

# Studies on Foliar Spray of Nutrients for Enhancing Productivity of Greengram

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**ABSTRACT:** A field experiment was conducted during Summer 2012 at Experimental Farm, Annamalai University. Nine treatments were laid out in randomised design with three replications. Among different sources of nutrients, foliar spray of Panchagavya (5%) at flower initiation recorded significantly higher grain yield of greengram compared to other treatments however, it was at par with foliar of spray of 19:19:19 (1%) in both year and as well in pooled analysis. The significantly lower grain yield was recorded in control plot in both the years.

**KEYWORDS:** Greengram, Foliar spray, Nutrient, Panchagavya, Growth and Yield components.

## I. INTRODUCTION

Greengram (*Vigna radiata* L.) is one of the important pulse crop in India. It is a protein rich staple food which contains about 25 per cent protein, almost three times that of cereals. It is consumed in the form of split as well as whole pulse, which is an essential supplement of cereal based diet and is an important ingredient in the average Indian diet. Rich in leucine, phenylalanine, lysine, valine, isoleucine, etc. In addition to being an important source of human food and animal feed, plays an important role in sustaining soil fertility by improving soil physical properties and fixing atmospheric nitrogen. It is a drought resistant crop, suitable for dry land farming and predominantly used as an intercrop with other crops. Though have multifarious advantages, productivity of greengram is declining year by year due to various reasons. There is a need for enhancing the productivity of this crop by adopting low cost production technologies. Among them, nutrients play an important role in boosting the productivity of greengram. It has been well established that most of the plant nutrients are absorbed through the leaves and absorption would be remarkably rapid and nearly complete. Moreover, foliar feeding practice would be more useful in early maturing crops, which could be combined with regular plant protection programmes. If foliar nutrition is applied it reduces the cost of cultivation which in turn reduces the amount of fertilizer thereby reducing the loss and also economizing crop production. Foliar application is credited with the advantage of quick and efficient utilization of nutrients, elimination of losses through leaching and fixation and regulating the uptake of nutrient by plants (Manonmani and Srimathi, 2009). Foliar application of nutrients using water soluble fertilizer is one of the possible ways to enhance the productivity of pulses like greengram. Looking into importance of foliar spray of nutrients in enhancing crop productivity of various field crops, a field experiment was conducted with the objective of studying the greengram productivity enhancement through foliar spray of nutrients.

## II. MATERIALS AND METHODS

The field experiment on greengram productivity enhancement through foliar spray of nutrients was conducted during summer 2012 AT Experiment Farm, Annamalai University . The soil of the experimental site was clay loam. Nine treatments were laid out in randomised block design with three replications. The variety VBN2 was sown with spacing of 30 cm X 10 cm. The recommended nutrient levels of 12.5 kg N and 25 Kg P<sub>2</sub>O<sub>5</sub> per ha were applied to all the plots. The treatments consisted of foliar spray of Urea (1%), DAP (1%), 19:19:19 (1%), Cow urine (5%), Panchagavya (5%), Jeevamruth (5%), Micronutrients (1%), Vermiwash (5%) and control. Panchagavya and Jeevamruth were prepared as per the standard procedure. Foliar spray was done at flower initiation (Table 1). Micronutrient spray contains (Boron 0.1%, Manganese 3.0 and Zinc 4.0 %). The data on growth, yield and yield attributes were statistically analysed and presented in Table 2 and 3.

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**Table 1. Nutrient status of different organic liquid manures  
(Nileema and Sreenivasa, 2011)**

Parameter	Panchagavya	Jeevamruth
pH	6.82	7.07
Soluble salt (EC)	1.88 dsm <sup>-1</sup>	3.40 dsm <sup>-1</sup>
Total nitrogen	1000 ppm	770 ppm
Total phosphorus	175.40 ppm	166 ppm
Total potassium	194.10 ppm	126 ppm
Total zinc	1.27 ppm	4.29 ppm
Total copper	0.38 ppm	1.58 ppm
Total iron	29.71 ppm	282 ppm
Total manganese	1.84 ppm	10.7 ppm

**Table 2. Growth and yield parameters of greengram as influenced by foliar spray of nutrients**

Treatments	Plant height (cm)	No. of leaves per plant	No. of pods per plant	1000 grain wt. (g)
Urea (1%)	34.4	16	37	53.7
DAP (1%)	32.4	19	40	52.5
19:19:19 (1%)	32.9	17	43	54.4
Cow urine (5%)	31.2	17	42	54.0
Panchagavya (5%)	31.9	16	49	54.7
Jeevamruth (5%)	31.9	17	47	52.2
Micronutrients (1%)	32.6	18	46	54.2
Vermiwash (5%)	33.8	15	37	52.5
Control	31.6	18	35	50.7
SEm ±	0.88	1.48	2.4	0.7
CD at 5%	NS	NS	7.2	2.1

