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Effect of Organic Fertilizers on the Growth of Shoot of Kalmegh (*Andrographis Paniculata)*

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Abstract: **Cultivation of *Andrographis paniculata* under three different treatments i.e Farmyardmanure, biocom post, and Vermicompost with respect to control was carried out at the three nurseries of Forest Department located at different altitudes (elevation) in Tehri Garhwal. Investigation has been done to find out the suitability of different treatments on the basis of different growth parameters. Data was recorded for height and diameter of shoot. Results concluded that vermicompost was most effective.**

Keywords: Andrographis paniculata, **Farmyardmanure, biocompost and Vermicompost.**

1. INTRODUCTION

There are about 45,000 plant species (nearly 20 per cent of the global species) are found in the Indian Subcontinent. Of these, about 3,500 species of both higher and lower plant groups are of medicinal values. Of around 500 medicinal plant species used by the contemporary *Ayurvedic* industry, around 80 per cent are procured from wild areas, mostly notified as forest land. Medicinal plants procured from cultivated private fields account for ten per cent of the total medicinal plants in active trade.

Andrographis paniculata is one of the most important ingredients in the Ayurvedic preparations for fever and liver diseases,which are commonly used by Ayurvedic physicians.A.paniculata was recommended in charaka samhita dating to 175 BC for treatment of jaundice along with other plants in multi-plant preparations. *Andrographis paniculata* Nees, the "kalmegh" of Ayurveda is an erect annual herb, belonging to family Acanthaceae Andrographolide" is the constituent extracted from the leaves of the plant which is bicyclic diterpenoid lactone. The plant extract exhibits antityphoid, antithrombogenic, anti-inflammatory, antisnakevenom, and antipyretic properties. It is used in traditional medicine against variety of diseases including cold,fever,snakebite,liver disease, diabetis,cancer,inflammation and malaria(Puri *et al.*, 1993).Despite enormous works done on *Andrograhis paniculata* its cultivation is still limited .Patra *et al.*, (2000) has done tremendous work in agrotechnology of Kalmegh (*Andrographis paniculata)*. Present report revealed shoot's growth pattern of *Andrographis paniculata* under the influence of different organic fertilizers at different sites.

2. MATERIAL AND METHODS

The experiment was carried out in UCST nursery Dehradun.

Seeds were collected from Dr. Susheela Tiwari Herbal Garden Rishikesh and sown in polythene bags . Meanwhile three nursery beds were prepared for three treatment biocompost vermicompost,farmyardmanure and one bed for control. The treatments were added to soil in 1:2 ratio. After few days of seed germination plantlets were transplanted in respective beds .After every two months three samples were taken from each beds. The plantlets were uprooted at random .The root system was cleaned to get rid of soil and sand particles. Data were recorded for height and diameter of shoot. The data was analysed statistically by Genstat 5 statistical package . Least significant difference (LSD) at 5 percent probability level was computed to compare treatment means.

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3. OBSERVATION

The analysis of data after two months of transplating revealed that Shoot height was highly influenced by various treatments . Increased shoot length was observed in vermicompost treatment (10.11cm) followed by farmyardmanure , biocompost and control.(Table 1).The significant variations were observed among treatments with respect to shoot height after four months.Shoot length of the plant developed under treatments was highest (13.73cm) in vermicompost followed by farmyardmanure (12.44 cm) which was significantly higher than biocompost (10.78 cm) and control (9.07 cm). Similar difference was recorded after six months also . The shoot height was greater in vermicompost than farmyardmanure, biocompost and least in control.

It has been found that shoot diameter varied significantly between treatments. after two months .The shoot diameter of the kalmegh was 0.17 cm in vermicompost treatment, 0.11 cm in farmyardmanure, 0.10 cm in biocompost and 0.09 cm in control condition.After four months also It was observed that Application of treatments significantly influenced the shoot diameter. The increased shoot diameter was calculated for plants grown in vermicompost treatment (0.23 cm) than Farmardmanure and biocompost (Table1).The control condition (0.12 cm) gave the decreased value of the shoot diameter. Similar significant variation was revealed among treatments after six months. The vermicompost treatment showed best result (0.26 cm) than other treatments and control(Table1).

Table 1. **Effect of Treatments on the growth of *Andrographis paniculata*.**

		Shoot height (cm)			Shoot diameter(cm)		
		2MAT	**4MAT**	**6MAT**	**2MAT**	**4MAT**	**6MAT**
TREATMENT	**Biocompost**	6.44(1.71)	10.78(1.87)	14.41(1.68)	0.10(0.03)	0.17(0.01)	0.20(0.02)
	Farmyardmanure	8.00(2.05)	12.44(2.18)	17.09(2.42)	0.11(0.03)	0.20(0.02)	0.23(0.02)
	Vermicompost	10.11(1.88)	13.73(2.54)	19.61(2.27)	0.17(0.03)	0.23(0.02)	0.26(0.04)
	Control	4.47(1.50)	9.07(1.83)	13.00(2.21)	0.09(0.03)	0.12(0.01)	0.14(0.02)
	C.D at 5%	1.72	1.60	2.58	0.03	0.04	0.04

Note: The values given in parenthesis are the standard error of mean values.
C.D- Critical difference, **NS –** Non-Significant, **MAT –** Months after Transplanting.

4. DISCUSSION

The result in this experiment revealed that vermicompost is the most effective treatment than farmyardmanure and biocompost for the growth of the shoot. These results corroborate the findings of Reddy (1986). The application of vermicompost also gave best results for shoot height in amaranthus species (Uma *et al*., 2009) and *Hordeum vulgare* (Joshi *et al.*, 2010).The increase in growth may have been due to increases in microbial biomass in soils receiving vermicomposts which increased nutrient mineralization. Moreover, increases in microbial biomass could have enhanced microbial competition which suppressed plant parasitic nematodes (Arancon *et al*., 2002) and plant diseases (Chaoui *et al*., 2002). Nethra *et al.* (1999) also observed the increase in shoot diameter in china aster by using vermicompost with recommended NPK in different proportions.Similar results were also obtained by Kale *et al.*, (1987) in which an increased stem girth of aster noticed when 2.5 t per ha vermicompost was applied. The vermicompost increases the population of beneficial microorganisms such as N-fixers, P-solubilizers and increases the nitrogenase and urease enzyme activity (Gopalreddy, 1997).

5. CONCLUSION

It may be concluded from this study that vermicompost is most suitable medium for the growth of the *Andrographis paniculata* and can be recommended to the large scale growers of this medicinal plant to boost up its productivity.

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