

Study of Micropragation and Shoot or Roots Proliferation of *Chlorophytum borivilanum*

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Abstract: Safed musli (*Chlorophytum borivilanum*) is an important medicinal plant of family Liliaceae contain a chemicals substance in the different parts mainly the root was used for investigation. Dry roots are known as safed musli which contain a drug. It is used against diuretic, nutritive, urinary tract infection, general debility, impotency etc. It is considered as wonder drug in Indian systems of medicines due to its aphrodisiac and natural sex tonic properties. It is also used to cure weakness and male sterility. It is a supplementary therapy for blood purification, nervous disorders and some gynecological problems. Such commercially important plant is infected by fungal diseases viz., responsible for decrease in yield; hence survey of fungal diseases was undertaken, which illustrates the different diseases of Safed musli.

Keywords: Safed musli, *Chlorophytum borivilanum*, roots.

1. Introduction

Chlorophytum borivilanum (safed musli) is an important medicinal plant growing in forests of Madhya Pradesh, Gujarat, Rajasthan and Maharashtra. It is a rhizomatous herb (Singh and Chauhan, 2003). Safed musli Leaves are sub erect and lanceolate. Flowers are star like. The roots are fleshy in bunches and measures upto 7-12 cm. in length. It is 3-4 months crop. It is cultivated in June-July. A well developed plant bears an average 2- 5 inflorescence. Each inflorescence contains 20-25 flowers. Seeds have a dormancy period of about 10 months and very low germination due to which cultivation is mostly carried out by tubers (Oudhia, 2000).

Safed musli is a very popular aphrodisiac agent, with no side effects. It is often prescribed for enhancing male potency and overcoming signs of fatigue. Safed musli is particularly used for individuals with low sperm count and low libido. The tuber roots of safed musli (*Chlorophytum*) have been used since ancient times, to prepare nutritive tonic for sexual weakness and is used in Ayurvedic medicines even today. Safed musli is a Hindi term for the botanical herb *Chlorophytum borivilianum*. It is a traditional medicinal plant and thick forests being its original and natural habitat. In Sanskrit it is known as shwet musli. Mainly its tuberous roots are utilized for ayurvedic medicines. Nutritive tonic made from these roots is used to improve general sexual weakness. Safed musli has natural oil, which is excellent manure for good and robust health and ideal for mother hood. It is also used in production of Chawanprash. In the ayurvedic literature, safed musli is celebrated as a 'Divya Aushad' (Divine Medicine) with unparalleled medicinal properties. It is a chief ingredient in the preparation of over a hundred ayurvedic formulations. Besides its extensive use in ayurveda and other conventional medicinal systems in Asia, Safed musli is also gaining increasing acceptance as a vitalizer.

It has also been widely accepted as a health-giving tonic, a curative for pre-natal and post-natal problems, a restorative for immunity- improvement and as a remedy for diabetes and arthritis as well. Seventeen species of *Chlorophytum* had been reported in India (P. Oudhia, 2001). All differ in

medicinal properties but due to lack of correct information, all of them are called safed musli. Cultivation of this wonder crop is much more profitable than any other crop of this season and provides good returns on investment in a short gestation period of 7-8 months.

Medicinal Properties and Uses

- The major components of safed musli are carbohydrates (41%), protein (8-9%), saponins (2-17%) and root fibres (4%).
- Saponin is the chief medicinal compound present in roots.
- The roots of safed musli are well known tonic. It has key application in the care of general debility by acting as an aphrodisiac. It has also been used in the treatment of rheumatism and the leaves for vegetable purpose in central India.

2. Material and Method

Plant materials -The fresh Safed Musli root was procured from the Sanjivani Ayurvedic Clinic and used investigation in the present.

Sterilization of Roots: It was then washed thoroughly with running water so that all dirt is removed. After washing the roots was manually peeled with the help of knife and the peeled root was then dried. Again the roots were washed thoroughly in running tap water for 5-10 minutes. After that they were washed with soap solution for 20 minutes with constant shaking and then washed with distilled water to remove any trace of soap 2 times for 5 minutes and then kept in 1% solution of Bavistin (BASF India the Limited) for one hour after that seeds were washed 3-4 times with distilled water and then were taken inside the laminar hood for further sterilization. Here 2-3 sterile water washings were given. After these washings, seeds were taken out and dipped in 70% ethyl alcohol for 30 seconds.

After alcohol dipped seeds were washed 2-3 times with autoclaved distilled water and then surface sterilized with freshly prepared 0.1% aqueous solution of Mercuric chloride (HgCl₂) for 8-10 seconds. After Mercuric chloride treatment, seeds were thoroughly washed for 3-4 times with ste-

rile chilled distilled water to remove any traces of Mercuric chloride. After sterilization of explants, they were inoculated in culture bottles containing MS medium with different concentrations of BAP, KN and IAA. The cultures were maintained at 25±2 °C with light intensity varied from 2000–3000 lux. The photoperiod was generally 16 hours light 8 hours dark.

Shoot proliferation: For shoot proliferation, BAP (1mg/L, 1.5mg/L, 2mg/L) and KN (1mg/L, 1.5mg/L, 2mg/L) at different concentrations in combination with IAA (1mg/L), and agar (0.8%) used. Daily observation was done regarding the growth and condition of explants. Data were recorded after 10-15 days of culture and only shoots greater than 4-6cm were considered for taking data in *Chlorophytum borivilanum*. At this stage, the proliferating cultures were sub cultured again in the same initial medium in order to increase budding frequency. After another 3 weeks of incubation the proliferating cultures were transferred to different media for shoot elongation.

Rooting of micro-shoots: Newly formed shoots measuring 1-2cm in length were excised individually from the parent explants and transferred to rooting media. Ms basal medium was used with 1mg/L IAA, 0.5mg/L BAP and 1mg/L KN. Data were recorded after 15 days of culture.

