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Effect of vermicompost on protein content of Soybean-*Glycine max*

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ABSTRACT: The term weed is used generally to unprofitable, troublesome or noxious growth and unwante plants in human controlled settings especially farms, fields and water bodies. Mechanical removal and weedicidal spray are common methods to eradicate weeds, but both these methods are not feasible. The disposal and decomposition of weed biomass is also a big problem. The present study deals with the use of weed biomass for the vermicomposting. Vermicompost of three common weeds of this area *Parthenium hysterophorous, Lantana camara* and *Eichhornia cresipes* was prepared as proposed by the Rajkhowa, et .al.(2005).

The prepared vermicompost of all the three weeds was used as biofertilizer in soybean crop separately. The protein content was assessed at the regular interval of 15 days till 75 days, in all the vermicompost treatments. The study revealed that in all the three vermicompost treated soil protein content increased considerably over control. This clearly indicates that weed biomass can be utilized for vermicomposting, and the prepared vermicompost is beneficial for growing of crops.

KEYWORDS: Vermicomposting, weeds, biomass, organic waste, biofertilizer, *Glycine max*.

1 INTRODUCTION

In developing countries like India, the situation is comparatively grimmer as it has the limited resources to feed the burgeoning population .Green revolution improved the quality and quantity of food grains by employing the modern agro technology. Vermicompost is a nutrient rich microbiologically-active organic amendment which results from the interactions between earthworms and micro organisms by the breakdown of organic matter. It is a stabilized, finely-divided peat-like material with a low C: N ratio and high water-holding capacity that constitutes a source of plant nutrients which are released gradually, through mineralization, as the plants need them.

Vermicomposting a biotechnological process which could provide a solution to tackle the problem of safe disposal of weeds as well as capable of transforming garbage into gold with the help of earthworm. It is a faster than composting. Vermicompost is an ecologically pure organic fertilizer[2].

The present study was based on the above aspect of vermicomposting in which an effect has been made on noxious weeds of this area viz *Parthenium , Lantana* & *Eichhornia* for the biotechnological process of vermicompost. And the compost prepared by these three weeds was utilized to assess the effect of this manure on the protein content of soybean (*Glycine max*) crop through bioassay[3].

2 MATERIAL AND METHODS

Vermicomposting of *Lantana camara* , *Parthenium hysterophorous* ,and *Eichhornia cresipes* was done by method proposed by Rajkhowa D.J., Gogoi A.K., Yaduraju N.T.(2005). Soybean (*Glycine max*) is commonly grown Kharif crop of this area- Ujjain,M.P,India.

