

Effects of gamma irradiation on the growth and yield of green gram (*Vigna radiata*)

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Gamma irradiation is one of the physical mutagens that widely used for mutation breeding, food sterilization and medicinal healing. Purpose of this study was to stimulate the growth and yield of green gram (*Vigna radiata*) which is very nutritious and great source of protein along with fiber, iron, calcium, phosphorous and many vitamins and also a very important source of protein for vegetarian. In the present study, irradiation techniques were applied to investigate the effect of gamma irradiation on yield, physical and biological characters of green gram plants. Five different strengths of gamma irradiation were applied: 0 (Control); 100; 200; 300; 400 kGy in air. Treated seeds were transferred in pots filled with sterile soil separately. Pots were arranged according to a completely randomized design (CRD) with six replicates. The application of different doses of gamma irradiation showed significant changes in biological (shoot length, shoot length, total chlorophyll content and pH) and physical (reflective index, current voltage characteristics and conductivity) properties of the plants at their 1st harvesting stage. The plants showed gradual increase in root length with increasing dose of gamma irradiation significantly ($P < 0.0001$). pH of the plant extracts varied significantly ($p < 0.05$) among different treatments. Higher (5.91) and Lower (5.75) pH values were observed in dose 400 Gy and control respectively. Gamma irradiation dosage at 400 Gy resulted in a significant increase in concentration of total chlorophyll content (66.3%) compare to control, suggesting that 400 Gy doses of radiation could activate photosynthetic pigment system. There was no significant difference observed in mass of yield among treatments and the control. Electrical conductivity of plant extracts increased gradually in parallel to the exposure dose. While the resistance and the refractive index exhibited an opposite trend. The present study revealed that the application of different doses of gamma irradiation do not stimulate the yield of the green gram plants and total chlorophyll content is not correlated with the yield.

Keywords: gamma irradiation, total chlorophyll content, reflective index, conductivity and green gram

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