

EFFECT OF CHEMICAL MUTAGENS ON SEEDLING GROWTH IN *VIGNA RADIATA* (L.) WILCZEK

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By treating the seeds of mungbean (*Vigna radiata* (L.) Wilczek) var. PDM-11 with 0.01, 0.02, 0.03 and 0.04% concentrations of MMS and HZ, a dose dependent reduction in seedling height was envisaged with increasing concentrations of both the mutagens. HZ was found to be more effective in inducing greater injury to seedling height as compared to MMS.

Keywords: Chemical mutagens; Seedling growth; *Vigna radiata*.

The generation of genetic variability through induced mutagenesis provides a base for strengthening crop improvement programmes. Various classes of physical and chemical mutagens differ in their efficiency in inducing mutations. Ever since the discovery that the mutations could be produced artificially, one of the aims of the mutation studies has been to find out the suitable treatment combinations of the mutagens that could induce higher magnitude of useful mutations. In the present study, an attempt has been made to study the effect of MMS and HZ on seedling growth of mungbean in M_1 .

Uniform and healthy seeds of mungbean (*Vigna*

radiata (L.) Wilczek) var. PDM-11 were presoaked in distilled water for 9 hours prior to treatment with (0.01, 0.02, 0.03 and 0.04 percent) concentrations of MMS (methylmethane sulphonate) and HZ (hydrazine hydrate) for 6 hours. Control was maintained by treating the seeds with distilled water only. Solutions of both the chemical mutagens were prepared in phosphate buffer of pH7. After completion of treatments, the treated seeds were washed thoroughly in running tap water to reduce the residual effect of mutagens sticking to the seed coat. Twenty five seeds from each treatment and control were spread over moist cotton in petriplates and kept in B.O.D. incubator

Table 1. Height of seedlings raised from MMS and HZ treated seeds of mungbean (*Vigna radiata* (L.) Wilczek) var. PDM-11 in M_1 generation.

Treatment	Shoot length (cm)		Root length (cm)		Total length (cm) Mean±S.E.	% age injury
	Mean±S.E.	CV (%)	Mean±S.E.	CV (%)		
Control	6.88±0.07	4.79	3.93±0.05	6.61	10.81±0.12	-
0.01% MMS	6.57±0.08	5.32	3.72±0.05	6.18	10.29±0.13	4.81
0.02% MMS	5.98±0.09	6.69	3.42±0.07	8.77	9.40±0.16	13.04
0.03% MMS	5.50±0.11	7.88	2.98±0.04	6.04	8.48±0.15	21.55
0.04% MMS	5.14±0.21	15.95	2.18±0.05	9.70	7.32±0.26	32.28
0.01% HZ	6.04±0.08	5.63	3.65±0.06	7.67	9.69±0.14	10.36
0.02% HZ	5.91±0.10	8.12	3.28±0.06	7.62	9.19±0.16	14.98
0.03% HZ	5.31±0.06	4.71	2.74±0.07	10.58	8.05±0.13	25.53
0.04% HZ	4.86±0.12	9.05	1.98±0.05	9.64	6.84±0.17	36.72

at 27 ± 1 °C temperature in order to find out the mutagenic effect of both MMS and HZ on seedling growth. Data collected after first seven days of sowing in petriplates was analysed statistically.

In the present study, seedling height after seven days of sowing in petriplates showed a decline over control in the mutagen treated populations. The decrease coincides with the increase in the concentrations of both MMS and HZ. The seedling injury was more drastic at highest concentrations of both the mutagens under study (Table 1). Similar results were observed earlier by Sinha and Singh¹ in lentil and Edwin and Reddy² in triticale. The percentage injury in seedling height ranged from 4.81 to 32.28% in MMS treatments whereas it ranged from 10.36 to 36.72% in HZ treatments (Table 1). HZ caused greater injury to seedling height than MMS. Inhibition in seedling growth was explained due to auxin destruction, changes in ascorbic acid content and physiological and biochemical disturbances³, destruction or damage to apical meristems⁴, temporary suspension of cell division or delay of mitosis⁵ and hampered respiratory enzyme synthesis and reduction in the level of amylase activity⁶. Root is found to be more sensitive than shoot to both the mutagens studied in the present investigation. This indicates that the shoot and root respond differently to the mutagenic treatments. A great deal of shoot growth is due to cell elongation whereas the root growth is more

dependent on cell division⁷.

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