



150 ANOS PARA 118 ELEMENTOS A TABELA PERIÓDICA

XXVI ENCONTRO NACIONAL

DA SOCIEDADE PORTUGUESA DE QUÍMICA

24, 25 E 26 DE JULHO DE 2019
FACULDADE DE CIÊNCIAS DA UNIVERSIDADE DO PORTO



ANO INTERNACIONAL
DA TABELA PERIÓDICA



The health-promoting potential of *Salix* spp. bark: from the phenolic composition to the *in vitro* bioactivity

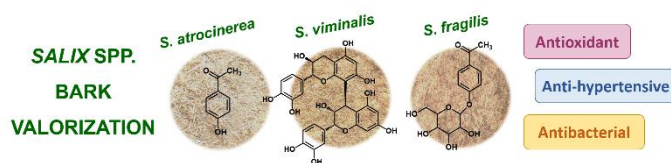
Ramos P A B,^{a,b} Moreirinha C,^a Santos S A O,^a Silva S,^c Coscueta E,^c Almeida A,^d Pintado M M,^c Freire C S R,^a Silva A M S,^b Silvestre A J D^a

a) CICECO – Aveiro Institute of Materials and b) QOPNA & LAQV-REQUIMTE, Department of Chemistry, University of Aveiro, 3810-193 Aveiro, Portugal; c) Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Universidade Católica Portuguesa/Porto, Rua Arquitecto Lobão Vital, 4202-401 Porto, Portugal; d) Biology Department and CESAM – Centre for Environmental and Marine Studies, University of Aveiro, 3810-193 Aveiro, Portugal

Email: patriciaaramos@ua.pt

Salix spp. (Salicaceae) cultivation has attracted attention, not only as source of biomass for energy generation, but also as source of extracts with health benefits.¹ Although salicin usually represents the marker bioactive of *Salix* spp. bark extracts, their flavanones and proanthocyanidins also exhibit interesting biological properties.¹ However, the phenolic composition and related bioactivity of *Salix* spp. bark extracts is still underexploited, particularly regarding to *S. atrocinerea* Brot., *S. viminalis* L. and *S. fragilis* L.,² whose knowledge may prompt innovative nutraceutical applications. Therefore, the present work aims at adding value to *S. atrocinerea* Brot., *S. viminalis* L. and *S. fragilis* L. bark, through the detailed characterization of phenolic compounds, by UHPLC-DAD-MSⁿ analysis, and the evaluation of the *in vitro* antioxidant, anti-hypertensive and antibacterial effects of their extracts (Scheme 1).

Thirteen phenolic compounds, including 2 acetophenones and 2 proanthocyanidins were detected. *S. atrocinerea* Brot. extracts revealed the highest DPPH[•] and ABTS^{•+} scavenging effects, as well as inhibitory activity on angiotensin I-converting enzyme. Considering the 24 h-inhibitory effect against *Staphylococcus aureus* growth, extracts of *S. fragilis* L., *S. viminalis* L. and *S. atrocinerea* Brot. bark were bactericidal at 1250 µg mL⁻¹. Phenolic compounds may be associated to the bioactivity of *Salix* spp. bark extracts. In sum, these promising insights can contribute for envisaging the sustainable and integrative use of the studied *Salix* spp. bark extracts, in the spite of the biorefinery concept.



Scheme 1: *Salix* spp. bark valorization, via phenolic characterization and the *in vitro* bioactivity evaluation.

Acknowledgements: FCT/MCTES is acknowledged for financial support to CICECO (UID/CTM/50011/2019), to QOPNA (UID/QUI/00062/2019), to CBQF (UID/Multi/50016/2019) and to CESAM (FCT UID/MAR/LA0017/2019), through national funds; co-financing, where applicable, come from FEDER within the PT2020. C. Freire also thanks FCT/MCTES for her contract under Stimulus of Scientific Employment 2017 (CEECIND/00464/2017). S. Santos and C. Moreirinha acknowledge the “AgroForWealth” project (CENTRO-01-0145-FEDER-000001) for respectively the contract and post-doctoral grant, and P. Ramos acknowledges the “MultiBiorefinery” project (POCI-01-0145-FEDER-016403) for her post-doctoral grant. The authors also thank The Navigator Company and RAIZ for providing *Salix* spp. samples.

References:

1. a) Dou J.; Galvis L.; Holopainen-Mantila U.; Reza M.; Tamminen T.; Vuorinen T. *ACS Sustain. Chem. Eng.* **2016**, *4*, 3871. b) Freischmidt A.; Jürgenliemk G.; Kraus B.; Okpanyi S. N.; Müller J.; Kelber O.; Weiser D.; Heilmann J. *Phytomedicine* **2012**, *19*, 245.
2. Ramos P. A. B.; Moreirinha C.; Santos S. A. O.; Almeida A.; Freire C. S. R.; Silva A. M. S.; Silvestre A. J. D. *Ind. Crops Prod.* **2019**, *132*, 245.