Indian J. Plant Physiol., Vol. 12, No. 2, (N.S.) pp. 178-180 (April-June, 2007)

SHORT COMMUNICATION

EX SITU CULTURE STUDIES ON A MEDICINAL PLANT *PEDALIUM MUREX* (LINN)

R. SARAVANAN, M. GHOUSE BASHA*, AMZAD BASHA K. AND L. VIVEKANANDAN

P.G. and Research Department of Botany, Jamal Mohamed College, Tiruchirappalli - 620 020, Tamil Nadu

Received on 25 Sept., 2006, Revised on 27 June, 2007

In the present study, nodal, internodal segments of *Pedalium murex* (Linn) were cultured on Murashige and Skoog (MS) medium supplemented with 3 mg/l 2,4-D, which was found to be most suitable for the successful callus initiation. The callus was then cultured on MS medium consisting of MS basal salts, 0.8% agar and 3% sucrose supplemented with BAP with a concentration of 3 mg/l, which lead to the highest rate of multiple shoot bud initiation. The *in vitro* shootlets were cultured on different concentrations of 2, 4-D in combination with BAP in the culture medium. For flower initiation, the highest rate of flower initiation was in the culture media supplemented with 1.5 mg/l 2,4-D and 1.5 mg/l BAP.

***Key words: In vitro* studies, medicinal plant, *Pedalium murex* (Linn).**

Pedalium murex (Linn) (Pedaliaceae) is an endemic and medicinally important herb. It is used in Siddha, Ayurvedic and Chinese medicines. Different parts of the plant are used for medicinal purpose. In general, the plant is exploited against diuretic, demulcent, aphrodisiac properties (Ford *et al.* 2000). It is also used for treating impotency in males, nocturnal emissions, gonorrhea, gleet and incontinuance of urine (Subramanian and Madhavan 1983) and also used in scorpion sting, jaundice, painful bladder, etc. In the present study, an attempt was made to understand the growth, development and flower initiation of this plant in *in vitro* conditions, since this plant is highly exploited due to its medicinal value.

The shoot-tips and nodes of the experimental material under study were collected from Khajamalai at Tiruchirappalli (Fig. A). They were kept under running tap water for 30 minutes and placed in detergent solution (Teepol-5%)for 10 minutes. The explants were then washed in running tap water until the removal of traces of detergent solution. After that, the explants were washed in double distilled water. The plants were then transferred in front of the laminar airflow and disinfected with 0.1% mercuric chloride for a period of 8 minutes. Finally, they were rinsed with sterilized distilled water. The disinfected plantlets were taken for inoculation. The surface sterilized shoots, nodes, internodes and leaves were cut into appropriate size of about 5mm length containing single node and were implanted into MS medium supplemented with 2,4-D for callus induction. The cultures were incubated at 24±2°C under 2000-lux intensity provided by white fluorescent lamp for 16hr photoperiod.

The callus was cultured on MS medium containing MS basal salts, 0.8% agar and 3% sucrose supplemented with BAP for the initiation of multiple shoot buds. The shootlets were cultured in the medium containing growth regulators 2,4-D and BAP with 1.5 mg/l respectively for *in vitro* flower initiation.

The internodal segments of *Pedalium murex* exhibited callus initiation in 12 days after inoculation and the fullfledged callus was initiated after 25 days (Fig.B

*Corresponding author, E-mail: ghobashjmc@yahoo.co.in

and C). Maximum callus induction (90%) was observed when 3 mg/l 2,4-D was used in the MS medium. When 2 mg/l was used, there was 80% callus induction (Table 1). The results obtained by Shahzad *et al.* (1999) were similar to our findings. Direct caulogenesis and rhizogenesis from leaf explants of *Solanum nigrum* on MS medium as well as from intermediate callus have been obtained. The MS basal medium with 2,4-D (2.0 mg/l) alone or in combination with BAP (0.5 mg/l) proved superior for the induction of compact nodular green calli whereas 2,4-D (0.5 mg/l) was suitable for multiple shoot regeneration.

Table 1. Influence of growth regulators on initiation of *in vitro* shooting after 3 weeks in MS medium.

Concentration of growth regulators (mg/l)	Culture showing shooting response (%)	Average number of shoots	Average shoot length (cm)	Remarks
2,4-D				
0.00	0	0	0	–
0.5	10	1	1.5	–
1.0	20	1	1.8	–
1.5	30	2	2.0	–
2.0	80	3	2.2	Internodal callus formation
3.0	90	3	2.0	Basal callus formation
BAP				
0.0	0	0	0	–
0.5	20	1	1.5	–
1.0	45	1	1.8	–
1.5	50	2	1.9	–
2.0	60	2	2.0	–
2.5	75	1	1.8	Multiple shoot formation
3.0	80	2	1.6	Shoot formation
2,4-D+BAP				
0.00+0.0	0	0	0	–
0.5+1.0	10	1	1.5	–
1.0+1.0	30	1	1.8	–
1.5+1.5	60	3	2.0	*Invitro* flower formation

