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Effect of Ethyl Methane Sulphonate on rate of germination and seedling of *Lycopersicum esculentum* seeds

Leena
Department of Botany,
Magadh University, Bodh Gaya,Bihar,India
Email ID – ramleena19@gmail.com

Abstract :
The present study deals with effect of chemical mutagen, Ethyl Methane Sulphonate on seeds of tomato (*Lycopersicumesculentum* Mill.). Tomato is used as vegetable all over the world. Besides its use in cooking it has got some medicinal properties also. It is a very rich source of vitamin C. It is supposed to help in developing immune system of the body. Five different concentrations of the Ethyl Methane Sulphonate were applied as 0.10 percent, 0.20 percent, 0.30 percent, 0.40 percent and 0.50 percent. The effect of Ethyl Methane Sulphonate can stimulate higher germination rate.

Keywords :- Chemical mutagen, Ethyl Methane Sulphonate, Tomato Seeds, Germination rate.

Introduction :-

The purpose of this study is to evaluate the effect of Ethyl Methane Sulphonate on germination rate in seeds of tomato (*Lycopersicumesculentum* Mill.).

Ethyl Methane Sulphonate (EMS) is an alkylating agent. Since the effects of alkylating agent resemble those of ionizing radiations, they are also known as radiomimetic chemicals. The effect of Ethyl Methane Sulphonate has been found to be most encouraging Venkatrajan and Subhash (1983); Wellensiek(1965); Mehra & Mann (1974), Maduli and Mishra (2007); Gaul et al (1966); Kumar and Singh (2003); Adamu and Aliya (2007). Therefore, this chemical has been chosen in our present study as chemical mutagen on seeds of a *Lycopersicum esculentum* Mill. Kumar, Devanand (1995); Chandra and Choudhary (1991); Khan and Verma (2015).

Use of tomato besides cooking has got some medicinal properties also. It is a very rich source of vitamin C, potassium, foliate and vitamin K.

Keeping the above point under consideration, two cultivars named as S-22 and Navoday of tomato available in Gaya Town have been chosen for mutational studies. The mentioned cultivars have been treated with different concentration of Ethyl Methane Sulphonate such as 0.10%, 0.20%, 0.30%, 0.40% and 0.50%. The mentioned treatment was carried out to score different germination rate of seeds. Detail of germination rate and timing of control seeds and treated seed have been observed and noted.

Material & Methods :

Materials for the present investigation include seeds of two cultivars of tomato namely "S-22" and "Novoday" available in Gaya Town. Percentage concentration of EMS given to seeds have been listed in table.

Table-1

Sl. No.	Name of Cultivar	Percentage of Concentration of EMS
1	S-22	0.10%
		0.20%
		0.30%

		0.40%
		0.50%
2	Navoday	0.10%
		0.20%
		0.30%
		0.40%
		0.50%

Six hours regularly. However, before treating seeds with EMS, they were kept in distilled water for 12 hours and after treatment they were washed in running tap water. Finally the seeds were kept in different petri dishes to calculate the germination percentage of seeds of control and treated seeds.

Result and Discussion :-

The effect of Ethyl Methane Sulphonate on germination of two cultivars of *Lycopersicum esculentum* Mill. was observed and certain interesting findings were noted. In S-22 cultivar, the maximum percentage of the seed germination was noted at 0.20% concentration of EMS. Minimum percentage of germination was at the highest concentration i.e. at 0.50% of EMS.

Germination rate in control and EMS treated plants of "S-22" cultivar.

Table-2

Control & treated seed	Total seed taken	No. of days taken by seed for fist germination	Total taken time in seed forming seedling	Total no. of seeds germination upto seedling stage	Percentage rate of germination
Control	100	10 days	30 days	79	79%
EMS Doses					
0.10%	100	11	31	82	82%
0.20%	100	12	32	84	84%
0.30%	100	11	31	81	81%
0.40%	100	13	33	66	66%
0.50%	100	14	34	32	32%

In the other cultivar Navoday the maximum percentage of seed germination was found at 0.30 percent concentration of EMS and minimum percentage of germination was at 0.50% concentration.

Table-3
Germination rate in control and EMS treated plants of "Navoday" cultivar

Control & treated seed	Total seed taken	No. of days taken by seed for fist germination	Total taken time in seed forming seedling	Total no. of seeds germination upto seedling stage	Percentage rate of germination
Control	100	11 days	31 days	77	77%
EMS Doses					
0.10%	100	12	32	79	79%
0.20%	100	13	33	78	78%
0.30%	100	12	32	80	80%
0.40%	100	14	33	59	59%
0.50%	100	14	33	27	27%

Many researchers said that low concentration of Ethyl Methane Sulphonate stimulate high rate of germination and seedling.

Conclusion :

With the help of chemical mutagen plant breeder and agricultural scientist can find out many advantages in future agriculture pattern with the knowledge of various genetic variations which stimulate high percentage of germination and seedling rate.

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