



RESEARCH ARTICLE

# Effect of EMS and SA on Pollen sterility in *Vigna radiata* (L.) Wilczek (Mung bean).

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## ABSTRACT

The seeds of *Vigna radiata* (L.) Wilczek (Mung bean) variety was treated with the chemical mutagens viz EMS and SA to study pollen sterility. EMS with 0.05%, 0.10%, 0.15% concentrations and Sodium azide with 0.01%, 0.02%, 0.03% concentrations. Pollen sterility is directly proportional to concentrations ie. increase in concentrations increases pollen sterility.

**Keywords:** Effect of EMS & SA., *Vigna radiata* (L.) Wilczek, Pollen Sterility, Mung bean.

## INTRODUCTION

Mutation breeding is one of the most useful technique to induce mutations in plant system. It used to introduce novel character in plant. Mutagen used are of two types those are physical and chemical mutagens. Mutagen before using LD 50 is determined to check the effect of mutagen on organism. Different criterion used to study the efficiency and effectiveness of it. Mutagenic efficiency is scored by observing genetic damage as mutagenic effectiveness is response of genotype to the different doses of mutagen ( Mohd Rafiq Wani *et.al.*, 2011) efficiency is depend on doses of mutagens administered in seeds. Mung bean is one of the most consumed protein source in the world.

## MATERIALS AND METHODS

Healthy and dry seeds of variety *Unnati* were selected for mutagenic treatments. These mutagenic treatments which were given to the seeds by using chemical mutagens administered at room temperature of 25 ± 2°C. Seeds were soaked in distilled water for six hours. These presoaked seeds were then treated with mutagen solutions for twelve hours and then treated seeds were washed thoroughly with distilled water. These seeds were soaked in distilled water after mutagenic treatments. To facilitate uniform absorption volume of chemical mutagenic solutions used was five times more than that of seeds which makes them fully submerged in it. Seeds soaked in 12 hours in distilled water were used as control. For mutagenic treatments different concentrations were prepared. In SA they were 0.01%, 0.02%, and 0.03% and in EMS 0.05%, 0.10%, and 0.15%. 400 seeds were used for each treatment with three replications. Randomized block design was used to sow seeds.

Pollen sterility was studied in twenty (20) randomly selected plants of each mutagenic treatment. From freshly dehisced anthers pollen grains were collected and stained with acetocarmine. Pollen grains which stained fully were counted as fertile while the shrivelled ones and partially stained pollens were considered as sterile.

## RESULTS AND DISCUSSION

The pollen sterility in control recorded was 4.7%. The highest value of pollen sterility was observed in 11.52% in 0.15%, lowest in 0.05% and 9.86% in 0.10% concentrations of EMS. In Sodium azide it was recorded that lowest value was 5.22% in 0.01%, highest value 8.62 in 0.03%. In 0.02% it was observed as 7.81%. Mutation breeding introduces more genetic variability in the plants like mung bean which contains limited genetic variability (Auti, 2012). The most common factor of mutagen induced sterility is chromosomal aberrations and hence the common form of sterility is the occurrence of nonfunctional gametes (S. Ignacimuthu & C. R. Babu 1989). Pollen sterility is a way to study the efficiency of mutagens. Pollen sterility increase when concentration of mutagen increased. It was recorded by S Ignacimuthu and C. R. Babu (1989) in different species of *Vigna* or *Vigna sublobata*, *Vigna radiata* and *Vigna mungo*. They observed trends that increased pollen sterility was dose-dependent increase which is also related to increase in the meiotic chromosomal aberrations. Such relationship was proved highly significant. Kashid and Kulthe (2011) in Okra varieties *Arka Anamika* and *Parbhani Kranti* recorded that when used chemical mutagens pollen sterility increased as concentration increased. Pollen sterility is an index of disturbances in reproductive machinery increased as dose of Gamma rays increases in Chilly (Rao *et al* 1991) as well as in Okra (Nandapuri *et al* 1971). Kothekar & Dnyansagar (1985), reported the increase in pollen sterility by ionizing radiations. Pollen sterility is

induced by chemical mutagenic treatment also has been recorded by Gaul *et al* (1966), Kothekar (1978), Deshpande (1980) and Hakande (1992) in different plant systems.

## CONCLUSION

From above results and discussion it is concluded that EMS is more effective mutagen than Sodium azide. As the concentration of Mutagenic treatment increased pollen sterility increases.

Table 1: Pollen sterility in % induced by EMS and SA

Mutagen	Concentrations	Pollen sterility in%
Control	-	04.70%
EMS	0.05%	06.61%
	0.10%	09.86%
	0.15%	11.52%
SA	0.01%	05.22%
	0.02%	07.81%
	0.03%	08.62%

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