**Table 3. Yield and economics of greengram cultivation as influenced by foliar spray of nutrients**

Treatments	Yield (kg/ha)	Economic (Pooled)			
		CoC (Rs/ha)	Gross Return/ha	Net return (Rs/ha)	B:C
Urea (1%)	466.7	7562	18667	11105	2.47
DAP (1%)	553.3	7648	22133	14486	2.89
19:19:19 (1%)	586.7	8140	23467	15327	2.88
Cow urine (5%)	530.0	7765	21200	13435	2.73
Panchagavya (5%)	597.3	11265	23893	12628	2.12
Jeevamruth (5%)	560.0	7890	22400	14510	2.84
Micronutrients (1%)	556.7	8115	22267	14152	2.74
Vermiwash (5%)	520.0	7765	20800	13035	2.68
Control	406.7	7315	16267	8952	2.22
SEm ±	13.3	-	-	1013	0.06
CD at 5%	39.8	-	-	3036	0.17

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## III. RESULTS AND DISCUSSION

The results of the experiment conducted during 2012 at Experimental Farm, Annamalai University indicated that, significantly higher grain yield of greengram was recorded with foliar spray of Panchagavya ( $597.3 \text{ kg ha}^{-1}$ ) as compared to other treatments however, it was at par with foliar spray of 19:19:19 ( $586.7 \text{ kg ha}^{-1}$ ) and Jeevamruth ( $560.0 \text{ kg ha}^{-1}$ ). The per cent increase in yield with these treatments over control was 47, 44 and 38, respectively. The significant improvement in yield with these treatments were mainly attributed to significantly higher number of pods per plant and 1000 grain weight over other treatments. These findings are in a good line with those obtained in bengalgram (Saravanan and Panerselvam, 2014), in blackgram and greengram (Britto John and Girija, 2007) and in cotton crop (Narayana *et al.*, 2009). The results during 2013 indicated that, significantly higher grain yield of greengram was noticed in treatment spray with 19:19:19 ( $701.7 \text{ kg ha}^{-1}$ ) followed by Panchagavya spray ( $696.7 \text{ kg ha}^{-1}$ ) as compared to other treatments. The significant improvement in grain yield of greengram mainly attributed to significant improvement in yield parameters like test weight and number of pods per plant as compared to rest of treatments. The Panchagavya is an efficient plant growth stimulant that enhanced the biological efficiency of crops. It is used to activate biological reactions and to protect the plants from disease incidence (Nileema and Sreenivasa, 2011).

The data were pooled for two years, which indicated that foliar spray of Panchagavya ( $647 \text{ kg ha}^{-1}$ ) recorded significantly higher grain yield of greengram as compared to other treatments. However, it was at par with foliar spray of 19:19:19 ( $644.2 \text{ kg ha}^{-1}$ ). Panchagavya contains several nutrients i.e. macronutrients like nitrogen, phosphorus, potassium and micronutrients which are required for the growth and development of plants and also contains various amino acids, vitamins, growth regulators like Auxins, Gibberellins and also beneficial micro organisms like pseudomonas, azetobacter and phosphobacteria which influenced yield of greengram (Ali, 2011). Panchagavya found to be best in better utilisation of leaf nitrogen and efficient photosynthetic activity improving the yield (Sarkar *et al.*, 2014). The significant increase in yield with these treatments is mainly attributed to significant improvement in number of pods per plant and test weight. Similarly application of Panchagavya at 3% on black gram recorded the highest grain yield as reported by Swaminathan *et al.* (2007). Foliar spray of Panchagavya at 3 per cent with no fertilizers was the most effective low cost technology in terms of grain yield of greengram as reported by Yadav Prakash and Tripathi, (2013). Similarly, Tharmaraj *et al.* (2011) observed that panchagavya application increased productivity, disease resistance in various pulses *Vigna radiata*, *Vigna mungo*, *Arachis hypogea*, *Cyanopsis tetragonoloba*, *Lablab purpureus*, *Cicer arietinum* and the cereal *Oryza sativa*. The next best treatment among organics is foliar spray of Jeevamruth.

### Economics

Foliar spray of 19:19:19 recorded significantly higher net returns (Rs. 15327 ha<sup>-1</sup>) compared to control and foliar spray of urea however at par with foliar spray of Panchavavya (Rs 12628 ha<sup>-1</sup>), DAP (Rs 14486 ha<sup>-1</sup>), Cow urine (Rs 13435 ha<sup>-1</sup>), Jeevamruth (Rs 14510 ha<sup>-1</sup>) and Vermiwash (Rs 13035 ha<sup>-1</sup>) and micronutrient spray (Rs 14510 ha<sup>-1</sup>). Though Panchgavya spray produced higher yield, due to its high cost resulted in lower economics return (Table 3). The B: C ratio followed similar trend.

## IV. CONCLUSION

To boost the productivity of greengram need to apply sufficient quantity of nutrients especially in the form of foliar spray which has advantage of quick and efficient utilization of nutrients, elimination of losses through leaching and fixation and regulating the uptake of nutrient by plants. The results clearly indicated that foliar spray of panchagavya and 19:19:19 recorded significantly higher grain yield and yield parameters of greengram. As per the economics is concern foliar spray of 19:19:19 gave higher economic return.

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