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| Research topic | Gamma radiation : Computation of D_{10} and effect of their biological characteristics of storage fungi |
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Abstract

The aim of this research was to estimate D_{10} value of storage fungi. Inoculation method and gamma irradiation on fungal contamination and qualities of mung bean, rice, soybean and peanut seeds were also carried out. The major storage fungi in those seeds were *Aspergillus flavus*, *A. niger* and *Rhizopus* sp.. The mycelium and spores of *A. flavus* cultured on potato dextrose agar and water agar, respectively, were exposed to 0.1-6.0 kGy gamma ray. Data of mycelial growth and spore germination were analyzed. The D_{10} value of *A. flavus* was 5.32-5.75 kGy with $r^2 = 0.9233$.

The efficacy of inoculation techniques using ground infected seeds and spore suspension on mung bean, rice, soybean and peanut was compared. The non-inoculated and inoculated seeds were also irradiated at doses of 0, 3 and 5 kGy with gamma ray and kept at 28-30°C for 3 months. The non-inoculated without irradiation seeds were used as the control samples. The results showed that ground infected seeds were significantly effective inoculums compared to spore suspension. Fungal contamination was significantly reduced by gamma irradiation and the higher dose was more effective except in the peanut. Inoculation technique and gamma irradiation did not influence to moisture content of the seeds during storage. Lipid content and free fatty acids of peanut were not significantly different among the tested samples. The higher lipase activity was found in the peanut inoculated with ground infected seeds. However, lipid content of irradiated soybean was significantly declined compared to the control treatment but lipid content was not affected by inoculation methods. Lipase activity of soybean was increased by irradiation and inoculums. The negative impact of gamma irradiation on mung bean and rice seeds were the significant reduction of germination. Germination of irradiated seeds was reduced more than 50% within 1 month. Lipase activity of irradiated rice was increased by 2-fold compared to the control seeds. Therefore, D_{10} value for food grains and durable commodities is 6 kGy. However, it is not recommended for seed treatment. The ground infected seeds would be recommended as inoculums for grains or seeds

research application. The 5 kGy of gamma irradiation is the appropriate dose and has very slight impact to chemical composition of oil grains.

Keywords: D_{10} , Gamma ray, Fungi, Seed