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Mutagenic Effect of Gamma Ray, Ethyl Methane Sulphonate and Sodium Azide on Seedling Height and Survival of Sunflower [*Helianthus annus* L.]

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Abstract: ***Seeds of sunflower [Helianthus annus L.] Bhanu& 55-56 were treated with various concentration of Gammaray [10kR, 20kR, 30kR] Ems [0.05%, 0.10%, 0.15] & [0.01%,0.02%,0.03%] respectively, For studying seedling height [Shoot & root] and survival percentage of plants. In this investigation found that when the increasing concentration of mutagenes the decrease seedling height in compair to control. The data on plant survival in the present studies indicate that the survival percentage decreases with increase the mutagenic treatment***

Keywords: Helianthus Annuus, Seedling Height Servival Percentage

1. Introduction

Sunflower [*Helianthus annus* L.] in one of the few crop species that originated in North America if is world 4 largest oil seed crop its seeds used as food & dried stalk as fuel. The production of sunflower which is the important source of vegetable oil in south Africa, is most prevalent in the summer rainfall areas, sunflower is an annual herb, with a rough, hairy stem, 3 to 12 feet high, broad, coarsely toothed, rough leaves,3 to12 inches long & circular heads flower, 3.to 6 inches wide specimens & often a foot or more in cultivation . The survival of plants at maturing revealed reduced values after the mutagenic treatments. The main aim of thes investigation was a calculate seedling height & survival percentage through induced mutation.

2. Materials & Methods

The experiment was conducted in RBD with three replications at the experimental farm of the Dr. babasaheb Marathwada university, Aurangabad (M.S) India. Three mutagens gamma rays [10kR,20kR,3.kR], ethyl methane sulphonate [0.05%,0.10%,0.15%] & SA [0.01%, 0.02%, 0.03%] were used here. Gamma ray eradicated with co 60. Was given from the Govt. Institute of science, caves road Aurangabad (M.S) India.

The seed of sunflower Bhanu & 55-56 cultivar from dry farming research station, Sholapur 413002(M.S) India. The treated seeds were presoaked in distilled water for 6 hrs. At room temperature followed by 6hrs . Immersed in mutagenic solutions. These seeds were thoroughly washing under running water for 4hrs. 50 seeds were kept in petridishes on blotting paper for counting seedling height (root &shoot) & reaming seed sown a field with distance of 45 cm between the plant & 60 cm between rows.

Seedling height (cm)
Seedling height (root & Shoot) length was measured on 10th days after sowing in petridishes for poilet experiment**.**

Plant survival
The number of plant reaching maturity and producing seed. is known as plank survival.

$$\text{Survival \%} = \frac{\text{No. of Seed Survival}}{\text{No. g seed germination}} \times 100$$

Table 1: Effect of mutagens on seedling height and survival percentage in sunflower . [*Helianthus annus* L.]
Variety –Bhanu.

Mutagen	concen-	Number of seed sown	seedling shoot length (cm)	seedling root length (cm)	seedling total length (cm)	Survival (%)
control	-	50	15.5	11	26.5	88.88
	10 kR	50	15.6	10	25.6	87.23
Gamma ray	20 kR	50	11.28	9.0	20.28	84.78
	30 kR	50	11.03	8.5	19.08	72.34
EMS	0.05%	50	15.01	10	25.01	87.5
	0.10%	50	11.4	7.5	18.09	82.60
	0.15%	50	08.1	7.5	15.06	80.00
	0.01%	50	12.5	6.5	19.00	66.66
SA	0.02%	50	11.2	5.0	16.02	63.63
	0.03%	50	7.8	7.6	15.4	60.60

SE-1.3. SE-3.3

Table 2: Effective of mutagens on seedling height & survivaol percentage in sunflower [*Helianthus annus* L.]
Variety-55-56

mutagen	concentration	Number of seed sown	seedling shoot length (cm)	seedling root length (cm)	seedling total length (cm)	Survival (%)
control	-	50	15.12	10	25.12	91.66
	10 kR	50	13.4	8.75	22.15	87.75
Gamma ray	20 kR	50	12.8	7.00	19.8	83.67
	30 kR	50	9.6	5.0	14.6	83.33
	0.05%	50	12.7	8.5	21.2	86.66
EMS.	0.10%	50	11.4	7.0	18.4	80.43
	0.15%	50	8.6	6.5	15.1	70.21
	0.01%	50	11.8	9.5	21.3	69.44
SA	0.02%	50	9.5	5.5	15	62.85
	0.03%	50	7.8	5.8	13.6	61.76

SE-1.2. SE-3.4

3. Result & Discussion

Seedling height (cm)
In the present investigation seedling height in control plants was (26.5 cm & 25.12 cm) in variety of Bhanu & 55-56 respectively. When the increase doses of gamma ray (1 & 4 table 2) being maximum height was (25.6 cm &22.15 cm) in Gamma ray 10 kr and minimum height was (19.08 cm & 14.6 cm) in Gamma ray 30 kR both variety of sunflower (Jayakumar & selvaraj 2003) decrease in length of root & shoot with increasing dose / concentration of gamma ray & EMS.

EMS & SA mutagen was recorded decrease in seedling height when increase the concentration (table 1 & table 2). The highest seedling height of EMS (25.01 cm & 21.2 cm) in 0.05 % & minimum height was (15.06 cm & 15.01 cm) in 0.15% of EMS.

The same observation noticed by SA. The highest seedling height of SA (19.00 cm& 21.3 cm) 0.01 % & minimum seedling height (15.04 cm & 13.06 cm) in 0.03% SA.

Survival percentage
The data on plant (flowering) in M , generation due to mutagenic treatment in variety of Bhanu & 55-56 was (87.23% & 87.75%) Gamma ray 10 kR respectively. The decrease in survival percentage was associated with increases in the dose concentration (72.34% & 83.33) in Gamma ray 30 kR both variety of sunflower . [Thirugnana kumar (1986)] report that a progressive decrease of gamma ray.

The maximum survival percentage notice EMS (87.5% & 86.66) in 0.05% & lowest percentage (80.00 % & 70.21 %) in 0.15 % of EMS in both variety Bhanu & 55-56 of sunflower .

SA concentration reported that (66.66 % &69.44) highest survival percentage 0.01 SA & lowest percentage (60.60 & 61.76) in 0.03% SA . Decrease in survival percent due to mutagenic treatments was reported by Kulkarni (1978) Rudraswami (1983), & Dalvi (1990) in horse gram, Auti (2005), Barshile (2006).

4. Conclusion

Due to increasing doses /concentration decreases seedling seedling height & survival percentage .

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