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Effect of Gamma Irradiation and Storage on Fungal Growth, Aflatoxin Production and Quality Characteristics of Groundnuts

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Abstract

Gamma irradiation has been established as a safe and effective physical means for microbial decontamination, disinfestation, shelf-life extension and improvement of overall nutritional attributes. The aim of this study was to determine the fungal growth, aflatoxin production, nutritive value and the quality characteristics of extracted oil of two groundnut (*Arachis hypogaea*) cultivars namely Sodari and Madani as affected of gamma irradiation at dose levels of 0, 1, 1.5 and 2 kGy followed by storage at room temperature.

After two years storage at room temperature, the results revealed that the fungal growth was significantly ($p < 0.05$) lower in the irradiated seeds compare to the control one for both cultivars. Furthermore, gamma irradiation treatments significantly ($p < 0.05$) reduced the production of aflatoxin especially at the dose of 2 kGy, which was 5.50 and 4.50 ppb in the cultivar Sodari and Madani, respectively. Moreover, the results indicated that gamma irradiation had significant ($p < 0.05$) effects on crude oil and crude protein contents after storage for both cultivars. For the quality characteristics of extracted groundnut oil, the results proved that gamma irradiation treatments with storage caused significant ($p < 0.05$) reduction in the acid value and the peroxide value, while the relative viscosity significantly increased, however, no significant change in refractive index was observed for both cultivars.

In the current study, the obtained results confirm that application of gamma irradiation prevent the fungal growth as well as production of the aflatoxin effectively for a long period of time extending to two years without adverse damage in groundnut quality.

Keywords: Aflatoxin, fungal growth, gamma irradiation, groundnut, storage