



2nd Symposium on **Medicinal Chemistry** of University of Minho

8 May 2015

SCHOOL OF SCIENCE, CHEMISTRY DEPARTMENT

Campus de Gualtar

Improving the antioxidant activity of medicinal and aromatic plants by applying electron beam irradiation

Eliana Pereira¹, João Barreira¹, Lillian Barros¹, Amílcar L. Antonio¹, Albino Bento¹, Isabel C.F.R. Ferreira¹

¹Mountain Research Centre (CIMO), ESA, Polytechnic Institute of Bragança, Portugal.

iferreira@ipb.pt

Irradiation techniques have been applied for decontamination of aromatic and medicinal herbs. Their popularity in the pharmaceutical and food industry requires specific criteria in terms of microbiological safety [1, 2]. In this study the objective was to evaluate the effects of different doses of electron beam (EB) irradiation (0 kGy – control, 1 kGy and 10 kGy) on the antioxidant activity of *Aloysia citrodora* P., *Melissa officinalis* L., *Melittis melissophyllum* L. and *Mentha piperita* L.. The antioxidant properties of their infusions and methanolic extracts were evaluated through free radicals scavenging activity, reducing power and inhibition of lipid peroxidation in brain homogenates (TBARS assay). By comparing the results obtained from control and irradiated samples, it was evident that EB induced an increase in the ability to scavenge DPPH radicals and in the reducing power, independently of plant species and extract type. Nevertheless, a similar conclusion could not be performed for TBARS assay. In this case, the infusions from EB irradiated samples have also showed a higher effectiveness as lipid peroxidation inhibitors; however, some of the methanolic extracts (particularly those obtained from *A. citrodora* and *M. piperita*) did not allow an activity as high as the one observed in control samples. Even so, an increase in TBARS formation inhibition was also achieved in the methanolic extracts of *M. melissophyllum* and *M. officinalis* (this latter, only when a 10 kGy dose was applied). According to the described effects, it might be concluded that the application of EB irradiation is an effective way of increasing the antioxidant activity of the methanolic and aqueous extracts prepared from the assayed aromatic and medicinal plants.

Acknowledgments:

The authors are grateful to project PRODOR n° 53514, AROMAP, for financial support of the work and E. Pereira grant, and to Fundação para a Ciência e a Tecnologia (FCT, Portugal) for financial support to CIMO (strategic project PEst-OE/AGR/UI0690/2014), J.C.M. Barreira grant (BPD/72802/2010) and L. Barros "Compromisso para a Ciência 2008" contract. The authors are also grateful to "MaisErvas - Aromáticas e Mediciniais" for samples providing and to Dr. A. Rafalski, for e-beam irradiations and Prof. A. Chmielewski, General Director of the Institute of Nuclear Chemistry and Technology, Warsaw, Poland, for allowing e-beam irradiations.

References:

- [1] R.M. Haleem et al., *Saudi Pharm J.*, **2014**, dx.doi.org/10.1016/j.jsps.2013.11.004.
[2] B. Katusin-Razem, B. Novak and D. Razem, *Radiat Phys Chem*, **2001**, 62, 261-275.