



Economic Implications of Organic Foliar Nutrition on Cowpea Growth and Yield: A Study on Optimizing Profitability

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Abstract

This study investigates the economic implications of employing organic foliar nutrition to enhance cowpea growth and yield, with a focus on optimizing profitability. Cowpea, a versatile crop known for its nutritional value, faces challenges in yield due to various factors. To address this, a field experiment was conducted using a randomised block design with nine treatments, including Panchakavya, Vermiwash, Seaweed Extract Spray, Jeevamirtham, and Humic Acid. Economic analysis revealed that the combined application of seaweed extract spray and jeevamirtham at specific growth stages yielded the highest net return and return per rupee invested. These results underscore the significance of informed agronomic practices in achieving enhanced profitability and underline the potential of strategic foliar nutrition in sustainable agriculture.

Keywords: Cowpea, foliar nutrition, economic implications, optimization, profitability, sustainable agriculture.

Introduction

Pulses, recognised as a vital food crop globally and an integral part of the Indian diet, have garnered significance due to their high protein content and essential amino acids. Cowpea, commonly known as 'labia,' holds multifaceted roles as a pulse, green vegetable, fodder, and green manure crop. It thrives in a range of tropical and subtropical climates, showing adaptability to various soil types and temperature ranges. While being a major crop in Africa, it is also cultivated in Asia, North and South America, and parts of Africa, with notable cultivation in the central and peninsular regions of India. The significance of pulses, including cowpeas, extends beyond their dietary role. They contribute substantially to dryland farming, offer economic benefits by supplying raw materials to industries, and play a role in maintaining soil fertility through nitrogen fixation. In the context of cowpea, its nutritional value is noteworthy, encompassing protein, fat, carbohydrates, vitamins, minerals, and other essential nutrients. However, despite their potential, cowpea yields in India often face challenges such as low soil fertility, inadequate irrigation, and limited research support. Efforts to enhance cowpea productivity encompass various strategies, including the foliar application of organic nutrients. This approach leverages the plant's capacity for efficient nutrient utilisation, potentially boosting flower production and yield. By supplementing critical nutrient requirements during key growth stages, foliar application aims to bridge nutrient discrepancies and maximise yield potential. This technique does not replace traditional soil fertilisation but offers an effective means of meeting specific crop demands.

The objective of this study is to explore the impact of individual and combined applications of various organic sources on the economic aspects of cowpea production.

Materials and methods

Investigating the economic implications of organic foliar nutrition on cowpea growth and yield, a field experiment was conducted in Pappireddipatti village, Dharmapuri district, from March to April 2017. The study encompassed diverse aspects, including experimental location, climatic conditions, soil characteristics, and a range of treatments. The chosen cowpea variety, Co (CP) 7, was subjected to a randomised block design with nine treatments and three replications. These treatments, including Panchakavya spray (3% concentration at 25 DAS and 45 DAS), Vermiwash spray (25% concentration at 25 DAS and 45 DAS), Seaweed Extract Spray (5 ml/L concentration at 25 and 45 DAS), Jeevamirtham (3% concentration at 25 and 45 DAS), and Humic Acid (0.6% concentration at 25 and 45 DAS), aimed to discern their effects on growth and yield. The study encompassed critical crop management practices and meticulous foliar spray interventions. Harvesting and economic analysis provided insights into net returns, calculated by juxtaposing cultivation costs with gross returns. This holistic approach, integrating agronomy, economics, and innovation, seeks to illuminate the interplay between organic foliar nutrition, cowpea cultivation, and economic viability.

Results and discussion

The economic evaluation of different treatments reveals noteworthy insights, with the highest net return and return on investment observed in the application of seaweed extract spray at 5 ml/l and Jeevamirtham at 3% during 25 and 45 DAS (T8). This treatment yielded the highest net return of Rs. 38,222 and a return of Rs. 2.19 per rupee invested, significantly outperforming other treatments. Notably, treatments with similar effects, such as T7 and T9, secured subsequent ranks in terms of net returns. Following this, the foliar nutrition approach involving humic acid at 0.6% during 25 and 45 DAS (T6) also demonstrated promising results. On the other end of the spectrum, the control treatment displayed the lowest net return of Rs. 14,571 and a return of Rs. 1.47 per rupee invested. The substantial net return obtained through the seaweed extract and Jeevamirtham foliar nutrition (T8) can be attributed to enhanced crop growth, yield components, and overall yield due to the organic nutrient application, as shown in Table 1. This robust outcome reflects the positive influence of foliar nutrition on profitability. The highest return per rupee invested, Rs. 2.19, was associated with the seaweed extract and Jeevamirtham foliar nutrition (T8). Conversely, the control treatment yielded the least return per rupee invested, potentially due to lower seed and haulage yields resulting in diminished returns. This consistency in results underscores the efficacy of the seaweed extract and Jeevamirtham foliar nutrition (T8) in maximising both net returns and return on investment. In conclusion, the application of seaweed extract spray in combination with Jeevamirtham during 25 and 45 DAS (T8) emerged as the optimal approach, delivering the highest net return and return per rupee invested.

Table.1. Effect of organic foliar nutrition on economics

Treatment	Cost of cultivation	Gross return (RS ha ⁻¹)	Net return Rs ha ⁻¹	Return rupee ⁻¹ Invested
T ₁ - Control	30668	45239	14571	1.47
T ₂ - Panchakavya spray @ 3% at 25 DAS and 45 DAS	31201	51793	20592	1.65

T ₃ - Vermiwash spray @ 25% at 25 DAS and 45 DAS	32318	48730	16412	1.50
T ₄ - Seaweed extract spray @ 5 ml/L at 25 and 45 DAS	32680	55836	23156	1.70
T ₅ - Jeevamirtham @ 3% at 25 and 45 DAS	31389	50297	18908	1.60
T ₆ - Humic acid @ 0.6% at 25 and 45 DAS	34553	60225	25672	1.74
T ₇ - Panchakavya spray @ 3% + Vermiwash spray @ 25% at 25 and 45 DAS	35370	66330	30960	1.87
T ₈ - Seaweed extract spray @ 5 ml/L + Jeevamirtham @ 3% at 25 and 45 DAS	32075	70297	38222	2.19
T ₉ - Vermiwash spray @ 25% + Jeevamirtham @ 3% at 25 and 45 DAS	34611	64340	29729	1.85

Conclusion

The study illuminates the substantial economic benefits achievable through strategic foliar nutrition, underscoring the vital importance of well-informed agronomic practices in augmenting profitability within cowpea cultivation. The investigation highlights the remarkable potential of the seaweed extract spray in conjunction with Jeevamirtham application during 25 and 45 DAS (T8), leading to the highest net return and return per rupee invested. These findings underscore the pivotal role of innovative farming techniques in maximising economic gains while reinforcing the need for ongoing research and implementation to ensure agricultural sustainability and economic prosperity.

References

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