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P32 Evaluation of the composition in organic acids, vitamin E and phenolic compounds of lovage (*Levisticum officinale* W.D.J. Koch) roots

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Since ancient times, several aromatic plants and spices have been used worldwide in traditional medicine, in addition to its common usage for food purposes. Lovage (*Levisticum officinale* W.D.J. Koch) is an aromatic plant from the Apiaceae (Umbelliferae) family used as a condiment in several regions of Europe, being also described to have medicinal properties. In particular, lovage roots are described as possessing carminative and spasmolytic activity.¹ According to the assessment report of the Committee on Herbal Medicinal Products (HMPC) of the European Medicines Agency on *Levisticum officinale* Koch, radix, this root is known as a medicine since ancient times in Greece, nowadays being authorized as a traditional herbal medicine in several countries of the European Union.² This report also includes information regarding lovage root chemical composition, referring the presence of different phthalides, coumarines, phenylpropanoids (chlorogenic, caffeic and ferulic acids) and polyacetylenes (falcarindol and falcarinol). Apart from this information, the scientific literature reports mainly the chemical composition of the essential oil of lovage root, with no information being available regarding other bioactive compounds.

Therefore, to address this gap, in this work, the organic acids, vitamin E and phenolic compounds of lovage roots were determined. Dried lovage roots were acquired from an herbal shop in Spain. Organic acids were determined by ultra-fast liquid chromatography coupled with a diode-array detector (Shimadzu Corporation, Japan) in the lyophilized sample, which was extracted using a methodology previously described and optimized.³ Tocopherols were determined in the lyophilized sample using a HPLC system coupled to a fluorescence detector as previously described.⁴ Phenolic compounds were analysed in two different extracts, namely hydroethanolic and decoction, after those being re-dissolved in ethanol/water (80:20, v/v) and water, respectively, to a concentration of 5 mg/mL. The compounds were evaluated using a Dionex Ultimate 3000 UPLC equipped with a quaternary pump and a diode array coupled in-series to an electrospray ionization mass spectrometry detector (LC-DAD-ESI/MSn) operating as previously described.⁵

The obtained results showed the presence of 3 organic acids in lovage root, namely oxalic (2.23±0.02 g/100 g d.w.), malic (1.48±0.04 g/100 g d.w.) and fumaric (0.007±0.001 g/100 g d.w.) and two tocopherols, α-tocopherol (0.83±0.03 mg/100 g d.w.) and γ-tocopherol (0.48±0.03 g/100 g d.w.). Regarding phenolic compounds' composition, a total of 9 compounds, including phenolic acids and flavonoids, were identified and quantified, with vanilic acid being the predominant one in both types of extracts. Comparatively to the hydroethanolic extract, the decoction allowed the extraction of a significantly higher amount of total phenolic compounds (24,3±0,5 mg/g extract versus 3.07±0.04 mg/g extract). To our knowledge, this study represents the first report on the organic acids, vitamin E isoforms and phenolic compounds composition in lovage roots.

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References:

1. E. Bylaité, P.R. Venskutonis, J.P. Roozen. *Journal of Agricultural and Food Chemistry* 46 (1998) 3735–3740.
2. Committee on Herbal Medicinal Products (HMPC), European Medicines Agency, Assessment report on *Levisticum officinale* Koch, radix, EMA/HMPC/524623/2011. Retrieved from https://www.ema.europa.eu/en/documents/herbal-report/draft-assessment-report-levisticum-officinale-koch-radix_en.pdf, accessed in October 2019.
3. L. Barros, E. Pereira, R.C. Calhelha, M. Dueñas, A.M. Carvalho, C. Santos-Buelga, I.C.F.R. Ferreira. *Journal of Functional Foods*, 5 (2013) 1732–1740.
4. L. Barros, A.M. Carvalho, J.S. Morais, I.C.F.R. Ferreira. *Food Chemistry*, 120 (2010) 247–254.
5. S.M. Bessada, J.C.M. Barreira, L. Barros, I.C.F.R. Ferreira, M.B.P.P. Oliveira. *Industrial Crops and Products*, 89 (2016) 45–51.