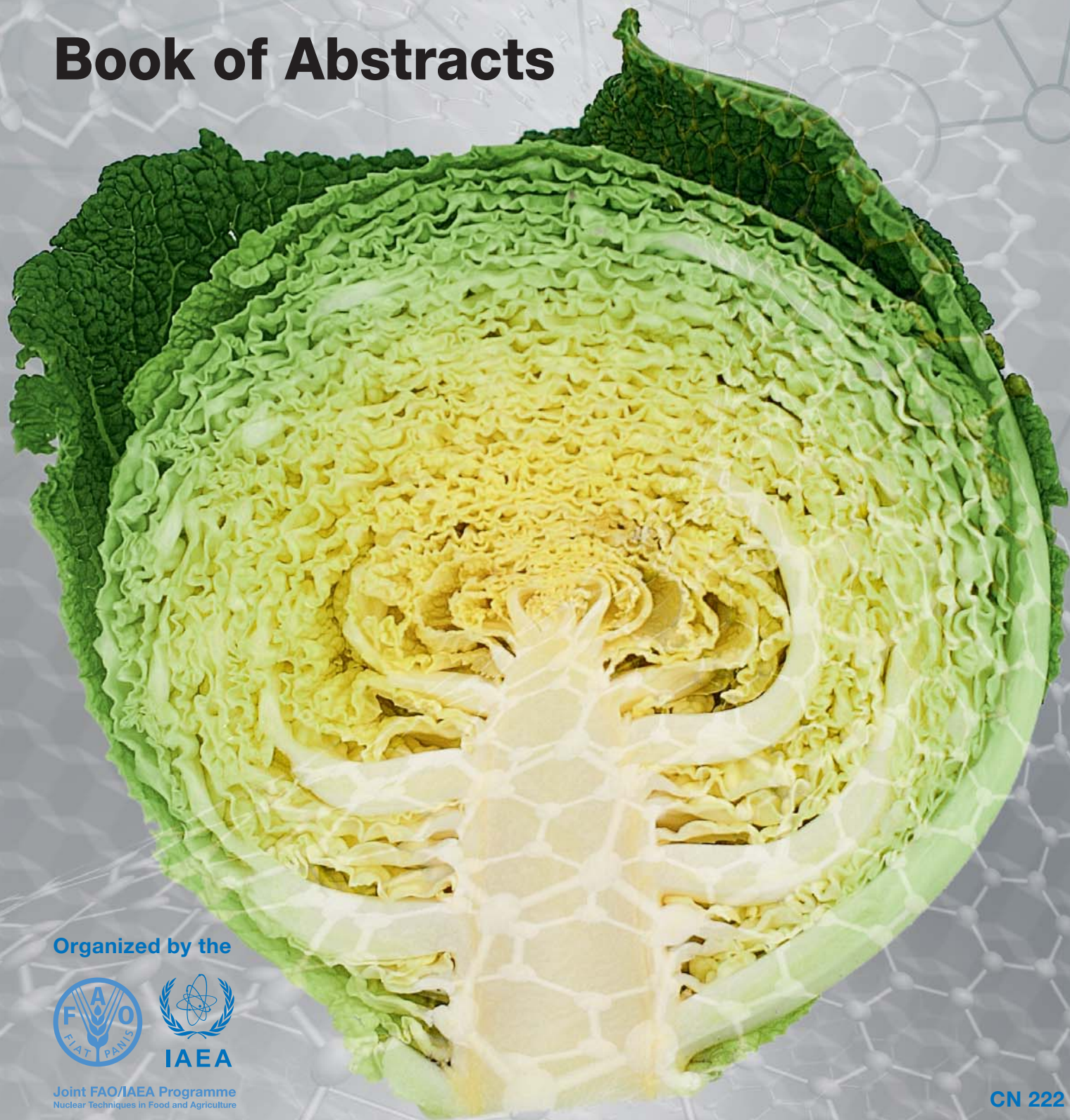


International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques

10–13 November 2014, Vienna, Austria

Book of Abstracts



Organized by the



Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

CN 222

Organized by the



Joint FAO/IAEA Programme
Nuclear Techniques in Food and Agriculture

**The material in this book has been supplied by the authors and has not been edited.
The views expressed remain the responsibility of the named authors and do not
necessarily reflect those of the government of the designating Member State(s).
The IAEA cannot be held responsible for any material reproduced in this book.**



