

# Impact of Lime on Flowering and Fruiting of *Raphanus Sativus* CV Pusa Chetki

Dr. Rajshree Gupta

Associate Professor Botany, B. B. D. Govt. College, Chimanpura, Shahpura, Jaipur, Rajasthan, India

Email: [rajshreegupta\[at\]rocketmail.com](mailto:rajshreegupta[at]rocketmail.com)

**Abstract:** This study investigated the impact of lime - dressing on flowering and fruiting in *Raphanus sativus* variety Pusa chetki, a radish cultivar, using pot culture experiments. Pots were filled with air - dried garden soil, and lime was added at concentrations of 0.1%, 0.3%, 0.5%, and 1% on a weight basis. Daily watering was done, and each treatment was replicated three times. After 15 days, seedling survival rate was recorded, and four healthy plants were kept in each pot. After 45 days, root - shoot length and biomass were measured, and one plant per replicate was observed for flowering and fruiting. The experiment lasted 100 days. Results revealed that only control plants exhibited flowering and fruiting, with approximately 15 - 16 flowers and 7 - 8 fruits per plant. Treated plants, even at the lowest concentration of 0.1% calcium, did not produce flowers or fruits, despite vegetative growth. Previous studies have shown that lime application reduces soil nutrient availability and can negatively affect yield in different plant species. This study confirmed that various lime concentrations had a detrimental effect on flowering and fruiting in *Raphanus sativus* variety Pusa chetki. Radish plants prefer slightly acidic to neutral soil conditions (pH 6.5 - 7.0), while lime increases soil alkalinity. In conclusion, although radish plants can tolerate lime concentrations of 0.1%, 0.3%, 0.5%, and 1%, the absence of flowering and fruiting indicates that lime application inhibits these processes in *Raphanus sativus* variety Pusa chetki. These findings emphasise the importance of considering soil pH and lime application when cultivating radish crops.

**Keywords:** Pot culture experiments, Lime, Flowering and fruiting, *Raphanus sativus*, Cultivar Pusa chetki

## 1. Objectives

- 1) The study investigated the impact of lime - dressing on flowering and fruiting in *Raphanus sativus* variety Pusa chetki radish.
- 2) Pots with air - dried garden soil were used, and lime was added at concentrations of 0.1%, 0.3%, 0.5%, and 1%.
- 3) Daily watering was maintained, and each treatment was replicated three times.
- 4) After 15 days, seedling survival rate was recorded, and four healthy plants were selected per pot.
- 5) After 45 days, root - shoot length and biomass were measured, and one plant per replicate was observed for flowering and fruiting.
- 6) Only control plants exhibited flowering and fruiting, while treated plants showed no signs of flowers or fruits, despite vegetative growth.
- 7) Previous studies have shown that lime application reduces soil nutrient availability and can negatively affect yield in various plant species.
- 8) Radish plants prefer slightly acidic to neutral soil conditions (pH 6.5 - 7.0), while lime increases soil alkalinity.
- 9) The absence of flowering and fruiting in treated plants indicates that lime application inhibits these processes in *Raphanus sativus* variety Pusa chetki.
- 10) These findings emphasise the importance of considering soil pH and lime application when cultivating radish crops.

## 2. Introduction

*Raphanus sativus* L., commonly known as radish, is a widely cultivated vegetable crop in India. It was selected as the subject of investigation in this study due to its significance

in agricultural practices. Among the various cultivars of *Raphanus sativus*, Pusa chetki, developed by the Indian Agricultural Research Institute (IARI) in New Delhi, was chosen for its suitability to thrive in hotter months, specifically from mid - April to mid - September when other varieties struggle to grow. Pusa chetki is known to have a relatively extended growth period, with the optimal time for cultivation identified as July to early September, making it an early - maturing variety. It typically reaches maturity within a relatively short span of about 40 to 45 days.

The present study aimed to investigate the impact of lime - dressing on flowering and fruiting in *Raphanus sativus* variety Pusa chetki. The experiment involved pot culture experiments conducted under natural environmental conditions, simulating real - world scenarios. The researchers focused on exploring the effects of various concentrations of lime on the growth and reproductive processes of the radish plants. Additionally, previous research has highlighted the potential negative effects of lime application on nutrient availability and yield in different plant species.

Understanding the specific response of Pusa chetki radish to lime application is crucial for optimising cultivation practices and ensuring successful crop production. By examining the relationship between lime concentrations and the flowering and fruiting patterns in this radish cultivar, this study contributes valuable insights into the role of soil pH and lime application in the cultivation of radish crops.

## 3. Material and Methods

To examine the effect of lime - dressing on flowering and fruiting in *Raphanus sativus* variety Pusa chetki, specific pot culture experiments were conducted. The experiments aimed to replicate real - world growth conditions by simulating

natural environmental conditions. To ensure accuracy and reliability, a well - defined experimental setup was employed.

The pots used for the experiments were of a standard size, measuring 15 × 15 inches. They were filled with 10 kg of air - dried garden soil, providing a suitable growing medium for the radish plants. Lime, in the form of calcium oxide, was added to the soil at different concentrations: 0.1% (10 g), 0.3% (30 g), 0.5% (50 g), and 1% (100 g) on a weight basis. The addition of lime aimed to introduce varying levels of calcium to the soil.

