

Investigation of Optimum Dose of Gamma Irradiation and Ems (Single and Combination Treatments) to Induce Mutation in Safflower (*Carthamus tinctorius*) Wild Cultivar

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ABSTRACT

In induced mutation breeding program, it is necessary to find the optimum dose for inducing mutation. Effective dose is vary plant to plant depends on size of seeds. There is inverse relation size of seeds and concentration of mutagen. Parameter of consideration of optimum dose for mutagenesis is germination around 50 % of seeds after mutagenesis is indication of successive mutagenesis. In this mutagenesis investigation 50% seed germination is observed in treatment of gamma irradiation 300 Gy and EMS 0.3 %. Another great decrease in seed germination of 80 % is observed in combination treatments 300 Gy + 0.3 and 400 Gy + 0.3 %.

Keywords- Mutagenesis, Mutagen, Gamma Irradiation, EMS.

I. INTRODUCTION

In mutational breeding program selection of optimum dose of mutagen for suitable crop seeds plays a key role for mutagenesis. Gamma irradiation and EMS are mutagens which is frequently using in induced mutational breeding. Outcomes of results of mutagenesis is completely depend on doses of mutagens and successful mutagenesis can be results in improved qualities in plant vise higher yield, shorter cultivation time, resistance to diseases, pests resistance and resistance of climate

change, increase and improve in oil content and fatty acid composition in oilseed crops.

II. METHODOLOGY

Germination percentage observation: Twenty seeds of Safflower (*Carthamus tinctorius*) wild cultivar treated with distilled water. Within 72 hour 19 seeds out of 20 got germinated, indicating 95 % seed germination. The lots of 10 seeds each were treated with EMS and gamma irradiation and the results obtained on per cent germination are shown in Table 1.

Table. 1: Effect of mutagen treatments.

Mutagens	No. Seed taken	Treatments	Treatment Time	Leaching of EMS With DW	Pre sowing Soaking with DW	Number of seeds germinated	Germination percentage (%)
Control	10	-	-	-	5 hr	10	100
Gamma irradiation	10	200 Gy	1 Gray/min	-	5 hr	02	20
	10	300 Gy	1 Gray/min	-	5 hr	05	50
	10	400 Gy	1 Gray/min	-	5 hr	04	40

EMS	10	0.1 %	08 hr	3.5 hr	-	06	60
	10	0.2 %	08 hr	3.5 hr	-	08	80
	10	0.3 %	04 hr	04 hr	-	05	50
Combination (Gamma ray + EMS)	10	200 + 0.1	07 hr	3.5 hr	-	06	60
	10	200 + 0.2	07 hr	3.5 hr	-	08	80
	10	200 + 0.3	04 hr	04 hr	-	06	60
	10	300 + 0.1	06 hr	3.5 hr	-	04	40
	10	300 + 0.2	06 hr	3.5 hr	-	08	80
	10	300 + 0.3	04 hr	04 hr	-	02	20
	10	400 + 0.1	05 hr	3.5 hr	-	06	60
	10	400 + 0.2	05 hr	3.5 hr	-	06	60
	10	400 + 0.3	04 hr	04 hr	-	02	20

III. CONCLUSION

In this mutagenesis investigation 50% seed germination is observed in treatment of gamma irradiation 300 Gy and EMS 0.3 % indicating mutagenesis. Another great decrease in seed germination of 80 % is observed in combination treatments 300 Gy + 0.3 and 400 Gy + 0.3 % and maximum seed germination 80% is observed in 0.2 %, 200 + 0.2, 300 + 0.2.

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