Recent Research in Science and Technology 2010, 2(7): 33-35
ISSN: 2076-5061
www.recent-science.com

BIOTECHNOLOGY

IN VITRO MULTIPLICATION OF IMPORTANT MEDICINAL PLANT *SOLANUM NIGRUM* L.

Narayan Pandhure*, Ranjit Bansode and Vijay Kothekar

Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad- 431004. (MS) India

Abstract

Medicinal plants are the most important source of life saving drugs for the majority of the world's population. The biotechnological methods are important to select, multiply and conserve the critical genotypes of medicinal plants. In vitro regeneration holds tremendous potential for the production of high quality plant-based medicine. During the present investigations, direct multiple shoot formation *Solanum nigrum* L. in vitro was recorded with BAP 6 mg/lit and IAA 0.5 mg/lit. Maximum shoot emergence was achieved using nodal segment as explant with BAP 6 mg/lit. and IAA 0.5 mg/lit. The well developed shoots were sub cultured on a rooting medium containing IBA. Plants were multiplied in vitro and hardened successfully.

Keywords: *Solanum nigrum* L. Multiplication, Micropropagation

Introduction

Solanum nigrum L. is an important medicinal plant belonging to the family Solanaceae. The whole plant is anti-periodic, anti-phlogiston, diaphoretic, diuretic, emollient, febrifuge, narcotic, purgative and sedative. The leaves, stems and roots are used externally as a poultice; wash etc. in the treatment of cancerous soles, boils, leucoderma and wounds [1]. Extracts of the plant are analgesic, antispasmodic, anti-inflammatory and vasodilator. The plant has been used in the manufacture of locally analgesic ointments and the juice of the fruit has been used as an analgesic for toothaches [2]. In the present study, an attempt was made to standardize a protocol for regeneration of the plant in *in vitro*.

Materials and Methods

The leaf explants of *Solanum nigrum* L. were collected from departmental garden. The leaves were washed in tap water containing 0.1% (v/v) Tween 20. The explants were then washed in double distilled water. The explants surface sterilized by dipping in 70% alcohol for 2 minute followed by washed thoroughly in sterilized distilled water. Then explants were disinfected with 0.1% mercuric chloride for 1 min. Finally, the explants were rinsed with sterilized distilled water for three times. The surface sterilized explants were cut into appropriate sizes and inoculated in MS containing basal salts with BAP (3.0 - 7.0 mg/l) and IAA (0.5 mg/l.

All the cultures were incubated in a growth room under a 16 h photoperiod (cool, white fluorescent light - 30-µmol m^{-2} s-1) and the temperature was maintained at 25 ± 2°C with 5 – 10 % relative humidity. Well developed shoots was obtained after 15 days. The well developed shoots were sub cultured on a rooting medium containing IBA.

The well rooted plantlets were removed from the MS medium, washed thoroughly in tap water, dipped in liquid MS, transplanted to sterile vermiculite, and irrigated with half strength of MS basal liquid medium. After three weeks, the plantlets were transferred to plastic cups containing equal ratios (1: 1: 1) of sterilized vermiculite, garden soil and farmyard soil. They were kept under shade for three weeks. The hardened plants were finally planted in the garden.

Results and Discussion

The leaf explants of *S. nigrum* showed callus initiation after 15 days of inoculation and the well-developed callus was noticed after 20 days. Maximum callus was recorded with BAP 4 mg/lit and IAA 0.5 mg/lit.(Table.1).

* Corresponding Author, *Email*: drnarayan14872@gmail.com

Table1. Effect of BAP and IAA for multiple shoot initiation from leaf explants of *S. nigrum*

Concentrations (mg/l)		No. of tubes resded/total No. of tubes inoculated	% of multiple shoot /Calli pon	No. of shoots/ explant (Mean ± SD)
BAP	IAA			
3.0	0.5	1/20	5C	2.00 ± 0.18
4.0	0.5	9/20	45C**	4.40 ± 1.81
5.0	0.5	16/20	80	12.75 ± 2.7
6.0	0.5	18/20	90	19.40 ± 4.2
7.0	0.5	12/20	60	11.83 ± 2.6
8.0	0.5	8/20	40	8.37 ± 2.06

Shoot induction was noticed prominently with BAP 5 mg/lit. and IAA 0.5 mg/lit,. Highest number of proliferated shoots (19.40) were recorded with BAP 6 mg/lit. and IAA 0.5 mg/lit,. This was followed by was 12.75 number of shoots with BAP 5.0 mg/l and IAA 0.5 mg/l.

Plate.1. Shoot Primordium from leaf explant

The elongated shoots were subsequently rooted on MS containing IBA (Table.2).

Plate2. Micro propagation from stem explant

Table 2. Effect of IBA on root formation from the regenerated shoots of *S. nigrum*

Concentrations (mg/l)	% of multiple roots	No. of roots/ explant (Mean ± SD)
IBA		
0.5	71	7.20 ± 2.14
1.0	58	4.70 ± 1.88
1.5	48	2.70 ± 1.33
2.0	32	2.00 ± 0.81
2.5	-	callus

The highest percentage of rooting was recorded when MS supplemented with 0.5 mg/l IBA (Table.2). Lowest rooting was recorded with IBA 2.5mg/lit. At this stage green ,fragile callus was obtained.

Similar observation was reported in earlier studies on *Anisochilus carnosus*, *Annona squamosa, Quisqualis indica* by Jeyachandran [3], Roxana Ahmed [4] and Poornima and Shivamurthy [5], respectively. The regenerated plantlets were finally subjected to hardening. Plants were hardened successfully in green house and transferred in the field.

Acknowledgements

Authors are thankful to Head, Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, for providing all the necessary facilities and encouragement.

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