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Flash Communications

Abstracts

Tomato Plant Biomass: From Agricultural By-Products to Bioactive Extracts with Industrial Application

M. Añibarro-Ortega [a], J. Pinela [a], A. Ćirić [b] F. Rocha [c], A.M. Barata [c], M.D. Soković [b], A.M. Carvalho [a], I.C.F.R. Ferreira [a], L. Barros [a]

[a] Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal
[b] Institute for Biological Research "Sinisa Stankovic" - National Institute of Republic of Serbia, University of Belgrade, Bulevar Despota Stefana 142, 11000 Belgrade, Serbia
[b] Banco Português de Germoplasma Vegetal (BPGV), Instituto Nacional de Investigação Agrária e Veterinária, I.P. (INIAV, I.P.), Quinta de S. José, S. Pedro de Merelim, 4700-859 Braga, Portugal

jpinela@ipb.pt

Tomatoes are highly consumed worldwide and their annual production generates a significant amount of plant by-products, especially aerial biomass. Although tomatoes are well-known for their nutritional composition and health-promoting effects [1], little information is available in the literature on the plant remains of this crop. Therefore, considering the substantial availability of this natural resource and the current trends of circularity and sustainable development, this study was carried out to evaluate the phenolic profile and bioactive properties of tomato plant biomass resulting from the regeneration of table tomato landraces conserved ex-situ in the Portuguese Genebank (BPGV), Braga, Portugal. The plant material resultant from the pruning performed after the flowering season was lyophilized and ground to prepare hydroethanolic extracts, which were characterized for their polyphenols composition (by HPLC-DAD-ESI/MS) and used to evaluate the antioxidant activity (through oxidative haemolysis inhibition, DPPH scavenging capacity, and reduction power assays) and antimicrobial potential against food-borne bacteria and fungi (by serial microdilution and p-INT methods) [2]. The chromatographic analysis allowed identifying phenolic acids and flavonoids, with prevalence of quercetin-3-O-rutinoside. The extracts showed antioxidant activity, with EC50 values lower than those previously reported for the respective table tomato fruits, thus translating a higher activity [2]. The extracts were also effective in some extent in protecting the erythrocyte population from the oxidative hemolysis caused the thermal decomposition of the free-radical initiator AAPH. Despite their low activity against the tested microfungi, some extracts had ability to inhibit and kill some bacteria (including Salmonella typhimurium, Listeria monocytogenes, Bacillus cereus, and Enterobacter cloacae) more effectively than ampicillin. Overall, it was concluded that table tomato plant biomass can be valorized to produce phenolic-rich extracts with antioxidant and antibacterial activities for possible use in the agri-food sector as natural preservatives.

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[1] J. Pinela, C. Montoya, A.M. Carvalho, et al., *Food Research International* **2019**, 125, 108545.
[2] M. Añibarro-Ortega, J. Pinela, A. Ćirić, et al., *Food and Bioproducts Processing* **2020**, 124, 307.