted Folin-Ciocalteu method [4];
- ✓ Identification of the phenolic compounds was performed by high performance liquid chromatography (HPLC-DAD).

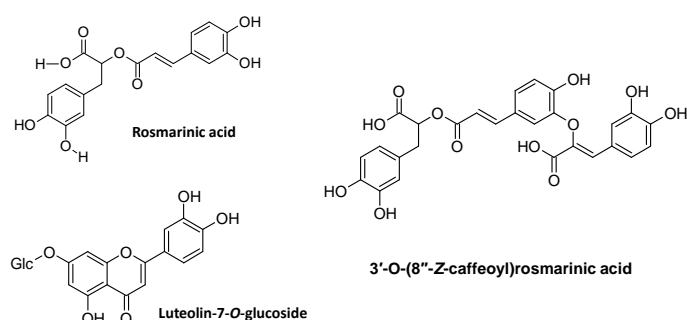


Figure 3 - Chemical structure of the three most abundant phenolic compounds in *T. zygis* and *T. pulegioides* extracts

## CONCLUSIONS

*T. zygis* and *T. pulegioides* share the major phenolic constituents, although these two species can be distinguished by specific phenolic constituents in their composition.

## REFERENCES

- [1] Zarzuelo, A. and Crespo, E. 2002, The medicinal and non-medicinal uses of *Thyme*. In: Stahl-Biskup, E. and Sáez, F., editors. *Thyme*, the genus *Thymus*, London: Taylor and Francis.
- [2] Pereira, O.R. and Cardoso, S.M. (2013) *Cur Anal Chem* 9:382-396.
- [3] Ferreira, F.M. et al. (2012) *Cyta-J Food* 10:92-102.
- [4] Guyot, S. et al. (1998) *J Agric Food Chem* 46:1698-1705.

## RESULTS

Aqueous extracts of *T. zygis* and *T. pulegioides* were enriched in caffeic acid derivatives, in particular rosmarinic acid and 3'-O-(8''-Z-caffeoyl)rosmarinic acid (Table 1, Figure 3). Both extracts also contained moderate amounts of the flavone luteolin-7-O-glucoside (Table 1, Figure 3). Besides the common compounds, *T. zygis* had high levels of the phenolic acid salvianolic acid K and the extract of *T. pulegioides* was enriched in eriodictyol-O-hexoside and derivatives (Table 1).

Table 1- HPLC data of eluting fractions in aqueous extracts of *T. zygis* and *T. pulegioides*.

RT (min)	$\lambda_{\text{max}}$ (nm)	MW	Compound	Total phenolics ( $\mu\text{g GAE/mg}$ ) <sup>a</sup>
<i>T. zygis</i>				
11.9	290, 328	360	Rosmarinic acid	319±44
12.6	289, 328	358	3'-O-(8"-Z-caffeoyl)rosmarinic acid	
10.1	254, 267, 345	448	Luteolin-7-O-glucoside	
11.4	288, 322	556	Salvianolic acid K	
<i>T. pulegioides</i>				
11.7	290, 328	360	Rosmarinic acid	391±3
12.5	289, 328	358	3'-O-(8"-Z-caffeoyl)rosmarinic acid	
9.9	254, 267, 345	448	Luteolin-7-O-glucoside	
-	282	450	Eriodictyol-O-hexoside and derivatives	

<sup>a</sup>Determined by Folin-Ciocalteu assay

## ACKNOWLEDGEMENTS

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