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## EFFECTS OF GAMMA IRRADIATION ON THE PHENOLIC COMPOUNDS OF *GINKGO BILOBA* L.

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Irradiation has been increasingly recognized as an effective decontamination technique that ensures the chemical and organoleptic quality of medicinal and aromatic plants [1,2]. One of those plants that has been highly studied is *Ginkgo biloba* L., due to its use in traditional medicine, but also by professionals in the medical field in order to treat problems typically associated with aging, such as intermittent claudication, decreased mental vitality in old age (mental confusion, memory loss, dementia praecox, concentration problems), poor circulation and tinnitus [3].

The aim of the present study was to evaluate the effects of gamma irradiation in the bioactive compounds of *G. biloba* (infusion and methanol/water extract), widely used in traditional medicine and in dietary supplements. Twenty-five compounds were detected, eighteen of which were flavonoids, one phenolic acid, five terpene lactones and one unknown compound. Among the quantified phenolic compounds, flavonoids were the main group present, being two kaempferol derivatives the major compounds found: kaempferol-3-*O*-dirhamnosylglucoside and kaempferol-3-*O*-rutinoside. Kaempferol-3-*O*-dirhamnosylglucoside was the most abundant compound in all the infusion preparations and in the methanol/water extract irradiated at 1 kGy, whereas kaempferol-3-*O*-rutinoside was the most abundant one in the control and irradiated at 10 kGy methanol/water extracts. Protocatechuic acid was the only phenolic acid identified and the quantities present were in the same range as the major flavonoids. The irradiation with the highest dose (10 kGy) is sufficient to guarantee the product disinfestation and microbial decontamination, also contributing to an increase in the extractability of phenolic compounds, both in methanol/water and infusion preparations.

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### References:

- [1] Alothman, M., Bhat, R., Karim, A.A. 2009. Effects of radiation processing on phytochemicals and antioxidants in plant produce. *Trend. Food Sci. Technol.* 20, 201-212.
- [2] Kirkin, C., Mitrevski, B., Gunes, G., Marriott, P.J. 2014. Combined effects of gamma-irradiation and modified atmosphere packaging on quality of some spices. *Food Chem.* 154, 255-261.
- [3] Diamond, B.J., Shifflett, S.C., Feiwel, N., Matheis, R.J., Noskin, O., Richards, J.A., Schoenberger, N.E. 2000. *Ginkgo biloba* extract: mechanisms and clinical indications. *Arch. Phys. Med. Rehabil.* 81, 668-678.