Effect of Gamma-Irradiation on Microbiological and Physiochemical Properties of Ceylon Cinnamon (*Cinnamomum zeylanicum)* Powder

T.K.V.V. Chandrasekara[1*], A.M.N.L. Abesinghe[1] and A.I.H.W. Surendra[2]

[1]Department of Animal Science, Uva Wellassa University, Badulla, Sri Lanka
[2]Sri Lanka Gamma Centre, Biyagama, Sri Lanka
**Corresponding Author E-mail: ans16003@sds.uwu.ac.lk, TP: +94769935156*

Ceylon cinnamon (*Cinnamomum zeylanicum*), commonly known as the "True cinnamon" has dominated the international spice market due to its high cinnamaldehyde content, strong aroma and rich flavor. Sri Lanka is the leading producer and exporter of Ceylon cinnamon. The initial microbial load in spices and herbs, in particular spore-forming bacteria, could be a serious threat for the hygienic safety of final processed products. Gamma-irradiation is a novel technique and it is more effective than ethylene oxide fumigation for sanitation of spices in controlling microbial contamination without adverse effect. Therefore, the present study was carried out to evaluate the effects of different doses of gamma-irradiation on microbiological and physiochemical properties as total plate count (TPC), yeast and mold count (YMC), total flavonoid content, total phenolic content, reducing sugar content, antioxidant activity, pH, color and water activity of Ceylon cinnamon. Cinnamon samples were collected from the local market and subjected to five doses of irradiation as 1, 3, 5, 7 and 10 KGy using an industrial Co^{60} gamma irradiation source. Non-irradiated cinnamon sample was used as the control. There was a significant reduction (100%) in TPC and YMC with increasing the irradiation dose up to 10 kGy. Results of physiochemical properties, antioxidant activity and color values did not showed significant difference in treatments and control samples. However, significantly lower levels of total flavonoid content, total phenolic content and reducing sugar content were observed in treatment with 10 kGy irradiation dose compared to control. The proximate composition of cinnamon treated with 10 kGy did not showed any significant differences in crude protein, crude fat, crude fiber and ash content compared to control while moisture content was significantly lower than the control. In conclusion, the 10 kGy gamma-irradiation dose was not adversely affected on quality of Ceylon cinnamon.

Keywords: Spices; Ceylon cinnamon; Gamma-irradiation; Dose