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Effect of Gamma Rays on Germination and Mortality Percentage in M_1 and M_2 Generation

Nitin Mehetre* and R. M. Kshirsagar

Department of Agriculture, Om Prakash Jogender Singh University (OPJS), Churu – 331303, Rajasthan, India

**Corresponding author*

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A B S T R A C T

The effect of Gamma radiation on germination & Mortality percentage in M_1, M_2 generation was studied. Gamma beams reduced germination in M_1 and increased in M_2. T_2 and T_3 recorded highest reduction while lowest in T_1. Mortality percentage was more M_1 & M_2 generation with increase in doses of gamma rays. M_1 generation has highest mortality in T_3 (15.50 %) while minimum in T_1 (5.60 %) in M_2. Mortality percentage was found increased with the increases in doses of gamma rays.

Introduction

Soybean is referred as "Golden bean" and "Miracle crop" of 21st century. It is one of the important oilseed as well as legume crop. It contributes more than 50% to global production of edible oil. It contain 40% good quality protein rich in lysine & 20 % oil high in essential amino acid (omega 6 & Omega 3) soy protein is rich in all essential amino acid minerals salts vitamin A, B & D. it is highly self-pollinated crop.

It is often called "Vegetarian's meat". Soybean straw is used as fodder & forage for livestock and poultry. Soybean are low in immersed fat & have no cholesterol, also contains antinutritional factors like trypsin inhibitor, phytohaemagglutinis & phytic corrosive Lipids solvents of nutrients K, E, D are available in soybean. India ranked 5th position in respect of area & production. *Hugo de vries* (1903) first given concept of induction mutation. Gamma rays an ionizing physical mutagen is capable of inducing mutation in plants. The present research work was therefore undertaken by using soybean cultivar JS-335 subjected to treatment of different doses of gamma rays and hence improves its yield.

Materials and Methods

Dry healthy and genetically pure seed of JS-335 was utilized in this study. Four different lots of soybean seed JS-335 were mack every lot was of 500g seed weight. Three lots were treated with gamma radiation at BARC, Trombay by three diverse

dosages 200 Gy, 250 Gy, 300 Gy and used for raising M_1 during *kharif*.

Germination count was taken 12 days after sowing and the amount of plants which failed to survive to up flowering from the date of germination were counted mortality.

Results and Discussion

Germination percent

The impact of various treatments of gamma radiations on germination in M_1 and M_2 generations are displayed in table 1 and graphically illustrated in fig. 1. Reduced germination per cent in all the treatments was surveyed in M_1 generation as evaluated to control. Treatment T_2 and T_3 recorded the highest reduction in germination per cent (51.45 and 47.25 %) respectively, while lowest in treatment T_1 (53.75 %). The germination per cent in control was observed (67.71 %).

In M_2 generation, germination reduction was examined in all the ailments as evaluated to control. The data revealed that germination percentage increased in M_2 as evaluated to M_1 generation in all the ailments. The germination percentage in M_2 ranged from 50.85 to 72.84 %. Reduction of germination percentage was highest in T_3 (50.85 %) of M_2 generation while lowest in T_1 (54.60 %) in contrast with control T_4 (72.84 %).

The experimental finding on the germination indicated that gamma beams reduced germination in M_1 generation. The germination percentage increased in M_2 generation in contrast with M_1 when the gamma rays radiate seeds. Similar to this results Satpute and Fultambkar (2012) also reported decline in germination percent over control in all mutagenic therapies in the soybean cultivars MAUS-71 and JS-335. Sangsiri *et al.*, (2005), Ayehband and Afsharinafer (2012) reported that the all genotypes, high dosages of gamma beams lowered the percentage of germination compared with placebo, but the low doses had no major impact.

Mortality

The data of survival of seedling as affected due to different treatments in M_1 and M_2 are displayed within table 2 and graphically illustrated in fig. 2.

The effect was recorded as mortality in percentage. It increases in M_2 generation as evaluated to their control in all the therapies.

In M_1 generation the highest mortality was evidenced in T_3 (15.50 %) While least viewed T_1 (10.50 %) in contrast with their respective control (5.10 %). Mortality per cent was found to increase with higher dosages of gamma radiations.

In M_2 generation, maximum mortality was evidenced in T_3 (7.80 %) while minimum was in T_1 (5.60 %). Increased doses of treatment of gamma rays had exerted increasing effect over this character.

Data in table 2 reveals that the mortality percentage is more in M_1 and M_2 generation in contrast with control. It is also found mortality increased in M_1 and M_2 generation with the increases in doses of gamma rays treatment. This indicates the JS-335 cultivar responded in the similar manner for all the treatments.

In according to the above result Ahire *et al.*, (2005) compared to their variations of their combinations, the proportion of lethality was higher. 0.2 percent EMS in the soybean cultivar MACS-450.

Karthika and Lakshmi (2006) also identified that in all biometric features, the treated population displayed a decreased speech than the untreated population. In the two soybean cultivars, CO_1 and CO_2, the mutagen gamma ray showed a higher proportion of reduction than EMS.

The germination parent reduced in both M_2 and M_1 as evaluated to control. The lessening in germination was more in M_1 than M_2 generation. Mortality percentage was more in M_1 than M_2 generation.

Table.1 Effect of gamma radiations treatments on germination per cent in M_1 and M_2generation.

