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# EFFECT OF GAMMA RADIATION ON GERMINATION AND PLANT HEIGHT OF *LYCOPERSICON ESCULENTUM* VAR. PUSA EARLY DWARF

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In the present investigation, effect of gamma radiation on the germination of seeds of *Lycopersicon esculentum* var. pusa early dwarf has been studied. Fifty seeds of *Lycopersicon esculentum* were irradiated to varying doses (10, 20, 30, 40 KR ) of gamma radiation using $Co^{60}$gamma cell irradiator. Irradiated and control seeds were sown on the same day in different pots. Morphological characters were monitored daily. It was observed that germination started on fifth day in all the pots and it was completed with in fifteen days from the date of sowing . Maximum germination was observed on $9^{th}$ or $10^{th}$ day in all the seeds but maximum percentage( 90 %) of seed germination was observed in the seeds irradiated to 30 KR even more than the control (54%). There after the percentage germination decreased with the increase in radiation dose. Maximum plant height (69 cms) was observed in 20 KR and minimum plant height (37 cms) was in 40 KR which is again less than the control.

**Keywords** : Gamma radiation; *Lycopersicon esculentum;* Plant height; Seed germination.

Irradiation is a process of exposing substances to radiant energy or ionizing radiation. In the context of this research, it can be defined as the process of exposing crops to carefully controlled amount of energy[1]. Research on food irradiation dates back to the twentieth century with the first United states of America and British patents issued in 1905. It allowed the use of ionizing radiation to kill bacteria in food[2].

In Nigeria, this nuclear technique has been tested and analysed at an experimental level on cereals, legumes, roots and tubes as well as fish and livestock. It has been identified as a process that can potentially play a major role in the pursuit of healthy and abundant food supplies for all[3]. Gamma radiation of 30-1000 Gy has been applied to achieve a delay in the ripening of some fruits and vegetables[4]. A reduction in the amount of visible and total mould present in bread during a storage period of up to 20 weeks was reportedly achieved by applying a gamma radiation of 150 Gy to the flour[5]. The processes is useful in solving various agricultural problems : reduction of post harvest losses through suppressing sprouting and contamination, eradication or control of insect pests, reduction of food-borne diseases and in extension of shelf life, and breeding of high-performance well adapted and disease resistant agricultural crop varieties[6,7]. The process controls hydration of seed to a level that allows pre germination activity but does not permit redicle protrusion through seed coat. The effect of osmotic priming to increase the rate and uniformity of germination are widely recognized[8,9]. Immense benefits derivable from this technology should therefore be made available to individuals, food companies and agricultural institutions.

Present work is the first phase of series of studies aimed at finding out the effect of irradiation on solanaceae plant ( *Lycopersicon esculentum* ) is intended to investigate how the gamma irradiation affects the germination and subsequent growth of the selected plant species.

Genetically pure seeds of *Lycopersicon esculentum* var. Pusa early dwarf were obtained from "National seed corporation, Jaipur" and were then grouped in to five sets of fifty seeds each. Seeds of first, second, third and fourth sets were irradiated to 10, 20, 30 and 40 KR doses of gamma radiation respectively where as fifth group was kept as control. Irradiation was carried out at the "Department of Radio therapy S.M.S. Hospital, Jaipur" using $Co^{60}$ Gamma cell irradiators. Irradiated and control seeds were sown on the same day in different pots in the Department of Botany, University of Rajasthan, Jaipur. Germination and growth characters monitored daily.

*Germination* - Germination in all the test pots started after five days and completed within fifteen days from the date of sowing. Seeds irradiated to 40 KR showed toxic effect where germination was adversely affected. Percentage germination increased with increasing dose of gamma

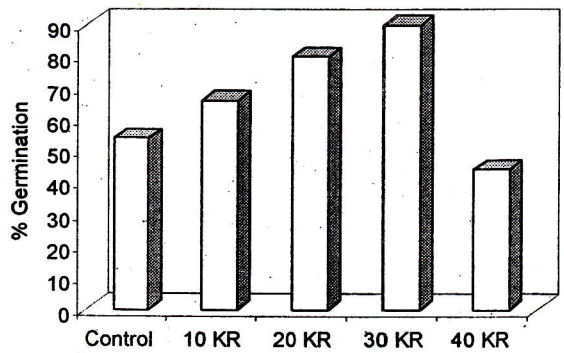


**Fig. 1.** Effect of Gamma radiation on germination.

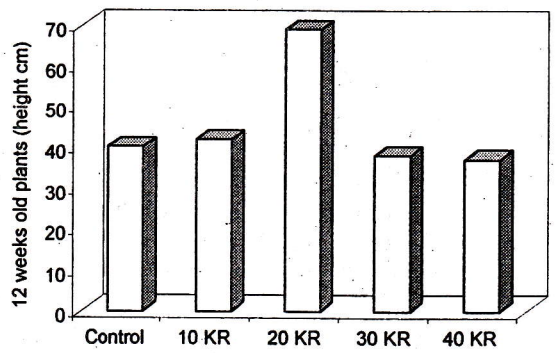


**Fig. 2.** Effect of Gamma radiation on plants height.

radiation (10 to 30 KR), thereafter it decreased (40 KR) (Fig. 1).

*Plant height* - Height of plants of various doses of gamma radiation was measured after 12 weeks. It was observed that maximum height in 12 weeks was observed in plants raised from seeds exposed to 20 KR (69 cm) followed by 10, 30 and 40 KR. However, height of control was 40 cm which is much less than that of plants of 20 KR dose (Fig. 2).

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