Title
11th National Chromatography Meeting

Título
11º Encontro Nacional de Cromatografia

Authors
Eduardo Mateus (Universidade Nova de Lisboa)
José Manuel F. Nogueira (Universidade de Lisboa)
Marco Gomes da Silva (Universidade Nova de Lisboa)
Maria João Cabrita (Universidade de Évora)

Edition
Faculdade de Ciências e Tecnologia
Universidade Nova de Lisboa
Campus de Caparica, Portugal
https://www.fct.unl.pt/

Imaging services
Camy (FCT, Universidade Nova de Lisboa)

URL
http://11enc.eventos.chemistry.pt/
e-mail: 11enc@chemistry.pt

ISBN: 978-989-8124-29-6

Scientific Committee

Ana Costa Freitas (Universidade de Évora)
Ana Maria Loureiro da Seca (Universidade dos Açores)
António da Silva Ferreira (Universidade Católica, Porto)
Cristina Delerue Matos (Instituto Politécnico do Porto)
Cristina Maria Dias (Universidade de Évora)
Eduardo Mateus (Universidade Nova de Lisboa)
Fernanda Cosme (Universidade de Trás-os-Montes)
Fernando Nunes (Universidade de Trás-os-Montes)
Isabel C.F.R. Ferreira (Instituto Politécnico de Bragança)
João Queiroz (Universidade da Beira Interior)
José Câmara (Universidade da Madeira)
José Manuel F. Nogueira (Universidade de Lisboa)
José Maria Oliveira (Universidade do Minho)
José Oliveira Fernandes (Universidade do Porto)
José Paulo Silva (Universidade do Algarve)
Ligia Salgueiro (Universidade de Coimbra)
Manuel António Coimbra (Universidade de Aveiro)
Marcela Segundo (Universidade do Porto)
Marco Gomes da Silva (Universidade Nova de Lisboa)
Maria João Cabrita (Universidade de Évora)
Maria Rosário Bronze (Universidade de Lisboa)
Nuno Mateus (Universidade do Porto)
Sílvia M. Rocha (Universidade de Aveiro)

Organizing Committee

Eduardo Mateus (Universidade Nova de Lisboa)
José Manuel F. Nogueira (Universidade de Lisboa)
Marco Gomes da Silva (Universidade Nova de Lisboa)
Maria João Cabrita (Universidade de Évora)

Chairman

Marco Gomes da Silva (Universidade Nova de Lisboa)

Local Organization

Eduardo Mateus (Universidade Nova de Lisboa)
Flávia Freitas (Universidade Nova de Lisboa)
João Brinco (Universidade Nova de Lisboa)
Jorge Lampreia (Universidade Nova de Lisboa)
Marco Gomes da Silva (Universidade Nova de Lisboa)
Maria José Correia (Universidade Nova de Lisboa)
Nazaré Couto (Universidade Nova de Lisboa)
Paula Guedes (Universidade Nova de Lisboa)

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

Rafael Mascoloti Sprea,[1,2] Ângela Fernandes,[1] Tiane C. Finimundy[1], Cristiane Canan,[2] Lillian Barros,[1] Joana S. Amaral [1,3,*] Isabel C. F. R. Ferreira,[1,*]

[1] *Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-399, Portugal*
[2] *Departamento Acadêmico de Alimentos, Universidade Tecnológica Federal do Paraná, Câmpus Medianeira, Brasil*
[3] *REQUIMTE-LAQV, Faculdade de Farmácia, Universidade do Porto, Rua de Jorge Viterbo Ferreira, 228, 4050-313 Porto, Portugal*

Email: jamaral@ipb.pt, iferreira@ipb.pt

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.

Acknowledgements and Funding: The authors are grateful to FCT, Portugal and FEDER under Programme PT2020 for financial support to CIMO (UID/AGR/00690/2019); FEDER-Interreg España-Portugal programme for financial support through the project 0377_Iberphenol_6_E. L. Barros thanks the national funding by FCT, P.I., through the institutional scientific employment program-contract.

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.