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EFFICIENCY OF COW URINE AS A PLANT GROWTH ENHANCER IN *CAJANUS CAJAN* (L.) Huth.

Seema Kuralkar and Mrunalini Tekam
Department of Botany, Institute of Science, Nagpur
Email: seemabodkhe73@gmail.com

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ABSTRACT:
Cow urine, an important component of Panchagavya, has been traditionally used in Indian agriculture and medicine due to its nutrient-rich composition and bioactive properties. The present study was conducted to evaluate the effect of different concentrations of cow urine (1%, 2%, 3%, 4%, and 5%) on the growth and phenotypic characteristics of *Cajanus cajan* (L.) Huth. under pot culture conditions. Cow urine was applied as an irrigation treatment, while distilled water served as the control. Growth parameters were recorded at 15 and 30 days after sowing. Results showed a concentration-dependent increase in plant growth. The 5% treatment recorded the highest plant height, root length, and shoot length at both stages compared to the control. Overall, cow urine significantly enhanced plant vigor and growth performance. The findings suggest that cow urine is an effective, eco-friendly bioenhancer and can be used as a sustainable alternative to chemical fertilizers in agriculture.

Keywords: *Cajanus cajan*, Cow urine, Plant growth enhancer, panchagavya, sustainable agriculture

INTRODUCTION

Traditional knowledge systems have long recognized the therapeutic and agricultural significance of natural resources, among which cow-derived products occupy a central role in Indian culture. The cow has been revered as a vital component of sustainable living and is often described as a “mobile medical dispensary” in ancient literature. Cow urine, one of the key constituents of *Panchagavya* (a traditional formulation comprising milk, curd, ghee, dung, and urine), has been extensively documented in classical Ayurvedic texts such as the *Charaka Samhita*, *Sushruta Samhita*, *Atharva Veda*, *Bhavaprakasha*, and other ancient scriptures. These texts highlight its use in treating a wide spectrum of ailments and emphasize its importance in maintaining health and ecological balance.

Historically, the use of cow urine in India dates back to the Vedic and possibly pre-Vedic periods, where it was considered both sacred and medicinal. Beyond its therapeutic applications, cow urine has gained considerable attention in agriculture and allied sectors due to its eco-friendly and sustainable properties. It is a rich source of essential macro- and micronutrients, including nitrogen, phosphorus, potassium, calcium, magnesium, chloride, and sulphate. Its application has been reported to improve soil structure, enhance nutrient availability, correct micronutrient deficiencies, and increase fertilizer use efficiency. Furthermore, cow urine is believed to contain growth-promoting substances that function similarly to plant hormones, thereby positively influencing plant growth and productivity.

Recent scientific investigations have validated several traditional claims regarding cow urine. It contains both volatile and non-volatile compounds that exhibit significant antimicrobial and antioxidant activities. Studies have shown that purified and photoactivated cow urine demonstrates inhibitory effects against drug-resistant microbial strains and can act as a

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bioenhancer, improving the efficacy of certain antimicrobial drugs (Runa et al., 2019).

In agricultural applications, cow urine and its formulations such as Panchagavya have been shown to support sustainable crop production. Panchagavya is known to harbor beneficial microorganisms, including lactic acid bacteria, yeasts, actinomycetes, photosynthetic bacteria, and fungi, which collectively enhance soil fertility and plant growth. Shailaja et al. (2014) reported that cow urine and dung can improve the insecticidal properties of Panchagavya, thereby reducing reliance on chemical pesticides. Similarly, Jandaik et al. (2015) demonstrated the antifungal activity of cow urine against plant pathogens such as *Fusarium oxysporum*, *Rhizoctonia solani*, and *Sclerotium rolfsii*.

Several studies have further explored the role of cow urine as a plant growth enhancer. Pradhan et al. (2016) reported improved nutrient uptake and growth in Indian mustard following cow urine application. Kalyani et al. (2018) observed enhanced growth in fenugreek plants treated with varying concentrations of cow urine, while Gottimukkala et al. (2019) highlighted its dual role as a growth promoter and antimicrobial agent across multiple crops, including maize, wheat, and basil. Jegoda et al. (2019) demonstrated increased yield and growth parameters in green gram, and Karale et al. (2020) emphasized its potential as an organic fertilizer and sustainable agricultural input. Furthermore, studies by Kumar and Singh (2020) and Singh et al. (2015) reported improved physiological parameters and growth in crops like maize, while Sharma et al. (2016) noted enhanced chlorophyll content and photosynthetic efficiency with Panchagavya application.

More recent investigations have continued to validate its agricultural importance. Ansar (2020) identified optimal concentrations of cow urine for maximizing mustard yield, and Choudhary et al. (2021) demonstrated improved growth and quality in moth bean. Archana and Seran (2023) further highlighted its synergistic effects when combined with other organic inputs in enhancing crop yield. Given its extensive traditional usage and growing scientific validation, cow urine emerges as a promising bioresource with multifaceted applications in healthcare and agriculture. Therefore, the present study aims to evaluate its antimicrobial potential and its effectiveness as a plant growth promoter, thereby bridging traditional knowledge with modern scientific approaches.

MATERIAL AND METHODS

A pot culture experiment was conducted to evaluate the effect of different concentrations of cow urine on the growth of *Cajanus cajan* (L.) Huth. (pigeon pea). The study was conducted under controlled environmental conditions, with garden soil used as the growth medium..

Collection and Preparation of Cow Urine

Fresh cow urine was collected from a healthy indigenous cow in a clean container. The collected urine was filtered through Whatman No. 1 filter paper to remove debris and suspended particles. The filtrate was stored in an airtight container at 4°C until further use.

