

## Influence of gamma rays and ethyl methane sulphonate on germination and seedling survival in sesame (*Sesamum indicum* L.)

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### SUMMARY

An investigation was carried out to study the influence of gamma rays and EMS (Ethyl methane sulphonate) on germination and seedling survival in *Sesamum indicum* L. Two sesame varieties were treated with gamma rays  $^{60}\text{Co}$  source with doses of 10,20,30,40 and 50 krad followed by Ethyl methane sulphonate with concentrations of 0.8, 1.0, 1.2, 1.4 and 1.6 per cent. The  $\text{LD}_{50}$  values based on germination reduction in the  $M_1$  generation were fixed at 30krad and 1.2 per cent for gamma rays and EMS, respectively. The seed germination percentage was reduced more under chemical mutagen than under physical mutagen treatment. Survival rate was less in cardeboriga when compared to SVPR 1, irrespective of mutagens. The percentage of seed germination, shoot length and root length decreased progressively with increasing dose/concentration of both the mutagens in both the varieties. In  $M_1$  both gamma rays and EMS produced deleterious effect on seedling survival.

**Key words :** Sesame, Seeds, Gamma ray, Ethyl methane sulphonate, Germination and seedling survival

The improvement of a cultivar is usually accomplished by adding one or two desirable attributes to the initial strain and if these desirable characters happened to be introduced by mutagens, it is certainly the simplest means to achieve the breeding objectives (Moe and Han, 1973). The inhibition of seed germination in  $M_1$  generation was the indication of degree of radio sensitivity of different genotypes and the extent of damage caused by the mutagens (Gaul, 1958). During early phase, the seedlings adjust or repair themselves to eliminate the dead and unwanted cells. On the other hand, some of the seedlings were not able to overcome the radiation damage and they die before they put forth any side effects. The present experiment was carried out to study the influence of gamma ray and ethyl methane sulphonate on germination and seedling survival in sesame and to provide scientific basis for sesame mutation breeding.

### MATERIALS AND METHODS

Two promising sesame genotypes namely, SVPR

1 (ruling popular white seeded type) and Cardeboriga (monostem African type) were treated with the two mutagens viz., gamma rays and EMS. Two hundred well filled dry seeds were sealed in butter paper covers and exposed to 10 to 50 krad doses of gamma rays from  $^{60}\text{Co}$  source at Indira Gandhi Centre for Research, Kalpakkam, Tamil Nadu. Another variety of two hundred seeds of each variety, for each treatment were presoaked in distilled water for four hours then treated with different concentrations of EMS ranging from 0.8 to 1.6 per cent for three hours. After the treatment, the seeds were thoroughly washed with tap water ten times.

### Laboratory studies:

From the gamma irradiated and chemical treated seeds, 100 seeds were placed in the moist germination paper replicated twice for the purpose of laboratory analysis, respectively. The following observations namely, (i) Seed germination, (ii) Shoot length (iii) Root length and (iv) Vigour index were recorded.

### Seed germination:

Germinated seeds were counted from third to seventh day. Emergence of cotyledonary leaf was taken as the indication of germination. Germination percentage was worked out in each treatment in each genotype separately.

### Shoot length:

The length of the shoot from the cotyledonary node to the tip of the shoot was measured on ten randomly

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