

Research
Paper

Growth and yield of safed musli (*Chlorophytum borivillianum*, Santapau and Fernandes) as influenced by bulky and concentrated organic manures grown under loamy sand soil

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ABSTRACT

An investigation was carried out on loamy sand soil during *Kharif* season of the year 2008-09 to study the effect of bulky and concentrated organic manures on growth and yield of Safed musli (*Chlorophytum borivillianum*) at Anand, Gujarat. The experiment consisted of eleven treatments. The maximum number of fasciculated roots per plant were found with the application of vermicompost @ 2 t/ha along with seed treatment of *Azotobactor*. Significantly higher fasciculated root length (10.3 cm) and girth (3.6 cm) was also observed under the same treatment. Application of vermicompost @ 2 t/ha along with *Azotobactor* recorded significantly higher fasciculated root yield (4444 kg/ha) which was at par with application of castor cake @ 1 t/ha along with *Azotobactor*, application of neem cake @ 750 kg/ha along with *Azotobactor* and application of castor cake @ 1 t/ha alone. Significantly the highest sapogenine content (1.494 %) was noticed in the application of vermicompost @ 2 t/ha along with root treatment of *Azotobactor* to fasciculated roots at the time of planting.

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Key words : Safed musli, Bulky organic manures, Concentrated organic manures, Sapogenine

INTRODUCTION

Safed musli (*Chlorophytum borivillianum*) is an important medicinal plant which belongs to Liliaceae family. It is widely distributed in India, particular in valley of Himalaya, Satpuda, Arvali and in hilly areas of the Bihar, Assam and founded in the parts of Rajasthan, Gujarat and Maharashtra. Fasciculated roots of Safed musli have economic importance. The roots of this herb have great medicinal value due to presence of the saponin content (2.17 %). It is the rich source of alkaloids, vitamins, proteins, carbohydrates, steroids, saponins, potassium, calcium, magnesium, phenol, resins and polysaccharides. In structure, the Sapogenine consist of sugar with sapogenine, the latter being the physiologically active portion of molecule. The right proportions of saponins and alkaloids component present in Safed musli

make a rich curative herb. It is considered as a wonder drug in the Indian system of medicine due to its aphrodisiac and natural sex tonic properties.

Traditionally safed musli grown in forest and is collected as one of the forest products by tribals. They sold it to private contractor and businessman on throw price. Recent research advances in commercialization of certain forest product has great awareness and interest amongst tribal. Safed musli is one of the products that have potentiality due to its immense medicinal value because of good market price. Area under Safed musli increasing day by day. Local people having quires about its package of practices, particularly the manure and fertilizers management and, therefore, the present investigation was carried out to study the effect of bulky and concentrated organic manures on yield and quality of safed musli.

MATERIALS AND METHODS

The present investigation was conducted at Medicinal and Aromatic Research Farm, B. A. College of Agriculture, Anand Agricultural University, Anand during the *Kharif* season of the year 2008-09. All bulky and concentrated organic manures applied as per treatments with and with out *Azotobactor*. The treatments comprised of application of FYM, vermicompost, castor cake, poultry manure, neem cake and *Azotobactor* applied alone or in combination with *Azotobactor* and replicated thrice in randomized block design . The experimental site was loamy sand in texture, low in organic carbon, low in available nitrogen and high in available phosphorus and in available potassium with pH 7.9. The sapogenine content in fasciculated roots was estimated by the procedure was designed by Mishra (1998).

RESULTS AND DISCUSSION

The results obtained from the present investigation have been discussed below:

Numbers of fasciculated roots per plant:

A persual of data presented in Table 1 revealed that the number of fasciculate roots per plant was significantly influenced by the different bulky and concentrated organic manures. The maximum numbers of fasciculated roots per plant were observed in the application of vermicompost @ 2 t/ha along with treatment of *Azotobactor* which were at par with application of castor cake @1 t/ha alone or along with *Azotobactor*, poultry manure @ 1 t/ha along with *Azotobactor* and vermicompost @ 2 t/ha alone and

lower number of fasciculated roots per plant were recorded under the absolute control. This might be due to the organic manure like vermicompost helped to maintain the fertility of the soil. It also helped to enhance the process of mineralization and availability of nutrients to the plants ultimately resulted vigorous growth of roots and plants. These findings are in conformity with the observation of Alam *et al.* (2007) and Bong and Naher (2004).

