

## *International Journal of Scientific Research and Reviews*

### **"Influence of selected biofertilizer on the growth parameters of *Macrotyloma uniflorum* (Lam.) Verdc."**

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#### **ABSTRACT**

Horse gram is less interested by researcher but important pulse crop India. Present experimental work indicates impact of various bio fertilizers on growth parameter and protein contain in horse gram. The seeds of horse gram treated with Cow dung, Goat manure, Chicken manure and Vermicompost. Mixture of soil with bio fertilizers analyzed to determine different macro and micronutrients from soil sample. Quantification soil mixture and bio fertilizer was taking place by cleaning and eliminating the undesirable wreckage such as stone, glass, pieces. 250 gram Soil sample collected up to 15 cm from soil surface after 30 days for soil analysis. Soil testing carried out to define pH, Salinity, Organic carbon, Phosphorous, Potassium, Copper, Iron, Zinc and Manganese from mixture of soil samples.

Soil comprising chicken manure is more alkaline as compare to other bio fertilizers. Organic carbon is noted concentrated in goat manure and cow dung comprises more phosphorus. Zinc contains found improved in vermicompost. Quantitative determinations of protein vermicompost bio fertilizers shows more protein content Besides chicken manure shows trace amount of protein content in seeds of horse gram. Effect of these bio fertilizers on germination length of root and shoot, plant height and protein contain were determined. Among all selected bio fertilizers Vermicompost is showing more significant.

**KEY WORDS:** Chicken manure, Goat manure, Horse gram and Protein.

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## INTRODUCTION:

Horse gram or Madras gram is botanical known as *Macrotyloma uniflorum* (Lam.) Verdc. is member of family Fabaceae. Morphologically plant body is Twining, sub-erect annual with cylindrical, slightly hairy to tomentose stems. It has trifoliate leaves with oblong or lanceolate leaflets. 1 to 2 cm long yellowish flowers develop in clusters at leaf axils which compressed pods grow about 5 cm in length. Seeds are generally round or slightly trampled in shape and turn black after dried. Horse gram is an important grain legume and fodder crop in India. It is native to the south eastern regions of India. It is also cultivated in Sri Lanka, Africa, Malaysia, Australia and West Indies etc. Horse gram plants can cultivate in arid zones. It is used up as a whole seed, as sprouts, or as whole meal, especially in southern Indian states.

Horse gram is enhanced nutritive crops grown mostly in tropical countries in after rainy season.<sup>1</sup> Legume like horse gram could play key role in emerging countries and accomplish food security in rural and tribal areas<sup>2</sup>. Substantial doses of chemical fertilizers and pesticides are being used by the farmers to get a more yield of various field crops. These chemical fertilizers and pesticides reduced soil fruitfulness and triggered health problems to the consumers. Adverse effects of chemical fertilizers, lead for the use of organic manures.<sup>3</sup> Bio fertilizers are usually named as microbial inoculants which are able of organizing essential nutritional elements in the soil from non-usable to usable form by the crop plants through their biological procedures. Since last more than ten years, biofertilizers are used widely as an environmentally friendly approach to reduce the practice of chemical fertilizers, increase soil fertility status and for boost of crop production by their biological activity in the rhizosphere.<sup>4</sup> Biological activities are significantly enriched by microbial interfaces in the rhizosphere of plants.<sup>5</sup>

Horse gram is in the top ten most broadly grown pulse species in present India. It is amongst the greatest universal archaeological pulse finds, showing that it has been of extensive significance since the Neolithic era. It is especially important on the Indian peninsula in the Dravidian speaking states of Tamil Nadu, Karnataka and Andhra Pradesh.<sup>6</sup> Tamil Nadu and Andhra Pradesh together account for nearly 90% of the total Indian acreage under this crop.

## MATERIALS AND METHODS:

Seeds of *Macrotyloma uniflorum* (Lam.) were collected and uniform sized seeds were selected and surface sterilized with 0.2% HgCl<sub>2</sub>. Thirty seeds were transferred to each petri plate containing germinating paper. In each petri plate moistened with 10ml distilled water. The control petri plate contain only 10 ml distilled water and different biofertilizer extract added in other four petri plates.

The experiment conducted in triplet. The seeds were allowed to germinate under the laboratory conditions for 8 days.

**Table no.1: Selected biofertilizers extract**

Sr. No.	Biofertilizer extract	g/500 ml D.W.	Quantity used
1	Distilled water	-	10ml
2	Cow dung	50ml	10ml
3	Goat manure	50ml	10ml
4	Chicken manure	50ml	10ml
5	Vermicompost	50ml	10ml

***Soil sampling and site Experiment conduction:***

Soil sample for these experiments were collected from the Botanical garden, Department of Botany, Dada Patil Mahavidyalaya, Karjat. In control pot added 5kg soil and Equal quantity of soil added in other four Pot 4.5 kg soil with 0.5 kg biofertilizer (table no.2). In each pot 20 seeds were sown were kept in sun light.

