

EFFECT OF ORGANIC LIQUID MIXTURE ON GROWTH OF GREENGRAM (*Vigna radiata* L.)

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Introduction

Conventional agriculture greatly depends on synthetic fertilizer. The excessive use of synthetic fertilizers resulted in deterioration of soil and environment. Organic fertilizers are good sources of nutrients for the crop production and improving the soil life, soil fertility and soil structure. Uses of solid organic fertilizers need in bulky than organic liquid fertilizers. Jiwamritha is a liquid organic fertilizer with lot of beneficial microbes. Application of Jiwamritha encourages microbial activity in the soil and helps to convert the non available form of nutrients in to available form to the plants (Palekar, 2008). Field trials with Jiwamritha application have not been investigated in Sri Lanka. Frequencies of application also have to be identified to obtain better yield at low cost. Greengram is a popular leguminous crop, grown for protein rich edible seeds. But fertilizer cost reduces profit of cultivation. Therefore, this experiment investigated the effect of Jiwamritha on the growth of greengram.

Methodology

The experiment was conducted in plastic pots during November to December in 2010 in the net house, Crop farm, Eastern University, Sri Lanka.

The experiment was arranged in a completely randomized design with five treatments and six replicates.

The treatments were defined as follows:

T₁: Once in one week Jiwarmitha application.

T₂: Once in two weeks Jiwarmitha application.

T₃: Once in three weeks Jiwarmitha application.

T₄: No fertilizer application.

T₅: Synthetic fertilizer recommended by Department of Agriculture (DOA).

Soil: Compost with the ratio of 2:1 was used as potting media. For T₅, Basal application was done according to the recommendation of Department of Agriculture (DOA). Pre germinated seeds of greengram variety MI-5 were used for planting. Other management practices were followed according to the DOA. Jiwamritha application at the rate of 554 l/ha was started one week after planting. Before the application, Jiwamritha was diluted ten times with water. For T₁, Jiwamritha was applied at first, second and third week after planting. For T₂, Jiwamritha was applied first and third week after planting. For T₃, Jiwamritha application was done only at first week after planting.

The parameters measured during this experiment were shoot biomass, number of effective nodules, number and length of 1st order lateral roots and root biomass at four weeks after planting. Collected data was analyzed using SAS.

Discussion and Conclusion

It was found that there were significant ($p < 0.05$) differences among treatments (Table 1) in all the measured parameters at four weeks after planting.

Table 1: Effects of Jiwamritha on growth of green gram

Treatments	Shoot biomass (g)	No of effective nodules/plant	No of 1 st order lateral roots/plant	Length of 1 st order Lateral roots (cm)	Root biomass (g)
T ₁	0.273b	4.33b	15.50b	12.00bc	0.076b
T ₂	0.313ab	5.16b	15.67b	12.33abc	0.091ab
T ₃	0.355a	7.50a	21.00a	14.50a	0.106a
T ₄	0.268b	3.83b	13.00b	10.16c	0.073b
T ₅	0.330a	5.00b	17.33ab	13.00ab	0.075b
F test	*	*	*	*	*

F test:-* : significant at P<0.05; ns: not significant.

Means with the same letter are not significantly different in each column according to the DMRT at 5% level.

Plants were subjected to T₃ attained highest value for measured parameters viz. shoot biomass, number of effective nodules per plant, number of 1st order lateral roots per plant, length of 1st order lateral roots and root biomass than other treatments. Lowest values were obtained in T₄ in all measured parameters.

Jiwamritha is a bio enhancer which consists of huge amount of beneficial effective microbes (Palekar, 2005). Inoculation of microbes to the soil with Jiwamritha improved the microbial activities and encouraged the microbial competition in the rhizosphere. From this, superior predator like protozoa started to graze the microbes. Protozoa are considered to be the most important microbial grazers in soil because of their high turnover rates (Bonkowski and Scheu, 2004). Woods *et al.*, (1982) found that microbial population was decreased from the protozoan grazing for the mineralization of nutrients. Therefore, microbial population was decreased for the mineralization of nutrients for the period of once in one week and once in two week application of jiwamrita. In once in three week application, these competitions did not occur among the microbes. Somasundaram *et al.*, (2008) demonstrated that presence of protozoa generally enhanced shoot biomass, lateral root growth and plant nitrogen uptake. Bonkowski *et al.*, (2001) reported that presence of bacterial grazers improved the release of nutrients from the bacterial biomass and presence of optimum numbers of microbes also improved the mineralization. Therefore, once in three week Jiwamritha application exposed significant than once in one week and once in two week Jiwamritha applications in green gram growth.

Growth of greengram was improved by once in three weeks application of Jiwamritha than other treatments. Growth of plants received once in one week, and once in two weeks Jiwamritha application approximately equal to the plants which received synthetic fertilizer application. Therefore, farmers can use Jiwamritha once in three weeks interval for greengram cultivation, instead of synthetic fertilizer which is less costly and environmental friendly.

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