

MUTAGENIC RESPONSE OF METHYL METHANE SULPHONATE (MMS) ON GERMINATION AND PLANT HEIGHT IN *LYCOPERSICON ESCULENTUM* MILL.

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Study undertaken is based on morphological characters viz. germination, initiation time, maximum germination time and plant height in the first generation of *Lycopersicon esculentum* variety pusa early dwarf. The present investigation provides a relative account of morphological effect of Methyl Methane Sulphonate (MMS) on the test plant. Germination percentage increased in seeds treated with 0.1% concentration of MMS but thereafter decreased with increasing concentration (from 0.2 to 0.4 %). Initiation time, maximum germination time and height after 6 and 8 weeks increased with increase in concentration (from 0.2 to 0.4%) of MMS. Plant height showed maximum increase with 0.4% of MMS in 6 to 12 weeks old plants. However, effect of 0.05% and 0.75% MMS was negligible regarding all parameters when compared with that of control. Hence, on the basis of results obtained 0.1% concentration of MMS was found most suitable for pusa early dwarf variety of *Lycopersicon esculentum*.

Keywords: Germination percentage; Germination time; Initiation time; *Lycopersicon esculentum*; Methyl Methane Sulphonate (MMS).

Lycopersicon esculentum Mill. (Solanaceae) is an annual self fertile plant, growing throughout the world for its edible fruits. Mutagens play an important role in influencing the plant characters. Gustaffson¹ studied chemical mutagenesis in higher plants. According to Swaminathan² mutagens are known to induce many epigenetic changes in the morphology and physiology of plants besides other mutagenic effects. Further, Mahna and Singh³ studied the effects of some alkylating agent on germination, emergence and plant height of some solanaceous crop plants. EMS and UV-radiations constitute an important group of mutagens. Chaturvedi *et al.*⁴ had studied the effects of gamma rays, EMS, n-nitro and n-methylurea on *Cajanus cajan*. A number of investigators have shown that alkylating agent such as EMS, MMS and NMG alone are powerful mutagens and adversely affect the seed germination, emergence, seedling height etc.^{2,5-10}. Singh *et al.*¹¹ reported gamma rays and EMS induce genetic variability in *Vigna munga*. Hence, mutation treatment undoubtedly is a very good techniques by which the yield can be enhanced. The present investigation was done to study the effect of Methyl Methane Sulphonate on germination and plant height of *Lycopersicon esculentum*.

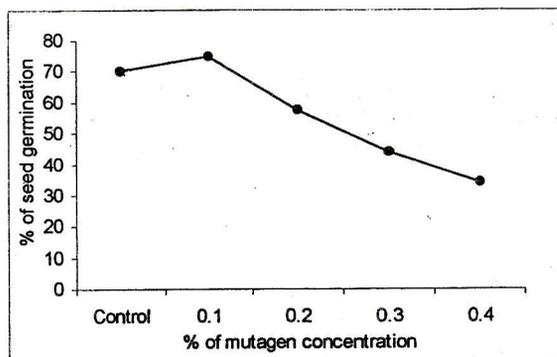
The seeds of *Lycopersicon esculentum* var. pusa early dwarf was obtained from National Seed Corporation, Jaipur. The plants were raised in the Botanical Garden, Department of Botany, University of Rajasthan, Jaipur. The dry seeds were soaked in double distilled water for 24 hours. Seeds were then transferred to the freshly prepared six different concentrations of MMS (0.05, 0.75, 0.1, 0.2, 0.3, 0.4%) and treated for three hours. A control was also run in distilled water. Seeds were thoroughly washed in distilled water and air dried before sowing.

The germination test were carried out in pots, in triplicates, using 50 seeds per replicate. Daily observations were made and the data on seedling, emergence etc. were collected.

Germination : The percentage, time taken for initiation and the day of maximum germination from the date of sowing of seeds were used as the parameters to study the effects of chemical treatment. High concentration of MMS was found to be highly toxic as it adversely affected the seed germination. Effect of different concentrations vary regarding initiation and maximum germination time (Table 1 and Fig.1). Percentage of germination increased in 0.1% concentration there after it decreased (0.2 to 0.4 %). However, in 0.05% and 0.75% percentage germination

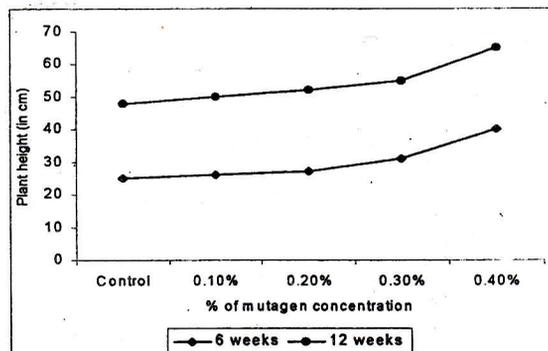
Table 1. Data on germination, plant height and number of branching in *Lycopersicon esculentum*.

Concentration (MMS) %	Germination (%) MMS	Time for germination		Plant height (cm) (MMS) (6 weeks) and (12 weeks)	
		Initiation of germination (days) MMS	Maximum germination (days) MMS	6 weeks (cm)	12 weeks (cm)
Control	70.00	VIII th	XIII th	25	48
0.05	70.00	VIII th	XIII th	25	48
0.75	69.00	VIII th	XIII th	25	48
0.1	75.00	VIII th	XIII th	26	50
0.2	57.33	IX th	XV th	27	52
0.3	44.00	X th	XVI th	31	55
0.4	34.00	XI th	XVI th	40	65

**Fig.1.** Effect of MMS on germination.

was similar to that of control. Time taken for maximum germination in control was 15 ± 1 days and time for initiation was 8th day. Time of initiation and maximum germination in seeds treated with 0.5 and 0.75 was same as that of control, but in seeds treated with 0.2, 0.3 and 0.4% concentration, time of initiation was 9th, 10th, and 11th day, respectively. Maximum germinate time for these concentrations (0.2, 0.3, 0.4%) was 15th, 16th and 16th, respectively.

Plant Height : It is clear from Table 1 that range of variation in plant height, as compared to control, was very less except the height of the plants treated with 0.3% and 0.4% where the increase in height was considerable. High concentrations of MMS increased plant height. In this case

**Fig.2.** Effect of MMS on plant height.

the maximum increase in plant height was recorded in 0.4% concentration in 6 weeks and 12 weeks old plants.

The study indicate that MMS (methyl methane sulphonate) is capable of increasing percentage germination (75%) of *Lycopersicon esculentum* var. pusa early dwarf when compared with the control (70%). However, effect of MMS on initiation time, maximum germination time and height after 6 and 8 weeks was negligible at 0.05, 0.75 and 0.1% concentration, higher than 0.1% (0.2, 0.3% and 0.4%) although increase the height of the plant but decrease the percentage germination and increase the initiation and maximum germination time.

Hence, on the basis of present study, it can be

concluded, that on the whole 0.1% concentration of MMS is the recommended dose for the test plant.

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