Treatments	Germination (%)	
	M_1	M_2
T_1 (200 Gy)	53.75	54.60
T_2 (250 Gy)	51.45	52.40
T_3 (300 Gy)	47.25	50.85
T_4 (Control)	67.15	72.84

Table.2 Gamma rays treatment effect on mortality per cent in M_1 and M_2 generation

Treatments	Mortality (%)	
	M_1	M_2
T_1 (200 Gy)	10.50	5.60
T_2 (250 Gy)	13.40	6.40
T_3 (300 Gy)	15.50	7.80
T_4 (Control)	5.10	4.30

Fig.1 Impact of treatment with gamma rays on germination percentage in the M_1 and M_2 generation

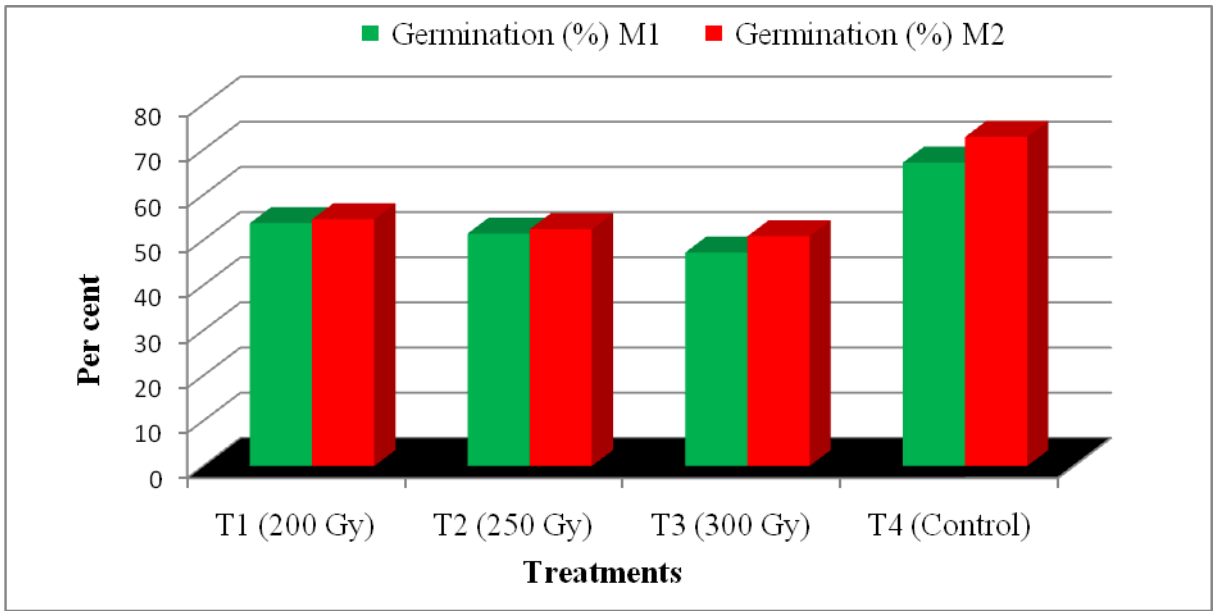
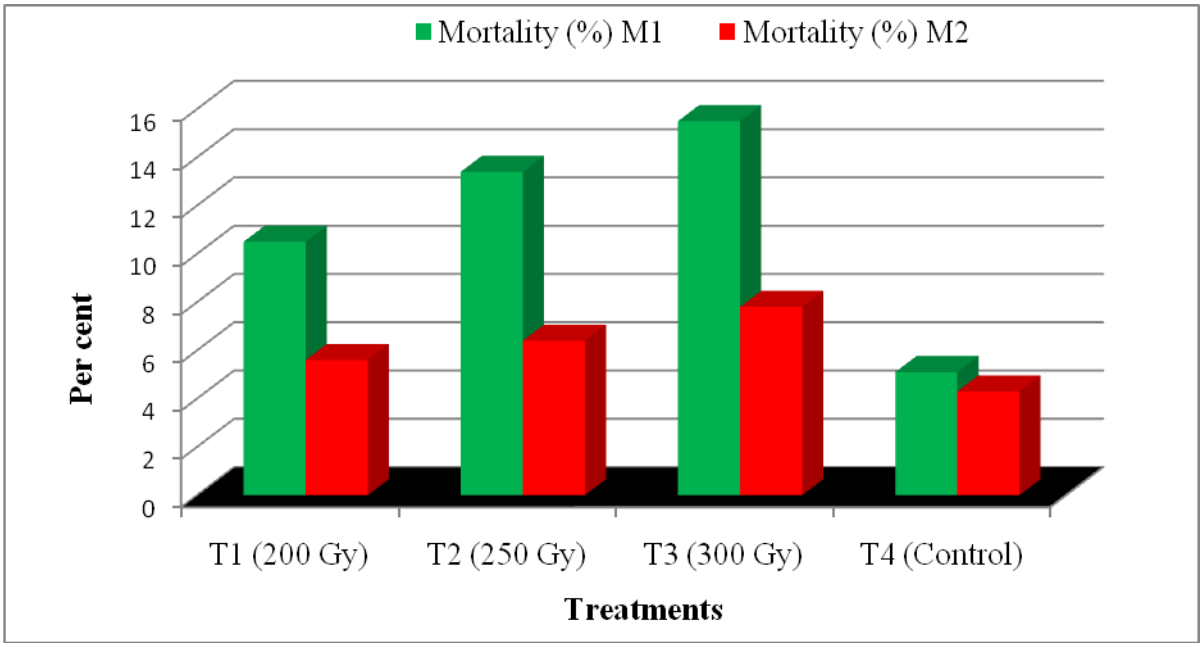


Fig.2 Impact of gamma rays treatments on mortality per cent in M_1 and M_2 generation



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