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Gamma radiation effects on microbial inactivation of two medicinal plants

Authors: Márcia Meneses[1,2], Amilcar L. Antonio[1,3], Sandra Cabo Verde[1]

[1] *Centro de Ciências e Tecnologias Nucleares, Instituto Superior Técnico, Universidade de Lisboa, Portugal*

[2] *Environmental Health RG - Lisbon School of Health Technology - Polytechnique Institute of Lisbon, Portugal*

[3] *Centro de Investigação de Montanha (CIMO), ESA, Instituto Politécnico de Bragança, Portugal.*

Presenting Author: Márcia Meneses E-mail: marcia17meneses@gmail.com Tel. no.: +351 911880273

The consumption of natural products has become a public health problem, since these medicinal teas are prepared using natural plants without an effective hygienic and sanitary control. The aim of this study was to assess the effects of gamma radiation, on the microbial burden of two medicinal plants: *Melissa officinalis* and *Lippia citriodora*.

Dried samples of the two plants were irradiated at a Co-60 experimental equipment. The applied gamma radiation doses were 1, 3, and 5 kGy at a dose rate of 1.34 kGy/h. Non-irradiated samples followed all the experiments. Bacterial and fungal counts were assessed before and after irradiation by membrane filtration method. Challenging tests with *Escherichia coli* were performed in order to evaluate the disinfection efficiency of gamma radiation treatment.

Characterization of *M. officinalis* and *L. citriadora* microbiota indicated an average bioburden value of 10^2 CFU/g. The inactivation studies of the bacterial mesophilic population of both dried plants pointed out to a one log reduction of microbial load after irradiation at 5 kGy. Regarding the fungal population, the initial load of 30 CFU/g was only reduced by 0.5 log by an irradiation dose of 5 kGy. The dynamics with radiation doses of plants microbial population's phenotypes indicated the prevalence of gram-positive rods for *M. officinalis* before and after irradiation, and the increase of the frequency of gram-negative rods with irradiation for *L. citriadora*. Among fungal population of both plants, *Mucor, Neoscytalidium, Aspergillus* and *Alternaria* were the most isolated genera. The results obtained in the challenging tests with *E. coli* on plants pointed out to an inactivation efficiency of 99.5% and 99.9% to a dose of 2 kGy, for *M.officinalis* and *L. citriadora*, respectively.

The gamma radiation treatment can be a significant tool for the microbial control in medicinal plants.

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