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Studies on invitro callus culture of *Solanum khasianum* Clarke

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Research Article

Abstract: *Solanum khasianum* Clarke is an important medicinal plant contains solasodine. Solasodine has great pharmacological importance as a precursor in the synthesis of steroids and sex hormones. Steroid drugs used for the treatments of asthma, inflammatory disorders, sex hormones imbalance, as oral contraceptives and as a therapy for cancer. Consumption of this herbal medicine is wide spread and increasing worldwide day by day. *Solanum Khasianum* propagated by only seeds. Harvesting from the wild is the main source of raw material, causing loss of genetic diversity and habit destruction Therefore there is a need of alternative method to compensate in demand of solasodine.Invitro callus culture is an alternative method for the production of solasodine. For callus culture MS media supplemented with different con. of sucrose, 2,4-D , NAA , BA were useed with mature seeds as explants. In vitro response of the explants to callus development was measured by measuring fresh weight and dry weight callus. Highest weight of callus was supported by MS medium supplemented with 3/ sucrose containing 2,4-D 4.52 µM and 4.44 µM BA.

Key Words: *Solanum khasinaum*, callus, sucrose2,4-D, NAA- BA

Introduction

Solanum khasianum Clarke is an important medicinal plant belonging to the family Solanaceae. It contains solasodine as a secondary metabolite (Maiti 1979). Which has great pharmacological importance in the synthesis of steroids (Trivedi 2007) and sex hormones as steroid drugs used for the treatments of asthma, inflammatory disorders, sex hormones imbalance and as oral contraceptives (Maiti 1979; Edwin 2008). It also also used in therapy therapy for tumor or cancer (Sharma 2009). Consumption of this herbal medicine is increasing world wide day by day (Canter et.al.2005, Julsing 2007). *Solanum Khasianum* propagated by only seeds (Gunay 1982). Harvesting from the wild as a raw material causing loss of genetic diversity and habit destructions (Canter etal.2005, Julsing 2007). Therefore there is a need of alternative method to overcome or to compensate increase in demand of these secondary metabolites. Invitro callus culture is an alternative method for the production of secondary metabolites (Sasoon 1991; Sarin 2005). The plant cell culture is not affected by change in environmental conditions. But improved production may be available at any place or season (Shrivastava et.al.2004). Therefore callus culture for secondary metabolite has been carried out in increasing scale. (Shrivastava et.al 2004; Sarin 2005).There are various techniques have been used for increasing the rate of secondary metabolites productions like immobilization, bioconversion (Naikes et.al. 1995), use of biotic and abiotic elicitors (Namdeo 2007, Ramani et.al. 2008), hairy root culture (Jacob and Malpathak 2005; Mehrotra et.al. 2008), fungal elicition (Namdeo 2007) and change in production medium (Namdeo 2006; Fernanda et.al. 2007). The callus culture and suspension culture are the basic techniques used to produce desired metabolites of plants (Shrivastava et.al 2004; Ghada 2005). Considering these facts the plant tissue culture may offers a means to obtain high yield of secondary metabolites invitro at commercial level. To achieve this goals the present investigation work was planned with invitro callus culture for production of solasodine.

Materials and Methods

Wild young disease free healthy fruits were collected from field. Fruits were washed thoroughly under running tap water and then were washed with 1% savelon detergent for 10 min, followed by rinsing with distilled water 4-5 times and 80% ethanol for 30 sec. These fruits were surface sterilized by 0.1% $HgCl_2$ for 5 min. and were rinsed 4-5 times with sterile distilled water to remove traces of sterilant. Seeds were isolated from sterilized fruits and were inoculated on MpS medium supplemented with different sucrose & hormone concentrations.

Result and Discussion:

The result of varying conc. of sucrose, auxin hormones (2, 4-D, NAA BA) in MS are shown in table. Medium with 3% sucrose concentration supplemented with 4.52 µM 2, 4-D and 4.44 µM BA were showed higher growth than the other treatments. Among these 2,4 D at 4.52 µM was proved superior over BA .As the percentage of sucrose was increased above 3% it was inhibited growth of callus.

Sucrose % w/v	2,4D µM	NAA µM	BA µM	Growth of Callus
3	4.52	0	0.44	**
3	4.52	0	4.44	***
3	0	5.37	0.44	**
3	0	5.37	4.44	***
5	4.52	0	0.44	**
5	4.52	0	4.44	**
5	0	5.37	0.44	**
5	0	5.37	4.44	**
8	4.52	0	0.44	*
8	4.52	0	4.44	*
8	0	5.37	0.44	**
8	0	5.37	4.44	**
10	4.52	0	0.44	**
10	4.52	0	4.44	***
10	0	5.37	0.44	**
10	0	5.37	4.44	***

* Poor growth **Moderate growth *** High growth

Media containing 3% sucrose, supplemented with 4.44 µM BA and 4.52 2,4 D supported the highest fresh weight and medium containing 8% sucrose supplemented with 4.52 µM 2,4-D and 4.44 µM BA. Supported heighst dry weight. Our investigation on invitro callus culture was concluded that Media containing 3% sucrose, supplemented with 4.44 µM BA and 4.52 2,4 D supported the highest fresh weight of callus. Present investigation is supported researcher Nisit Kittipongaptatana et al 1998**.**

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