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Evaluation of safed musli (*Chlorophytum borivilianum* Santapau & Fernandes) germplasm

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Abstract

Safed musli (*Chlorophytum borivilianum* Santapau & Fernandes), an herbaceous plant belonging to the family liliaceae is mostly collected from wild sources as its tubers are in high demand in indigenous systems of medicine in the preparation of a aphrodesiac drug for curing general debility. Safed musli germplasm were evaluated for their performance. A large variability was observed in terms of morphological and yield attributing characters and tuber yield among the germplasm. CB/MS-6 gave highest number of leaves plant^{-1} (23.8), number of tubers plant^{-1} (10.2), tuber thickness (0.80 cm) and fresh (65.3 g plant^{-1}) and dry (8.5 g plant^{-1}) tuber yield. Further, two distinct plant types (prostrate or spreading and erect) were observed among these accessions. Observations on the crop grown in farmer's field in different locations revealed the feasibility of its cultivation in semi arid areas of Andhra Pradesh, Madhya Pradesh and Maharashtra.

Key words: *Chlorophytum borivilianum*, medicinal plant, safed musli

Safed musli (*Chlorophytum borivilianum* Santapau & Fernandes) belonging to the family liliaceae is mostly collected from forests for its roots (tubers) which are in high demand in the indigenous systems of medicine and is an essential component in the preparation of 'Chyanprash'. Thirteen species in the genus *Chlorophytum* are reported to occur in India (Sheriff & Chennaveeraiah 1972), of which eight are endemic to the subcontinent (Nair 1974). Among different species, the tubers of *C. arundinaceum* and *C. borivilianum* are reputed to be best in quality. The saponins of the tubers are considered to be potent medicinal compounds in the tubers (Bordia *et al.* 1995).

Safed musli is cultivated in about 120 ha, mainly in the states of Maharashtra, Madhya Pradesh, Gujarat, Uttar Pradesh, Rajasthan and Andhra Pradesh. The annual production is about 100 tonnes from the cultivated area and 500 tonnes collected from wild source. The tubers of cultivated varieties are much superior in quality compared to the tubers collected from wild. Germplasm of *C. borivilianum* collected from various parts of Madhya Pradesh and Maharashtra were assessed for their performance. Further, data on yield attributing characters and yield of the crop grown in farmer's fields at different locations were also collected to assess the potentiality of the crop.

Ten single tubers (with crown region) of each collection were planted at a spacing of 30 cm on ridges (30 cm apart) in July 2000 at the research farm of Central Institute of Medicinal

and Aromatic Plants, Field Station, Hyderabad which is situated at 542 M above MSL, 17.20° N latitude and 78.3° E longitude. The annual rainfall in the area is about 760 mm, 80% of which is received between June and September. Average day and night temperatures vary from 22° C to 35° C. The soil of the experimental field was well drained, gravel sandy-loam in texture, with organic carbon 0.3%, pH 7.3 and available N, P and K at 60.6, 10.8 and 155 kg ha^{-1}, respectively. Farm yard manure (20 tonnes $acre^{-1}$), neem cake (0.5 tonnes $acre^{-1}$), bone meal (0.5 tonnes $acre^{-1}$), single super phosphate (60 kg P_2O_5 $acre^{-1}$) and muriate of potash (40 kg K_2O $acre^{-1}$) were applied at the time of final land preparation and before making ridges. Irrigation (4 - 5 days interval) through furrows was given during dry period.

Observations on number of leaves $plant^{-1}$, length and width of leaf were recorded in three plants selected at random in October 2000 before plants started drying. Number of tubers $plant^{-1}$, tuber length and thickness and fresh weight of tubers were recorded in February, 2001. Dry weight of musli was recorded after peeling off the skin and sundrying for 4 days. Yield attributing characters on five randomly selected plants and fresh tuber yield of safed musli grown in farmer's field at ten different locations in Andhra Pradesh, Madhya Pradesh and Maharashtra were recorded.

A large variability was observed in morphological and yield attributing characters and yield among the different accessions tested. In the entry CB/MS-6, number of leaves $plant^{-1}$, number of tubers $plant^{-1}$, tuber thickness and fresh and dry tuber yields were highest (Table 1). Leaf length and width and tuber length were highest in CB/MS-2. Further, two distinct plant types (prostrate or spreading type and erect type) were observed among the accessions. In the prostrate type (CB/MS-6), the leaves spread out immediately after coming out from the crown region while in the erect type (CB/MS-2), the leaves grow upward for a short distance and then spread out.

