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IN VITRO PROPAGATION OF *BRYOPHYLLUM PINNATUM* (LAM.)

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Abstract:

Bryophyllum pinnatum (Lam.) (Crassulaceae) is a perennial and widely used divine herb. Though it is not a native of India, it was introduced into the country by Europeans as an ornamental plant. Gradually it started finding its use in Indian traditional systems of medicine like Ayurveda, Unani and Homoeopathy. Experiments were undertaken to study the compatibility of standard Murashige and Skoog medium fortified with different PGRs (BA, IAA and NAA) with *Bryophyllum pinnatum* (Lam.) using leaf as explants. Their concerned explants viz. Leaf incorporated on Murashige and skoog media containing 0-1mg/l IAA, 0-1mg/l NAA in combination with 0-1mg/l BA. Results showed in one month the high compatibility of MS media supplemented with 0.4 mg/l BA and 1 mg/l IAA *Bryophyllum pinnatum* (Lam.) developed completely rooted plantlets. The regenerated plantlets were hardened and successfully transferred to soil and grown to maturity.

Key words: *In vitro* propagation, leaf explants, PGRs, *Bryophyllum pinnatum* (Lam.)

INTRODUCTION

Bryophyllum pinnatum (Lam.), commonly known as the "air plant. It is a succulent perennial plant belonging to the family Crassulaceae. The species is widespread in tropical and subtropical regions worldwide due to its medicinal uses and unique vegetative propagation. *Byrophyllum pinnatum*'s potential in traditional medicine, particularly in treating wounds, inflammation, and infections. Various studies highlight the plant's pharmacological potential, including its antimicrobial, anti-inflammatory, analgesic, antioxidant, and antidiabetic activities. These bioactive properties are primarily attributed to its rich composition of secondary metabolites, such as flavonoids, alkaloids, and phenolic compounds. Modern scientific research is increasingly validating the plant's pharmacological benefits, emphasizing its antimicrobial, antioxidant, analgesic, and nephroprotective properties.

MATERIALS AND METHODS

Plant materials for *Bryophyllum pinnatum* (Lam.) for tissue culture studies were grown and maintained in the Medicinal Garden of IITE Gandhinagar. Leaf explants were surface sterilized with 0.5% Mercury chloride, 2% Sodium hypochlorite following by washing of sterile double distilled water for one minutes each to remove the traces of HgCl₂ and Sodium hypochlorite. Sterile Leaf explants were excised in to pieces of 1 to 2 cm and carefully inoculated on MS basal medium (Murashige and Skoog's, 1962) revised and slightly modified with sucrose (3.5 %) was used as carbon source and agar agar (0.8 %) as a gelling agent supplemented different combination of 0-1mg/l IAA, 0-1mg/l NAA in combination with 0-1mg/l BA. The pH of the medium was adjusted to 5.8 before the addition of agar and autoclaved at 1210 C (1.06 kg/cm²) for 20 minutes. The cultures were incubated at 25±20 C, for 16-18 hours photoperiod. Each treatment consisted of 5 replicates and was periodically carried out at 4 weeks interval for further growth of shoot, leaf and Root multiplication. Regenerated shoots (more than 5 cm in length) will well developed with roots were removed without any traces of agar, transferred to grown in plastic pots filled with sterile sand, soil and vermiculate (2:1:1) kept in the controlled atmosphere room (26 °c ± 2°c, 55 ± 5%, Humidity

and 2000 Lux). The hardened plants were acclimatized in the green house and then finally they were transferred to pots containing normal garden soil rite after one month.

RESULTS AND DISCUSSION

The leaf explant was culture in MS supplemented with combination of BA + NAA and BA+IAA medium. The multiple shoot formation observed in MS with BA+IAA medium within eight day of inoculation. Leaf explants were capable of direct development of multiple shoot, leaves and root formation.

MS medium combination with 0.4 mg/l IAA and 1mg/l BA Medium were showed the highest number of proliferations of rooted shoot. While minimum number Shoot and leaf growth observed in MS with combination of BA + NAA medium. Similarly lowest shoot were found by the Tahir S.M. and A.Saidu, 2021 in *Bryophyllum pinnatum*.

The combined treatment of 0.4 mg/l IAA and 1mg/l BA had obtainable the 36 number of leaves within the 25 Days of inoculation. While the minimum number of leaves observed in 0.5 mg/l NAA and 0.4mg/l BA medium. Multiple Roots (more than 34) per culture were observed in 0.4 mg/l IAA and 1mg/l BA within four weeks. When roots were well grown the rooted plantlets were transferred to plastic/Thermocol cups containing 1:2 soil rite growing medium for acclimatization followed by hardening with more than 95% survival ratio.



Bryophyllum pinnatum (Lam.)

Different Stages of *in vitro* regeneration of *Bryophyllum pinnatum* (Lam.) in MS supplemented with 0.5 mg/l BA+1mg/l IAA medium

Table 1 Effect of various concentration on the growth of *Bryophyllum pinnatum* (Lam.)

Sr No.	PGRS Concentration			One month			
	BA (mg/l)	IAA (mg/l)	NAA (mg/l)	shoot number per plantlets	Length (cm) ± S.E	Leaf number	No. of Root
1	0.2	0.5	0	0	0	0	0
2	0.4	0.5	0	2 ± 1.2	1.4 ± 0.4	6	4
3	0.6	0.5	0	5 ± 0.8	1.8 ± 0.5	10	8
4	0.8	0.5	0	9 ± 1.2	3.0 ± 0.7	20	20
5	1	0.5	0	10 ± 1.8	4.0 ± 1.0	25	26
6	0.2	1	0	14 ± 1.8	4.5 ± 1.0	32	30
7	0.4	1	0	16 ± 1.2	5.2 ± 1.2	36	34
8	0.6	1	0	10 ± 1.2	4 ± 1.5	28	32
9	0.8	1	0	10 ± 0.8	2 ± 1.0	22	20
10	1	1	0	6 ± 1.0	2 ± 0.6	16	20
11	0.2	0	0.5	0	0	0	0
12	0.4	0	0.5	4 ± 1.0	1.0 ± 0.2	2	6
13	0.6	0	0.5	4 ± 0.2	1.2 ± 0.8	5	8
14	0.8	0	0.5	6 ± 1.6	1.0 ± 1.0	10	16
15	1	0	0.5	6 ± 1.0	1.2 ± 0.6	12	26
16	0.2	0	1	12 ± 0.8	2.5 ± 1.2	16	24
17	0.4	0	1	12 ± 1.4	3.0 ± 1.4	20	24
18	0.6	0	1	8 ± 1.0	4.4 ± 1.2	20	12
19	0.8	0	1	10 ± 0.8	6 ± 1.0	16	14
20	1	0	1	16 ± 1.0	6 ± 0.6	10	18

CONCLUSIONS

In vitro multiplication of *Bryophyllum pinnatum* (Lam.) protocol was standardized for medicinally and economically important for further exploited for commercial propagation and conservation. This plant role as a medicinal resource and an ornamental plant underscores its importance in both traditional and modern contexts this plant has been traditionally used in various medicinal systems, including Ayurveda, Unani, and traditional folk medicine. The plant is known for its rich phytochemical composition, including flavonoids, alkaloids, glycosides, steroids, and tannins, which contribute to its numerous health benefits.

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