

# Study The Effect of *Bacopa Monnieri* (L) Pennell Roots-Soaked Water on The Growth of Some Legumes

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**Abstract:** This study investigated the growth-promoting effects of *Bacopa monnieri* root extract on legume plants. *Bacopa monnieri*, a renowned Ayurvedic herb, possesses cognitive-enhancing properties. In this experiment, *Bacopa monnieri* roots were soaked in water to extract their bioactive compounds. The resulting extract was then used to irrigate legume plants. Growth parameters, including shoot length, root length, and biomass, were measured to evaluate the impact of the *Bacopa monnieri* root extract on legume growth.

**Keywords:** *Bacopa monnieri*, roots, growth, Legumes.

## 1. Introduction

Legumes are an important group of plants that play a crucial role in agriculture and food security. They are known for their ability to fix nitrogen in the soil, which can improve soil fertility and reduce the need for synthetic fertilizers. However, legumes can also benefit from the application of natural plant extracts that contain bioactive compounds with growth-promoting properties. *Bacopa monnieri* is one such plant that has been reported to have various bioactive compounds, including saponins, alkaloids, and flavonoids, which have been shown to have beneficial effects on plant growth. These compounds can enhance plant resilience and growth rates by improving nutrient uptake and stress tolerance. The application of natural plant extracts like *Bacopa monnieri* could complement the benefit that legumes provide in agricultural systems by further enhancing their growth and productivity.

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## 2. Methods

### A. Collection and Preparation of *Bacopa Monnieri* Extract

Fresh roots of *Bacopa monnieri* were collected and soaked in distilled water for 24 hours to extract bioactive compounds. The resulting water, referred to as *Bacopa monnieri* root-soaked water, was used

### B. Experimental Setup

Legume seeds from five species—soybeans (*Glycine max*), chickpeas (*Cicer arietinum*), common beans (*Phaseolus vulgaris*), kidney beans (Rajma), and lentils (*Lens culinaris*, commonly referred to as moong)—were selected for the study. A total of 20 seeds per legume species were used, with 10 seeds assigned to the treatment group and 10 seeds to the control group as the treatment solution for the experiment.

### C. Seed Treatment and Germination

Seeds in the treatment group were sprayed with *Bacopa monnieri* root-soaked water, while the control group seeds were sprayed with regular tap water. The seeds were monitored during germination to observe any differences in growth onset.

### D. Potting and Watering

Once germinated, seedlings from both groups were potted separately. Each plant was watered daily with 20 mL of its respective solution (*Bacopa monnieri* root-soaked water for the treatment group and tap water for the control group).

### E. Growth Monitoring and Data Collection

Growth parameters were measured at regular intervals over a period of four weeks. These parameters included:

- **Shoot length:** Measured from the base of the stem to the apex.
- **Root length:** Measured from the root collar to the tip of the longest root.
- **Biomass:** Measured as the dry weight of the plant after

Table 1  
1 Effect on seed germination(10 seed are selected for sample) average

Sample↓/parameters→	Treated with Bacopa monnieri root-soaked water	Treated with normal tap water
1 Soybeans	02	None
2 Chickpeas	None	None
3 Beans	04	None
4 Rajma	None	None
*5 Lentils(moong)	10	10

Table 2  
Effect on root length (average) in cm

Sample↓/parameters→	Treated with Bacopa monnieri root-soaked water	Treated with normal tap water
1 Soybeans	2.75	00
2 Chickpeas	00	00
3 Beans	10.25	00
4 Rajma	00	00
5 Lentils(moong)	8.93	4.7

Table 3  
Effect of leaves appearance (in days)

Sample↓/parameters→	Treated with Bacopa monnieri root-soaked water	Treated with normal tap water
1 Soybeans(02plants)	13	20
2 Chickpeas	00	00
3 Beans(04 plants)	10	15
4 Rajma	00	00
5 Lentils(moong)(10 plants)	05	07

Table 4  
Effect on stem of legumes

Sample↓/parameters→	Treated with Bacopa monnieri root-soaked water	Treated with normal tap water
1 Soybeans(02plants)	(healthy and long) Double growth	(Small and thin stem) Retarded growth
2 Chickpeas	-	-
3 Beans (04 plants)	(healthy and long) Double growth	Small and thin stem) Retarded growth
4 Rajma	-	-
5 Lentils(moong)(10 plants)	(healthy and long) Double growth	Small and thin stem) Retarded growth

drying at a constant temperature.