Length of fasciculated root:

Different bulky and concentrated organic manures had significant influence on fasciculated root length recorded at harvest. Significantly higher fasciculated root length was observed with application of vermicompost @ 2 t/ha along with root treatment of *Azotobactor* and was at par with application of castor cake or poultry manure @ 1 t/ha along with *Azotobactor*. The lowest fasciculated root length was recorded under control. This might be due to the increased and readily available nutrients and their uptake of nitrogen through the organic manures which might to balance C/N ratio and increased the activity of plant metabolism have contributed to increase the root length. The results are in accordance with the results reported by Emura and Hosoya (1979) in carrot.

Girth and yield of fasciculated root:

Significantly higher girth of fasciculated root measured at harvest was noticed in the treatment of vermicompost applied @ 2 t/ha with *Azotobactor* which was at par with application of castor cake @ 1 t/ha with *Azotobactor* and only application of vermicompost @ 2 t/ha. The developments of fasciculated roots were increased with application of vermicompost and poultry manure might be

Table 1: Effect of bulky and concentrated organic manures on yield and quality of safed musli

Sr. No.	Treatments	No. of fasciculated roots per plants (No. of roots /plant)	Length (cm)	Girth (cm)	Yield (kg/ha)	Sapogenine content (%)
1.	5 t FYM /ha	11.1	8.4	3.0	1894	1.048
2.	5 t FYM /ha + azotobactor	8.2	8.1	2.9	3446	1.130
3.	2 t vermicompost /ha	12.9	8.5	3.4	2973	1.314
4.	2 t vermicompost /ha + azotobactor	14.6	10.3	3.6	4444	1.494
5.	1 t castor cake /ha	13.7	9.3	3.0	3934	1.394
6.	1 t castor cake /ha + azotobactor	12.6	9.1	3.5	4134	1.411
7.	1 t poultry manure /ha	9.7	9.2	2.8	3081	1.105
8.	1 t poultry manure /ha + azotobactor	13.6	8.4	2.8	2949	1.193
9.	750 kg Neem cake /ha	7.7	9.0	2.9	1646	1.104
10.	750 kg Neem cake /ha + azotobactor	11.0	8.5	3.2	4064	1.230
11.	Control (Absolute)	9.0	8.0	2.7	1102	1.023
	S. E. ±	0.91	0.42	0.12	218.0	0.03
	C.D. (P=0.05)	2.65	1.29	0.34	633.9	0.08
	C.V (%)	13.9	8.28	6.57	12.10	3.92

due to provided more nitrogen at initial stage because these manures contained more nitrogen in available form which helped for better growth of root. These results are in conformity with those reported by Sunandarani and Mallareddy (2007). Organic manures had a pronounced effect on fasciculated root yield. Application of vermicompost @ 2 t/ha along with *Azotobactor* showed significantly higher fasciculated root yield (4444 kg/ha) of Safed musli which was at par with application of castor cake @ 1 t/ha along with *Azotobactor*, application of neem cake @ 750 kg/ha along with *Azotobactor* and application of castor cake @ 1 t/ha. Higher nitrogen and phosphorus content of vermicompost, neem cake and castor cake that might have resulted the higher fasciculated root yield. The increase in fasciculated root yield might be due to the fact that organic manures which improved the physical condition of soil and provide better condition for uptake of nutrients which lead to better growth of plant. These results are in line with of Krishanaswamy *et al.* (1984), Sharma *et al.* (1989), Barevadia and Patel (1996), Chandrashekharan *et al.* (2000), Jayaprakash *et al.* (2003) and Paturde and Wankhede (2004).

Sapogenine content in Safed musli:

The highest sapogenine content (1.494 %) was recorded under application of vermicompost @ 2 t/ha with treatment of *Azotobactor*. This might be due to better availability and uptake of nitrogen and other nutrients in combination of manures which might have lead to balanced C/N ratio and increased activity of plant metabolism as suggested by Sunandarani and Mallareddy (2007) and Emura and Hosoya (1979).

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