**Table no.2: Selected biofertilizers mixed with soil.**

Sr. No.	Biofertilizer extract	4.5 kg soil mixed	Quantity used
1	Distilled water	-	10
2	Cow dung	500gm	10
3	Goat manure	500gm	10
4	Chicken manure	500gm	10
5	Vermicompost	500gm	10

***Analysis mixture of Soil and biofertilizers:***

Estimation of quality of soil contains mixture with bio fertilizers was started by cleaning and removing the unwanted debris such as stone, glass, pieces. 250 gram Soil sample collected up to 15 cm from soil surface after 30 days for soil analysis. Soil testing carried out to determine pH, Salinity, Organic carbon, Phosphorous, Potassium, Copper, Iron, Zinc and Manganese from mixture of said soil samples.

**RESULTS AND DISCUSSION:**

***1) Analysis of mixture of soil with bio fertilizers:***

Analysis of mixture of soil with bio fertilizers indicates several differences as shown in following table. Soil containing chicken manure is more alkaline as compare to other bio fertilizers.

Organic carbon is recorded maximum in goat manure and cow dung consist more phosphorus. Zinc contain found better in vermicompost.

**Table no.3: Analysis mixture of Soil and biofertilizers:**

Sr. No.	Properties	General limitation	Control	Cow dung	Goat manure	Chicken manure	Vermicompost
1.	pH	6.5-7.5	8.24	8.15	8.41	8.89	7.99
2.	Salinity	0-1	0.62	1.31	0.50	1.54	1.04
3.	Organic carbon	0.40-0.60	0.42	0.56	0.71	0.58	0.63
4.	Phosphorous	14-21	-	67.54	26.32	60.09	58.55
5.	Potassium	150-200	580.89	1108.9	866.05	1922.2	1341.3
6.	Copper	0.20-99.9	2.19	2.25	2.59	1.94	1.51
7.	Iron	4.5-99.9	0.27	0.19	0.22	1.39	0.24
8.	Zinc	0.61-99.9	18.68	19.92	17.43	22.41	28.64
9.	Manganese	2.0-99.9	0.73	2.84	2.94	3.94	1.40

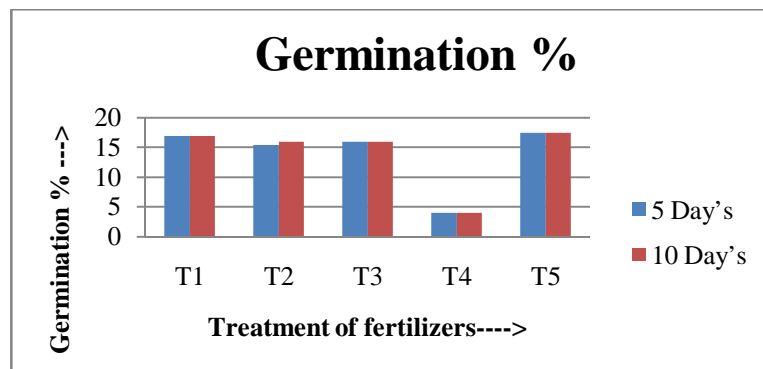
**2) Germination percentage:**

Germination percentage was calculated on fifth day and tenth day which was more in vermicompost and less in chicken manure and intermediate in cow dung and goat manure among selected biofertilizers.

**Table no.4: Effect of different organic fertilizers on germination percentage.**

Treatments	Germination %	
	5 Day's	10 Day's
Control (T <sub>1</sub> )	17	17
Cow dung (T <sub>2</sub> )	15.5	16
Goat manure (T <sub>3</sub> )	16	16
Chicken manure (T <sub>4</sub> )	4	4
Vermicompost (T <sub>5</sub> )	17.5	17.5

**Graph no. 1: Effect of organic fertilizers on germination percentage of *Macrotyloma uniflorum* (Lam.)**



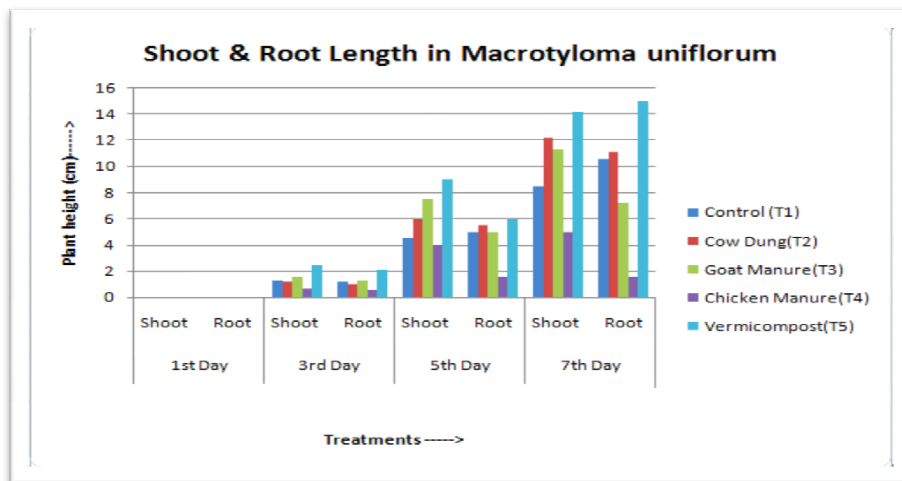
### 3) Calculations shoot and root length:

