P-189 EFFECTS OF GAMMA AND ELECTRON-BEAM IRRADIATION ON THE INDIVIDUAL PHENOLICS OF *Viola tricolor* L. EDIBLE FLOWERS

João C.M. Barreira[a,b],*, Amanda Koike[a,c], Lillian Barros[a], Celestino Santos-Buelga[b], Anna L.C.H. Villavicencio[c] and Isabel C.F.R. Ferreira[a]

[a] Mountain Research Centre (CIMO), ESA, Polytechnic Institute of Bragança, Campus de Santa Apolónia, 1172, 5301-855 Bragança, Portugal.

[b] Grupo de Investigación en Polifenoles (GIP-USAL), Faculty of Pharmacy, University of Salamanca, Campus Miguel de Unamuno, 37007 Salamanca, Spain.

[c] Nuclear and Energy Research Institute, National Commission of Nuclear Energy - IPEN/CNEN-SP, Av. Professor Lineu Prestes 2242, Butantã, Zip code 05508-000, São Paulo, Brazil.

[*] jbarreira@ipb.pt

Edible flowers are being used in culinary preparations to improve the sensorial and nutritional qualities of food, besides improving human health due to the profusion in bioactive compounds [1]. Nevertheless, edible flowers are highly perishable and must be free of insects, which is difficult because they are usually cultivated without using pesticides [2]. Food irradiation is an economically viable technology to extend shelf life of foods, improving their hygiene and quality, while disinfesting insects [3]. The efficiency and safety of radiation processing (using Co-60 or electron-accelerators) have been approved by legal authorities (FDA, USDA, WHO, FAO), as also by the scientific community, based on extensive research [4].

Viola tricolor L. (heartseases), from Violaceae family, is one of the most popular edible flowers. Apart from being used as food, it has also been applied for its medicinal properties, mainly due to their biological activity and phenolic composition [5].

Herein, the phenolic compounds were analyzed by HPLC-DAD-ESI/MS and linear discriminant analysis (LDA) was performed to compare the results from flowers submitted to different irradiation doses and technologies (Co-60 and electron-beam). Quercetin-3-*O*-(6-*O*-rhamnosylglucoside)-7-*O*-rhamnoside (**Figure 1**) was the most abundant compound, followed by quercetin-3-*O*-rutinoside and acetyl-quercetin-3-*O*-

(6-*O*-rhamnosylglucoside)-7-*O*-rhamnoside. In general, irradiated samples (mostly with 1 kGy) showed the highest phenolic compounds content.

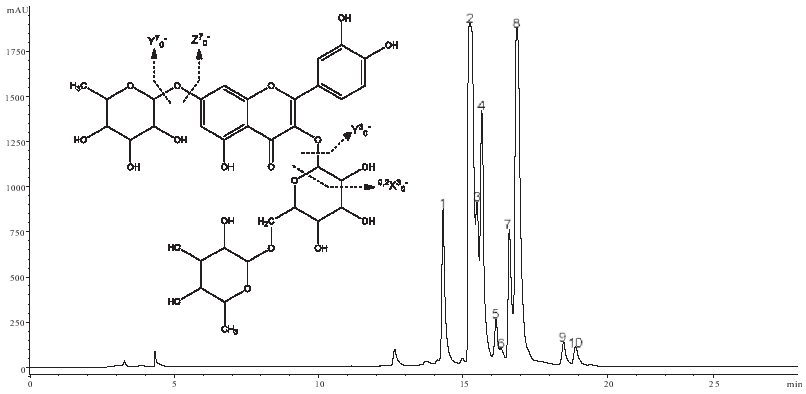

Figure 1. HPLC chromatogram of the phenolic compounds of *Viola tricolor* recorded at 370 nm and chemical structure of quercetin-3-*O*-deoxyhexosylhexoside-7-*O*-hexoside.

The LDA outcomes indicated that differences among phenolic compounds effectively discriminate the assayed doses and technologies, defining which variables contributed mostly to that separation. This information might be useful to define which dose and/or technology optimizes the content in a specific phenolic compound.

Overall, irradiation did not negatively affect the levels of phenolic compounds, providing the possibility of its application to expand the shelf life of *V. tricolor* and highlighting new commercial solutions for this functional food.

Acknowledgements:

The authors are grateful to FCT for financial support to CIMO (PEst-OE/AGR/UI0690/2014), João C.M. Barreira (SFRH/BPD/72802/2010) and L. Barros ("Compromisso para a Ciência 2008" contract). The GIP-USAL is financially supported by the Spanish Government through the Consolider-Ingenio 2010 Programme (FUN-C-FOOD, CSD2007-00063). Authors also thank CNEN, CAPES, CNPq and IPEN-CNEN/SP for financial support to Amanda Koike. This research is included in a Bilateral action FCT-CNPq, Portugal/Brazil 2014.

References:

[1] J. Mlcek, O. Rop, Trends Food Sci. Technol. 2011, 22, 561-569

[2] K.M. Kelley, A.C. Cameron, J.A. Biernbaum, K.L. Poff, Postharvest Biol. Technol. 2003, 27, 341-344

[3] X. Fan, B.A. Niemira, K.J.B. Sokorai, Food Res. Int. 2003, 36, 713-719

[4] J. Farkas, Trends Food Sci. Technol. 2006, 18, 1-5

[5] V. Vukics, A. Kery, G.K. Bonn A. Guttman, Anal. Bioanal. Chem. 2008, 390, 1917-1925.