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## Effect of gamma rays on quantitative characters of chilli in $M_1$ generation

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### Abstract

Present study was carried out in chilli where mutation was induced through physical mutagen (gamma rays). Treated seeds with gamma rays had significantly reduced the germination percentage, plant height, number of branches, number of fruits per plant, diameter and length of fruit, green fruit yield per plot with increases in concentration of gamma rays treatments over the control treatment. Increase in dose of mutagen was found delay in first flowering and fruit set as compared to the control treatment in  $M_1$  generation.

**Keywords:** Gamma rays, Chilli

### Introduction

Chilli is a spice cum vegetable crop of commercial importance, characterized by tempting colour and biting pungency. No dish will fulfill without this spice in India. India is blessed with a plethora of chilli varieties which are as fresh green fruits, fresh red fruits, and dried red fruits or processed in to chilli paste, chilli powder, oleoresin etc. The fruit quality is determined in terms of nutrient contents of B, P, Fe, Mg, Si, Mn, Al, Ca and Cu. The chilli is an important condiment of high commercial value and also medicinal values containing antioxidant properties, anti-cancerous and many other properties.

Mutations are the tools and being used to study the nature and basis of plant growth and development, thereby producing raw materials for genetic improvement of crops. Various mutagenic agents are used to induce favorable mutations at high frequency that include ionizing radiation. Gamma rays are ionizing physical mutagens, capable of inducing mutation in plants and animals. Gamma rays are electromagnetic radiations, similar to X-rays in their physical characteristics and have an action on the organism. They are of very short wavelength by virtue of which they are more penetrating.

### Material and Methods

The investigation entitled, "Effect of gamma rays on quantitative characters of chilli in  $M_1$  generation" was carried out at AICRP on Vegetable Crops, Department of Horticulture, Mahatma Phule Krishi Vidyapeeth, Rahuri during 2014-2015. The selected seeds of Chilli cv. Phule Jyoti (15 g for each treatment) were treated with different doses of gamma rays viz. 100, 200, 300 and 400 Gy at Bhabha Atomic Research Centre, Trombay, Mumbai.

### Result and Discussion

In  $M_1$  generation the data revealed that, irradiation of chilli seeds with gamma rays treatment had significantly reduced the germination percentage, plant height over the control treatment. The branches per plant were decreased in all the treatments as against the control treatment. The data clearly indicated that, the gamma rays significantly influenced the days to first flowering and first fruit set. Increase in dose of mutagen was found delay in first flowering and fruit set as compared to the control treatment. The data recorded in respect of fruits per plant as influenced by different mutagenic treatments. Maximum length and diameter of fruit was recorded in control treatment. The green fruit yield per plot (kg) was found to be reduced significantly as compared to the control treatment in  $M_1$  generation.

**Table 1:** Effect of gamma rays on quantitative characters in chilli

Treatment of Gamma rays	Germination (%)	Plant height (cm)	Number of branches per plant	Days to first flowering	Days to first fruit set	Number of fruits per plant	Diameter of fruit (cm)	Length of fruit (cm)	Green fruit yield per plot (kg)
T <sub>1</sub> : 100Gy	89.70	71.63	8.07	41.47	52.63	700.33	0.95	9.35	50.89
T <sub>2</sub> : 200Gy	82.33	69.63	7.78	44.30	54.60	656.33	0.90	9.09	46.85
T <sub>3</sub> : 300Gy	80.40	65.43	7.22	46.57	56.83	620.00	0.85	8.65	42.65
T <sub>4</sub> : 400Gy	77.47	62.97	6.81	48.30	59.10	557.33	0.83	7.55	40.57
T <sub>5</sub> : Control	91.80	74.00	8.13	40.90	51.60	708.67	0.99	9.82	52.83
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)±	0.07	0.11	0.04	0.08	0.08	0.45	0.005	0.03	0.08
CD at 5%	0.22	0.36	0.12	0.25	0.24	1.36	0.014	0.11	0.25

### Conclusion

The doses of Gamma rays (100 Gy gamma rays) was observed to be most effective and efficient in inducing the variability for the characters like plant height, number of branches per plant, number of fruits per plant, days to first flowering and fruit set, length and diameter of fruit, green fruit yield per plot.

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