The experiment was conducted under controlled environmental conditions to minimize variability.

### 3. Observation

Effect on different parameters is noted after every 24 hours interval and recorded data is explained with the help of tables and charts, are shown be

Table 1 to 4 and Fig. 1 to 3 shows the overall observation from day 1 to continuously till 4<sup>th</sup> week.

### 4. Results

The results of the experiment showed that the legume plants watered with Bacopa monnieri roots-soaked water exhibited significantly higher growth compared to the control group. The shoot length, root length, and biomass of the legumes were all significantly greater in the Bacopa monnieri-treated plants. This suggests that the bioactive compounds present in Bacopa monnieri roots-soaked water have a positive effect on the growth of legume plants

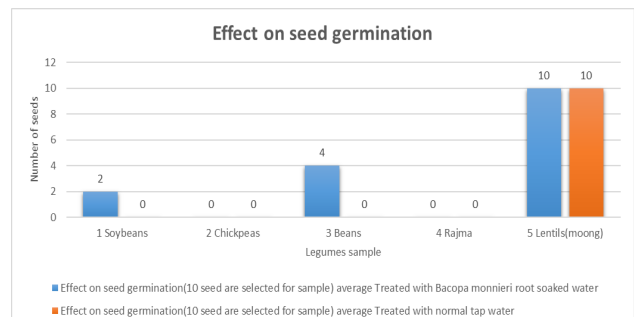


Fig. 1. Effect on seed germination(10 seed are selected for sample) average

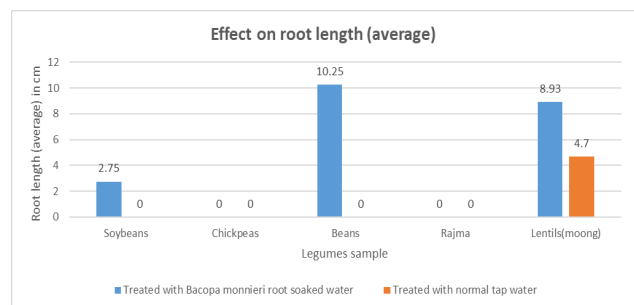


Fig. 2. Effect on root length (average) in cm

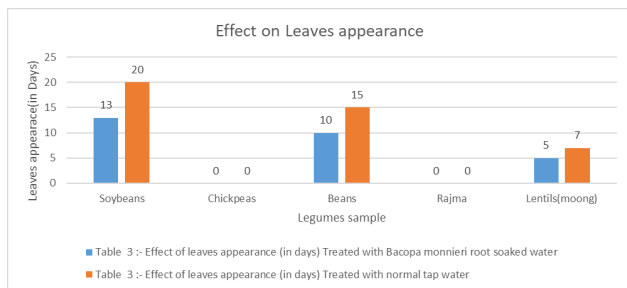


Fig. 3. Effect on Leaves appearance (in days)

## 5. Conclusion

In conclusion, the results of this study demonstrate that *Bacopa monnieri* roots-soaked water has a beneficial effect on the growth of some legumes. The bioactive compounds present in *Bacopa monnieri* roots-soaked water appear to promote the growth of legume plants, as evidenced by the increased shoot length, root length, and biomass of the treated plants. Further research is needed to identify the specific bioactive compounds responsible for this growth-promoting effect and to determine the optimal concentration of *Bacopa monnieri* roots-soaked water for maximum growth enhancement in legume plants.

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