Root length and shoot length are shown graphically, shoot length observed more in vermicompost extract and root length also more in vermicompost which is calculated on seventh day. Chicken manure extract that shows less shoot length and root length calculated on seventh day.

Table no. 5: Effect of different bio-fertilizers on Shoot and root length of *Macrotylomauniflorum* (Lam.)

Treatments	Shoot and root length (cm)							
	1st Day		3rd Day		5th Day		7th Day	
	Shoot	Root	Shoot	Root	Shoot	Root	Shoot	Root
Control (T1)	0	0	1.3	1.2	4.5	5	8.5	10.6
Cow Dung (T2)	0	0	1.2	1	6	5.5	12.2	11.1
Goat Manure (T3)	0	0	1.5	1.3	7.5	5	11.3	7.2
Chicken Manure (T4)	0	0	0.6	0.5	4	1.5	5	1.5
Vermicompost (T5)	0	0	2.4	2.1	9	6	14.2	15

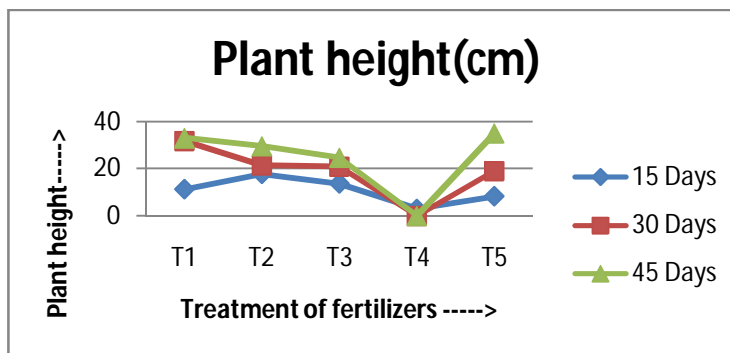
Graph no. 2: Effect of different bio-fertilizers on Shoot and root length of *Macrotylomauniflorum* (Lam.)



### 4) Measurements of plant height:

Plant height was calculated for all experimental plants in pots containing biofertilizers successively on 15<sup>th</sup>, 30<sup>th</sup>, and 45<sup>th</sup> days. Plant height was higher in the pot containing cow dung biofertilizer and lower in chicken manure on 15<sup>th</sup> and 30<sup>th</sup> days. Whereas on 45<sup>th</sup> day, the pot containing vermicompost and goat manure showed higher and lower heights, respectively.

Graph no. 3: Effect of organic fertilizer on plant height of *Macrotylomauniflorum*



### 5) Protein Estimation:

Quantitative analyses of protein of seeds of *Macrotylomauniflorum* by Lower's methods. Pods were harvested after 45<sup>th</sup> and dried seed crushed in mortar pestle with 80% acetone. Spectroscopic quantification noted at 280nm absorption and calculates graphically.

Table no.6: Estimation of protein content in *Macrotylomauniflorum* (Lam.)

Sr. No.	Treatment of Bio-fertilizers	Amount of protein in $\mu\text{g}$ in 1 gm.	Absorbance at 280nm
1.	Control	560	0.163
2.	Cow dung	1040	0.236
3.	Goat manure	1320	0.283
4.	Chicken manure	Traces	-
5.	Vermicompost	1460	0.302

Quantitative determinations of protein in vermicompost bio fertilizers shows more protein content. Besides chicken manure shows trace amount of protein content in seeds of *Macrotylomauniflorum* (Lam.) Vermicompost can be preferred as it can increase quantity of protein in seeds. Several researchers have stated that protein content in seed was gradually improved with increasing level of nitrogen.<sup>7&8</sup> Vermicompost shows more plant height in also root and shoot length on the other hand chicken manure shows less height of plant as well as root and shoot length.

### CONCLUSION:

Effect of these bio fertilizers on germination length of root and shoot, plant height and protein content were determined. Among all selected bio fertilizers Vermicompost is showing more significant. *Azotobacter*, *Azospirillum* bluegreen algae and *Rizhobium* are profiting biofertilizers for the crop production.<sup>9</sup>

## **ACKNOWLEDGEMENT:**

The authors are grateful to Gawade B. B., Rahim Bagwan and Gund A. B. for their constant support, Cooperation and their time to time help.

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