3. Result and Discussion

Achieved on MS medium containing 4.08gm/L, BAP at 3mg/L and IBA 0.5mg/L, KN 1mg/L and Sucrose 20gm/L, CaCl₂ 440mg/L, Agar 0.8% during every subculture period of 21 days. 3 to 3.5 cm long shoots were found to be most suitable for the purpose of rooting. On the standard rooting medium more than 80% of the shoots were successfully rooted. The fibrous adventitious roots originating from the basal shoot part were more than 16 in number and measured 6-4 cm on average root. Induction could be uniformly obtained after 7 days of inoculation of shoot.

Table 1: Effects of growth regulators on proliferation of *Chlorophytum borivilanum* Shoots

S. NO.	Medium+Growth Hormones (Mg/l)	Average No. of Shoots	Average Shoots length (in cm)
1.	MS+ 1.0 BAP	1-2	2
2.	MS+ 1.5 BAP	1-3	2-3
3.	MS+ 2 BAP+ 1IBA	1-3	1-2
4.	MS+ 1 BAP+ 0.5 IBA*	2-4	4-6
5.	MS+ 1.5 BAP+ 0.5 IBA	1- 2	1-3
6.	MS+ 1 KNs	1-2	1-2

*Showing maximum growth.

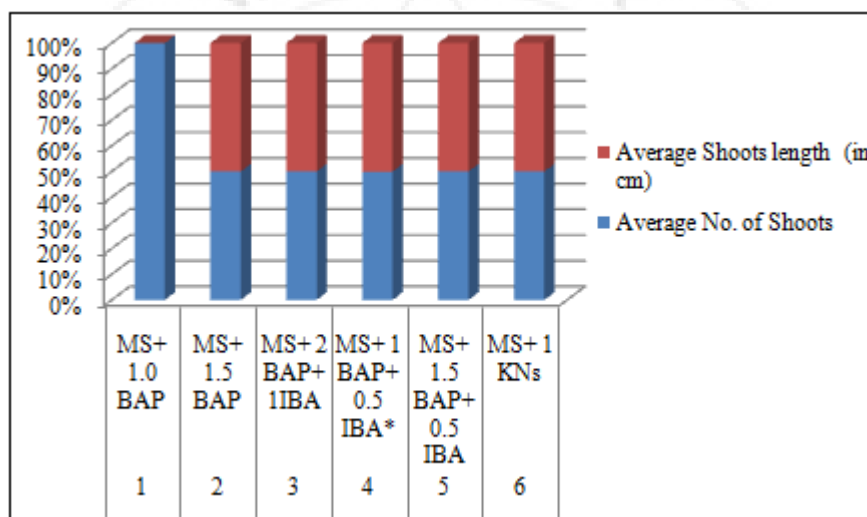
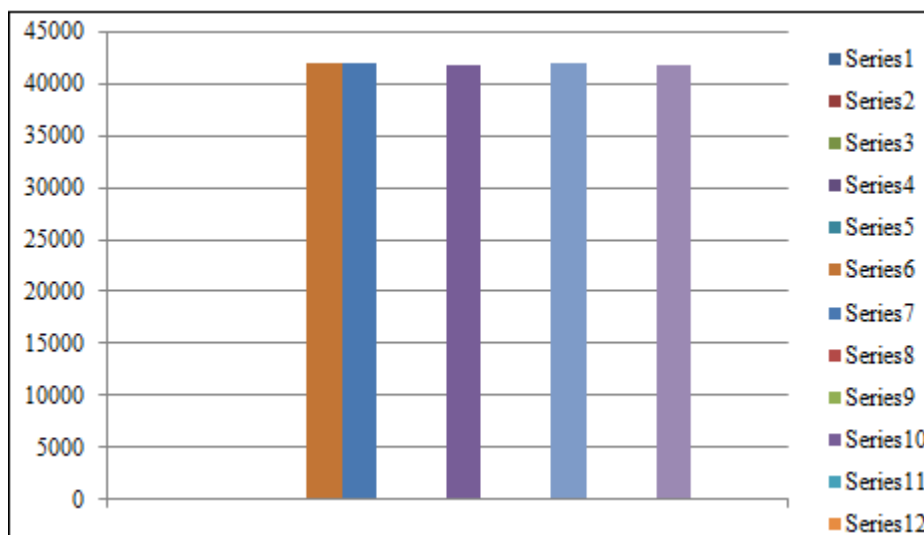


Table 2: Effect of growth regulators on proliferation of *Chlorophytum borivilanum* Roots

S. No.	Medium+ Growth Hormones (mg/l)	Root length in cm	Root Morphology
1.	MS+ 1 IBA *	4-6	Thin, long
2.	MS+ 1 IBA+ 0.5 BAP	1-2	Thin, short
3.	MS+ 1.5 IBA	1-3	Thin, long
4.	MS+ 2 IBA+ 1 KN	1-2	Thin ,short

*Showing maximum growth



4. Conclusion

Chlorophytum borivilianum is a medicinal plant and due to its extensive medicinal, nutraceutical and other uses it's enjoy a great demand in the market across the globe. *Chlorophytum borivilianum* presents the finest commercial opportunity among the various medicinal plants. Micro propagation technique of *Chlorophytum borivilianum* has been briefly analyzed. During propagation the protocol efficiency revealed that 80-90% plant regeneration. It was apparent from the results that, the MS medium containing concentration of 1.5 mg/l KN and 3 mg/L BAP was more efficient for shoot regeneration and was standardized as the best media. The micro propagation technique is useful in the plant regeneration and transformation and production of the secondary metabolites in order to produce plants for medicinal use and further research efforts.

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