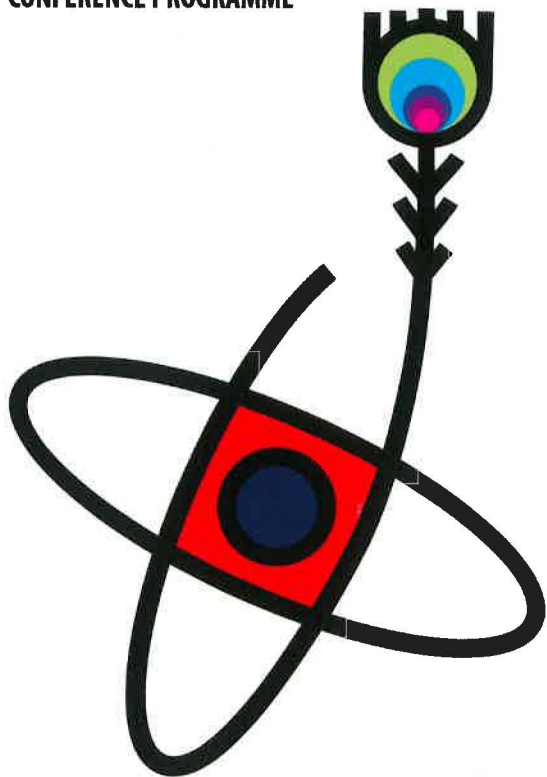


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GAMMA RADIATION-INDUCED EFFECTS ON THE RECOVERY OF PHARMACOLOGICALLY ACTIVE POLYPHENOLS FROM *TUBERARIA LIGNOSA* MEDICINAL PLANT

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Keywords: *Tuberaria lignosa*; γ -rays irradiation, hot-water extraction, ellagitannins, HPLC-DAD-ESI/MS

ABSTRACT

Ionizing radiation has been used for many years as a safer and environmentally friendly alternative comparatively to chemical fumigants to decontaminate medicinal plants and other food commodities [1]. Perennial spotted rockrose (*Tuberaria lignosa* (Sweet) Samp.) is a highly quoted medicinal plant in the northeast region of Portugal rich in ellagitannin derivatives [2,3]. As polyphenols, these compounds play an important role in human nutrition and display several biological effects, including antioxidant, anti-inflammatory, antitumor, antibacterial, and anti-HIV replication activities [2-4]. However, little is known about the impact of ionizing radiation on the integrity and extractability of these high added-value compounds. This work aimed to investigate the effects of γ -rays irradiation on the extraction and/or degradation kinetics of ellagitannins from *T. lignosa* aerial parts. The plant material was submitted to irradiation doses up to 10 kGy in a cobalt-60 experimental chamber. Then, the non-irradiated and irradiated plant material was submitted to different solid-liquid extractions, according to a three-level full factorial design, using boiling water as extraction solvent. The ellagitannins were analyzed in a high-performance liquid chromatography (HPLC) system connected to a diode array detector (DAD) and a mass spectrometer (MS). Punicalin, punicalagin isomers, and punicalagin gallate isomers were the most abundant compounds. In general, the extractability of this group of phytochemicals was improved by the irradiation treatment (5 kGy) and longer extraction times (10 min). In addition, the 10 kGy dose did not induce adverse effects. In conclusion, this study demonstrated the suitability of γ -rays irradiation for preserving or improving the extractability of pharmacologically active compounds from *T. lignosa* aerial parts.

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References:

- [1] H. Molnár, *et al. Food Control*, 2017, In press.
- [2] J. Pinela *et al.*, *Food Chem.*, 2012, 135, 1028.
- [3] J. Pinela *et al.*, *RSC Adv.*, 2015, 5, 14756.
- [4] J. M. Landete, *Food Res. Int.*, 2011, 44, 1150.

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