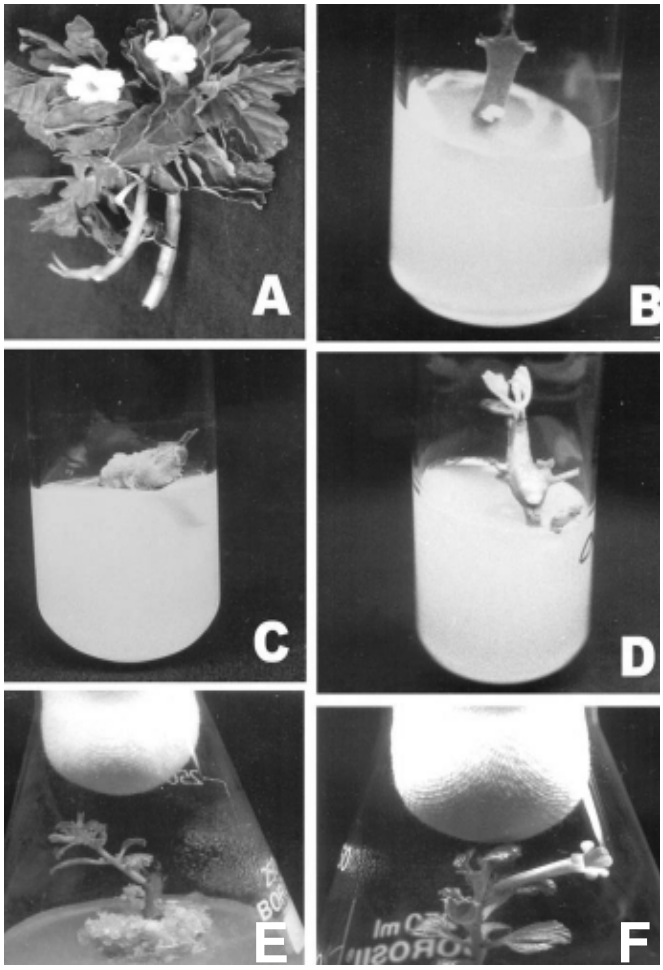

Fig. 1. *Ex situ* culture studies on a medicinal plant - *Pedalium murex* (Linn)
A. Explant-Twigs of *Pedalium murex* (Linn) with flowers, B. Callus initiation from the explant internodal segments, C. Growth of callus, D. Shoot proliferation from the explant, E. Multiple shoot proliferation from basal callus, F. *In vitro* flower initiation

The next phase of study was multiple shoot initiation from the callus, which was seen after two weeks of inoculation. When 3 mg/l BAP was used, the optimum shoot proliferation (80%) was observed with an average shoot length of 1.6 cms (Fig. D) (Table 1). Our results are supported by the observation of Verma and Kant (1996) who obtained shoot proliferation from nodal stem explants of *Emblica officinalis* on MS medium with BAP (3.0 - 5.0 mg/l) and NAA (0.5 mg/l). These shoots elongated on hormone-free MS medium. The elongated shoots were subsequently rooted on half-strength MS medium containing IBA (2.0 - 3.0 mg/l). Additions of 2,

4-D with 3 mg/l concentration lead to the multiple shoot initiation (Fig.E).

The final phase of the study was *in vitro* flower initiation (Fig. F). This was observed using the growth regulators 2, 4-D and BAP with 1.5 mg/l respectively in the culture medium with the shooting response of 60%. The shoot length was optimum with 2 cms length (Table 1). Our observation was supported by the report of Kulkarni *et al*. (2000) initiated in *in vitro* studies of *Withania somnifera* using nodes, internodes, hypocotyl and embryos.

ACKNOWLEDGEMENT

Authors are thankful to the Department of Science and Technology, New Delhi, for providing the DST FIST-Sponsored program to our Department. Authors are grateful to the University Grants Commission, New Delhi, for providing financial support.

REFERENCES

Ford, M.G., Marris, D., Smith, J.R., Leonard, P.K., and Renser, P.E (2000). A unique formulation of alphacypermethrin with enhanced residual properties and precision field performance. BCPC Conference-Pests and Diseases **3:** 1081. (ISBN I 901396 60 6).

Kulkarni, A.A., Thengane, S.R. and Krishnamurthy, K.V. (2000). De novo regeneration of various explants of *Withania somnifera* (L.) Dun. *Horticul. Abstr.* **70:** 230.

Murashige, T., and Skoog, F. (1962). A revised medium for rapid growth and bioassay with tobacco cultures. *Plant Physiol.* **15:** 473-497.

Shahzad, A. (1977). Somatic cell Genetics and plant improvement *Ann. Agron.* **20:** 39-81.

Subramanian, S.V. and Madhavan V.R. (1983). Heritage of Tamil Siddha Medicine, International Institute of Tamil Studies, Madras.

Verma, B. and Kant, U. (1996). Micropropagation of *Emblica officinalis* Gacrtz through mature nodal explants. *J. Phytol. Res.* **9:** 107-109.