Observations recorded in farmers' fields in different locations revealed a large variability in respect of number of leaves $plant^{-1}$, number of tubers $plant^{-1}$, tuber length and thickness and fresh tuber yield (Table 2). Fresh tuber yield recorded at Akola, East Godavari and Indore were significantly higher than the yields recorded at Ananthapur, Guntur, Hyderabad, Nagpur and Ranga Reddy districts. Higher

Table 1. Germplasm evaluation of safed musli (*Chlorophytum borivilianum*)

Entry	No. of leaves $plant^{-1}$	Length of leaf (cm)	Width of leaf (cm)	No. of tubers $plant^{-1}$	Tuber length (cm)	Tuber thickness (cm)	Fresh weight of tubers (g $plant^{-1}$)	Dry yield of musli (g $plant^{-1}$)
CB/MP-1	18.4	22.6	1.4	6.5	5.5	0.49	27.5	4.7
CB/MP-2	21.6	25.8	1.7	9.6	6.9	0.66	38.3	5.4
CB/MP-4	14.3	18.0	1.2	6.4	5.0	0.45	18.3	3.1
CB/MP-9	19.5	23.0	1.3	7.5	7.6	0.72	32.0	5.1
CB/MP-11	17.6	19.4	1.5	7.8	5.8	0.48	31.5	5.0
CB/MS-2	23.0	28.7	1.7	10.1	8.7	0.78	63.3	8.2
CB/MS-5	20.7	21.3	1.6	9.8	7.8	0.65	50.7	7.2
B/MS-6	23.8	27.8	1.6	10.2	8.4	0.80	65.3	8.5
CB/MS-10	20.0	17.2	1.7	8.8	7.9	0.71	53.4	7.0
CB/MS-12	17.6	18.5	1.5	7.7	6.5	0.56	43.1	6.9
LSD (P = 0.05)	2.5	2.8	0.2	1.5	1.1	0.12	6.8	1.0
CV	13.4	18.6	15.1	15.7	9.7	10.5	17.2	18.1

Table 2. Growth and yield of safed musli in farmers field at different locations

Location	No of leaves plant^{-1}	No. of tubers plant^{-1}	Tuber length (cm)	Tuber thickness (mm)	Fresh tuber yield (tonnes ha^{-1})	Remarks
Ananthapur (Thadepatri)	16.5	6.5	5.6	4.7	4.87	Planted in July on ridges at 60 cm apart & periodic furrow method of irrigation
Akola	20.0	9.5	7.7	7.2	7.45	Planted in May on raised bed with drip system of irrigation
Cuddapah	18.4	8.6	6.6	6.4	6.14	Planted in July on ridges & sprinkler method of irrigation
East Godavari (Kakinada)	19.5	9.8	7.6	7.0	7.06	Planted in June on raised bed with sprinkler method of irrigation
Guntur	17.6	7.8	5.8	6.5	5.57	Planted in July on ridges & furrow method of irrigation
Hyderabad (Medchal)	14.5	7.5	6.1	4.8	4.51	Planted in August on ridges & furrow method of irrigation
Indore	20.7	9.0	8.7	7.3	6.85	Planted in July on raised bed and sprinkler method of irrigation
Mehboob Nagar (Shamshabad)	20.2	9.1	8.4	5.6	6.37	Planted in July on ridges & sprinkler method of irrigation
Nagpur	18.5	8.3	6.5	5.3	5.31	Planted in June on raised bed with sprinkler method of irrigation
Ranga Reddy (Shankarpally)	17.1	6.4	6.0	6.1	5.12	Planted in July on ridges & sprinkler method of irrigation
LSD (P = 0.05)	2.6	1.5	1.2	1.1	9.80	

number of leaves and tubers plant^{-1} and tuber length and thickness observed in these areas led to higher tuber yields which may be due to early planting (May - June) on raised beds (45 cm high and 100 cm wide) and providing drip/sprinkler irrigation.

Thus it may be concluded that there is large variability in respect of morphological traits, yield attributing characters and yield of safed musli among the tested accessions. The same may be utilized for future crop improvement programme. A large variability was also observed in respect of growth and fresh tuber yield at different locations, partly because of variations in time and method of planting, method of irrigation, etc. Location specific agrotechnology needs to be worked out in order to realize full potential of the crop.

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