Preparation of Treatments

Different concentrations of cow urine were prepared by diluting it with distilled water as follows:

- Control treatment consisted of 100 ml distilled water without cow urine.
- 1%: 1 ml cow urine + 99 ml water
- 2%: 2 ml cow urine + 98 ml water
- 3%: 3 ml cow urine + 97 ml water
- 4%: 4 ml cow urine + 96 ml water
- 5%: 5 ml cow urine + 95 ml water

Seed Material and Sowing

Healthy and uniform seeds of pigeon pea (*Cajanus cajan*) were obtained from a local market in Nagpur, Maharashtra. The seeds were soaked in distilled water overnight to enhance germination.

Irrigation and Treatment Application

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The pots were irrigated twice daily with their respective treatment solutions. Control pots were irrigated with tap water. Each treatment was maintained under similar environmental conditions to ensure uniformity.

Growth Parameters and Sampling

After germination, seedlings were allowed to grow under normal conditions. At intervals of 15 and 30 days after sowing, three seedlings from each treatment were carefully uprooted without disturbing the root system. The following growth parameters were recorded:

- Plant height (cm)
- Root length (cm)
- Shoot length (cm)
- Number of leaves
- Number of branches
- Fresh weight of the plan

RESULT & DISCUSSION:

A pot culture experiment was conducted to evaluate the effect of different concentrations of cow urine on the growth of *Cajanus cajan* (L.) Huth. (pigeon pea). The study was conducted under controlled environmental conditions, with garden soil used as the growth medium..

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CONCLUSION:

The non-toxic nature of cow urine, composed of approximately 95% water, 2.5% urea, and 2.5% minerals, salts, hormones, and enzymes, makes it an eco-friendly alternative to synthetic agrochemicals. The findings of the present study reinforce the potential of cow urine as a sustainable agricultural input that can enhance crop productivity while maintaining environmental safety. Overall, the study highlights the effectiveness of cow urine as a natural bioenhancer and supports its integration into organic farming practices.

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Treatment	Root Length (cm)	Shoot Length (cm)	Branch	Leaf	Plant Height (cm)	Plant Weight (g)
Control	8.3	13.6	0.3	3	22	0.3163
1%	8.3	16.3	0.6	4	24.5	0.3542
2%	10.2	17.4	0.3	3.3	27.5	0.4151
3%	11.1	18.5	0.6	4	29.1	0.4644
4%	12	18.7	0.6	4	30.7	0.4771
5%	13.3	19.5	0.6	4	32.4	o.5194

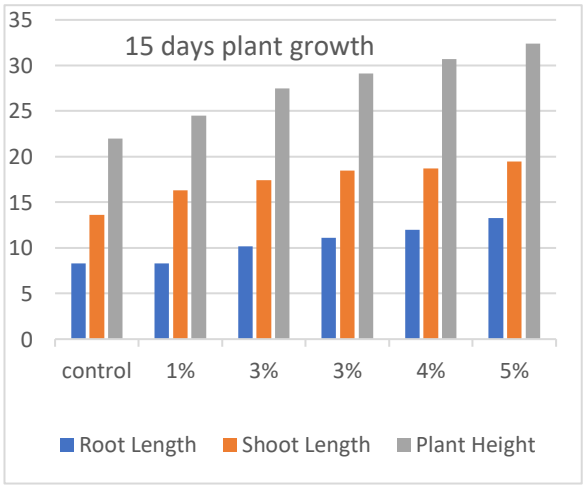
Table 1: Effect Of Cow Urine on morphological Character of *Cajanus cajan* (L.) Huth

After 15 Days by Pot Culture Experiment

Treatment	Root Length (cm)	Shoot Length (cm)	Branch	Leaf	Plant Height(cm)	Plant Weight (g)
control	4.8	17.5	1.6	7	22.3	0.4187
1%	6.5	19.8	2.6	9.6	26.3	0.5124
2%	7	21.5	3.3	12	28	0.6805
3%	7.1	24.5	2	7.3	31.3	0.7864
4%	9.1	25	2	7.6	34.1	0.8123
5%	10	28	3	8	38	1.0317

Table 2: Effect Of Cow Urine on morphological Characters of *Cajanus cajan* (L.) Huth After 30 Days by Pot Culture Experiment

Fig 1: - 15 and 30 day plant growth of *Cajanus cajan* (L.) Huth plant after treatment with different concentration of cow urine.



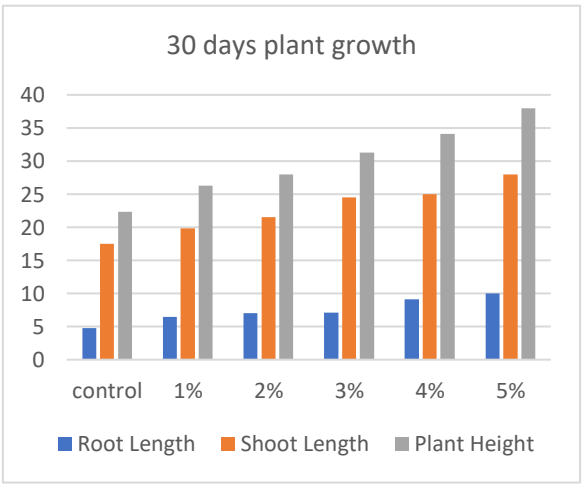


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Figure 2: Effect Of Different Concentrations (Control and 1%, 2%, 3%, 4%, 5%) Of Cow Urine on *Cajanus cajan* (L.) Huth After 15 Days.

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