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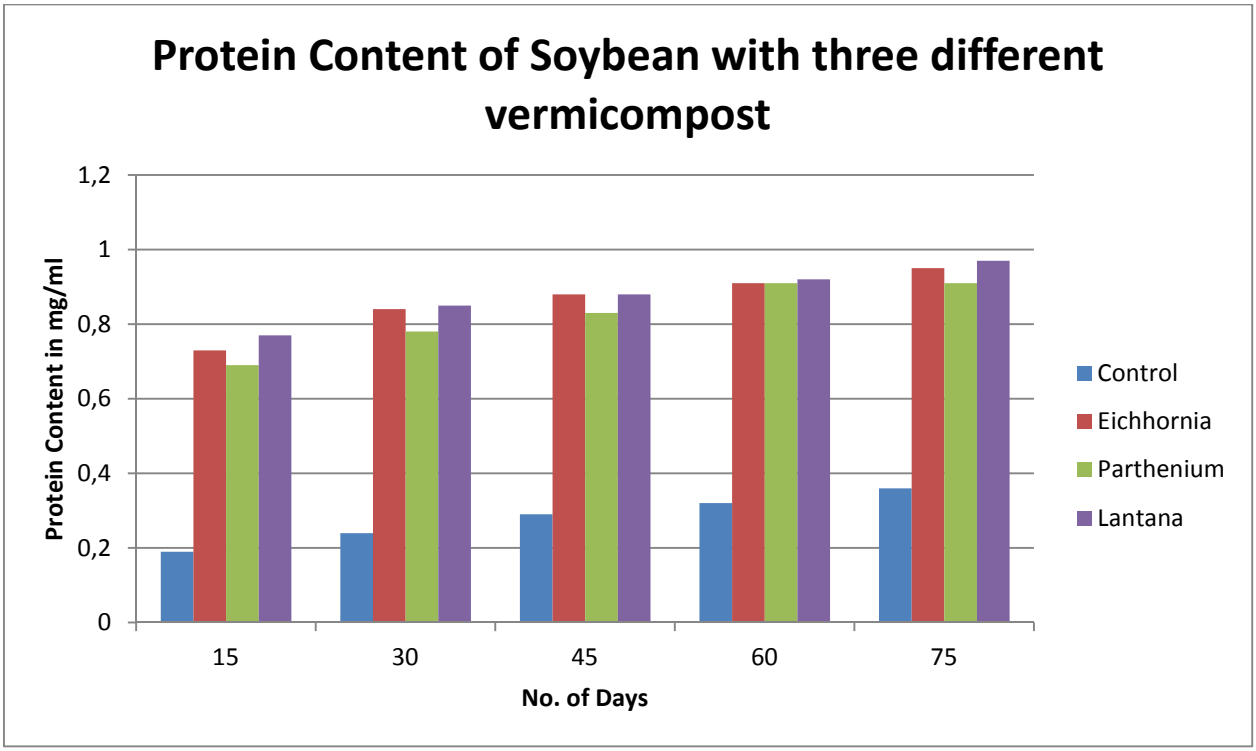
Estimation of protein content was performed by Folin Lowry's method, 1951. Five hundred mg of plant material (leaf) wasweighed and macerated in a pestle and mortar with 10 ml of 20 percent trichloroacetic acid. The homogenate was centrifuged for 15 minutes at 600g. The supernatant was discarded. To the pellet, 5 ml of 0.1 N NaOH was added and centrifuged for 5 minutes. The supernatant was saved and made up to 10 ml with 0.1N NaOH. This extract was used for protein estimation. One ml of the extract was taken in a 10 ml test tube and 5 ml of reagent 'c' was added. The solution was mixed and kept in darkness for 10 minutes. Later, 0.5ml of Folin phenol reagent was added and the mixture was kept in dark for 30 minutes. The sample was read at 660 nm in a UV spectrophotometer[4,5].

3 RESULT AND DISCUSSION

In all the three vermicompost treated soil samples, the protein content of soybean plants increased considerabely over control on all the days .The increase in protein content was more in *Eichhornia* and *Lantana* as compared to *Parthenium,* though parthenium too showed considerable increase in protein contents as shown in the table[6].Similar results have been observed in soybean using cowdung, vermicompost and chemical fertilizer by[7]

Table : showing protein contents of Soybean with three different vermicompost

S.No.	No. of Days	Protein content in mg/ml			
		Control	*Eichhornia*	*Parthenium*	*Lantana*
1	15	0.19	0.73	0.69	0.77
2	30	0.24	0.84	0.78	0.85
3	45	0.29	0.88	0.83	0.88
4	60	0.32	0.91	0.89	0.92
5	75	0.36	0.95	0.91	0.97



Statistical analysis(ANOVA) was performed on the above results to verify the level of significance in three different vermicompost treatments over control on protein contents of soybean crop ,

ANOVA Table

Source of variation	Sum of Squares(Ss)	Degree of Freedom(df)	Mean Square(Ms)	F value
Between Samples	1.801	3	0.6004	-
Within Samples	0.3535	16	0.0220	-
Total	2.1545	18	-	27.9
Note: Significant difference at 5% probability level				

The results obtained after performing ANOVA were highly significant i.e. 27.9 at 5 % significant level. The observations clearly indicate that the vermicopmost is better option to be used as biofertilizer in soybean crop .The study also shows that weed biomass instead of dumping , should be utilized as the biomass for vermicomposting. This study is a step towards improving the level of proteins in soybean crop, which is utilized through out world for its protein contents .This can be milestone for researchers in the food technology improving the quality of soybean.

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