**International Symposium on Food Safety and Quality:
Applications of Nuclear and Related Techniques**

IAEA CN-222

10 -13 Nov 2014

IAEA, Vienna

Book of Abstracts

Irradiation and storage time effects on chemical parameters of processed samples of wild *Macrolepiota procera* (Scop.) Singer

FERNANDES, Angela^{1, 2}; ANTONIO, Amilcar L.^{1, 3, 4}; RAFALSKI, Andrzej R.⁵; P.P. OLIVEIRA, M. Beatriz²; ANABELA MARTINS, Anabela¹; FERREIRA, Isabel C.F.R.¹

¹ Centro de Investigação de Montanha (CIMO), ESA, Instituto Politécnico de Bragança, Portugal

² REQUIMTE/ Depto. de Ciências Químicas, Faculdade de Farmácia, Universidade do Porto, Portugal

³ IST/ITN, Instituto Tecnológico e Nuclear, Sacavém, Portugal

⁴ Departamento de Física Fundamental, Universidade de Salamanca, Spain

⁵ Center for Radiation Research and Technology, Institute of Nuclear Chemistry and Technology, Poland

Corresponding Author: afeitor@ipb.pt

Macrolepiota procera (Scop.) Singer is one of the most popular mushrooms, being considered an excellent edible species and highly appreciated for its nutritional and culinary values. Nevertheless, due to its very fragile nature has to be processed to extend the shelf-life. Drying and freezing are widely used postharvest technologies, but bacteria and mold can survive in these foods [1,2]. The irradiation of mushrooms can be a safe method of decontamination, ensuring hygienic and sensory quality [3]. The present work reports the effects of i) electron-beam irradiation (0.5, 1 and 6 kGy) and storage period (0, 6 and 12 months) on the chemical composition of dried (at 30 °C in an oven) samples of wild *Macrolepiota procera* (Scop.) Singer; ii) gamma irradiation (0.5 and 1 kGy) on organic acids and phenolic compounds of dried, frozen (at -20 °C in a freezer) and fresh *M. procera* samples. The fruiting bodies were collected in Trás-os-Montes (Northeast of Portugal) in November 2011. The electron-beam irradiation was performed at the Institute of Nuclear Chemistry and Technology, in Warsaw, Poland. Gamma irradiation was performed in experimental equipment with four ⁶⁰Co sources at a dose rate of 2.3 kGy h⁻¹. Proximate composition was evaluated by official procedures, fatty acids were analysed by gas-chromatography coupled to flame ionization detection (GC-FID), while sugars and tocopherols were determined by high performance liquid chromatography (HPLC) coupled to refraction index (RI) and fluorescence detectors, respectively. The organic acids and phenolic compounds were analysed by high performance liquid chromatography coupled to a diode array detector (HPLC-DAD). The storage period had a higher effect on all the evaluated parameters than the tested radiation doses, except for fatty acids, which suffer significant changes with storage time and electron-beam irradiation. The differences caused by processing type were also higher than the verified for irradiation dose. Furthermore, some effects of the processing type (drying or freezing) were attenuated by irradiation: the lower amounts of oxalic acid in fresh samples, malic acid in dried samples and citric acid in fresh and dried samples, was significantly mitigated by irradiation treatment. Irradiation showed potential usefulness to be used as complementary conservation technology since it attenuated some effects of dehydration and freeze treatment.

Acknowledgements: FCT and COMPETE/QREN/UE-strategic projects PEst-OE/AGR/UI0690/2011 (CIMO) and PEst-C/EQB/LA0006/2011 (REQUIMTE); SFRH/BD/76019/2011 grant to A. Fernandes.

[1] Giri, S.K., Prasad, S. (2007). Journal of Food Engineering, 78 512-552.

[2] Jaworska, G., Bernás, E. (2010). International Journal of Refrigeration, 33 877-885.

[3] Kulshreshtha, M., Singh, A., Deepti and Vipul. (2009). Journal of Engineering Science and Technology, 4, 90-98.