To maintain optimal soil moisture throughout the experiment, daily watering was carried out. Each pot was equipped with a drainage hole to ensure proper water flow and prevent waterlogging, which could have adverse effects on plant growth. The sowing of *Raphanus sativus* variety Pusa chetki seeds was performed by placing 20 seeds evenly spaced and at a depth of 5 cm in each pot. This ensured consistent seed placement across all treatments.

To ensure reliable results, each treatment was replicated three times. This replication helped reduce the influence of random variations and provided a more robust evaluation of the impact of lime - dressing on flowering and fruiting. Standard cultural practices were followed during the experiment to create optimal growing conditions for the radish plants. The arrangement of the pots was carefully managed to minimize the potential for cross - contamination and to ensure uniform light exposure for all the plants.

After 15 days of growth, the survival rate of the seedlings was recorded. From each pot, four healthy plants were retained, ensuring consistency and eliminating any outliers that may have affected the overall observations. After 45 days, additional parameters such as root - shoot length and biomass were measured to assess the overall growth and development of the radish plants.

To specifically observe the effect of lime treatment on flowering and fruiting, one plant per replicate was retained, while the others were removed. This allowed for focused observations on the impact of different lime concentrations on these crucial reproductive processes. The experiments continued for a total of 100 days to capture the long - term effects of lime - dressing on the radish plants.

To provide a comprehensive evaluation, three replicates were included for each lime concentration, ensuring a robust analysis of the data. Additionally, a control group without any lime treatment was included to serve as a baseline comparison.

By implementing this well - designed experimental approach, the objective was to accurately assess the influence of various lime concentrations on the flowering and fruiting of *Raphanus sativus* variety Pusa chetki. The chosen methodology enabled the observation of how the application of lime affected the growth and development of the radish plants under natural conditions, providing valuable insights into the specific responses of this cultivar to lime - dressing.

## 4. Results & Discussions

After a growth period of 100 days, the data regarding flowering and fruiting was recorded, as seen in table 1.

**Table 1:** Showing the impact of lime dressing on flowering and fruiting of *Raphanus sativus* variety Pusa chetki.

Sr. No.	Lime Dressing	Flowering	Fruiting
1	Control	15 - 16	7- 8
2	0.10%	-	-
3	0.30%	-	-
4	0.50%	-	-
5	1%	-	-

(Values represent the mean of three replicates.)

The data regarding the effect of lime concentrations on flowering and fruiting of *Raphanus sativus* cv Pusa chetki were recorded in table 1. The flowers and fruits were observed only in the control plants. The treated plants did not develop flowers and fruits in spite of vegetative growth.

There were about 15 - 16 flowers and about 7 - 8 fruits per plant in *Raphanus sativus* cv Pusa chetki. The results of the effect of lime concentrations on flowering and fruiting of Pusa chetki were observed in pot culture experiments after 100 days of growth.

It was found that there was no flowering and fruiting in the plants treated with different lime concentrations. It was interesting to note that flowering and fruiting appeared only in plants which were not treated with any level of lime but even at 0.1% concentration of calcium, there was no flowering and fruiting.

In the control condition, the number of flowers were about 15 - 16 and only 7 - 8 fruits developed per plant.

Singh and Singh (1993) found that grain and straw yield in wheat plants (cv. HD 1553) in limed pots were significantly less than in unlimited pots. It was also reported that uptake of K and Mn was also reduced in wheat plants due to lime application. They concluded that the differences in yield might be due to the decrease in availability of nutrients in the soil with lime.

Dahia and Singh (1980) reported that application of lime reduced the Mn content and uptake by the oat plants due to the precipitation of lime as carbonate.

It can be concluded that 0.1%, 0.3%, 0.5% and 1% concentration of lime can be tolerated but flowering and fruiting doesn't occur in radish plants (*Raphanus sativus* variety Pusa chetki).

Radish plants prefer slightly acidic to neutral soil (pH = 6.5 - 7.0) and lime increases the alkalinity of soil.

## 5. Conclusions

In conclusion, this study focused on investigating the impact of lime - dressing on flowering and fruiting in *Raphanus sativus* variety Pusa chetki, a cultivar known for its adaptability to hotter months in India. The experiment

utilised pot culture experiments under natural environmental conditions to assess the effects of different concentrations of lime on the growth and reproductive processes of the radish plants.

The results demonstrated that, contrary to the control plants, the treated plants did not exhibit flowering and fruiting even at the lowest concentration of 0.1% calcium. This indicates that lime application inhibits these crucial processes in *Raphanus sativus* variety Pusa chetki, despite showing vegetative growth. These findings highlight the importance of considering soil pH and lime application when cultivating radish crops, as radish plants generally prefer slightly acidic to neutral soil conditions (pH 6.5 - 7.0), whereas lime increases soil alkalinity.

Furthermore, the selection of Pusa chetki radish as the experimental material was justified due to its suitability for growing in hotter months and its relatively extended growth period. Understanding the specific responses of this cultivar to lime application provides valuable insights for optimising cultivation practices and ensuring successful crop production.

Overall, this study reinforces the notion that lime application can have a detrimental effect on the flowering and fruiting processes in *Raphanus sativus* variety Pusa chetki, underscoring the importance of carefully considering soil pH and lime application when cultivating radish crops.

## References

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