AN IN VITRO ANALYSIS AND ETHNOBOTANICAL PROFILE OF JASMINUM SAMBAC L.

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ABSTRACT
The use of herbal drugs for prevention and treatment of various health ailments has been in practice since time immemorial. The main beauty and uniqueness of jasmine is its fragrance, which cannot be imitated by any known synthetic aromatic chemical and has a unique status in the perfume world. Apart from that inhaling jasmine scents increases beta waves in the brain, which are associated with increases states of alertness. Various diseases like conjunctivitis, diarrhoea, abdominal pain and dermatitis are treated with its flowers along with roots and leaves are also utilized for curing pain, diarrhoea and fever. The present research is the highlight of various traditional uses as well as in vitro analysis reported till date from J. sambac. Regeneration of Maid of Orleans through direct and indirect organogenesis has been investigated.

Keywords: Organogenesis, in vitro, ethnobotanical

INTRODUCTION
Jasminum sambac Linn. Family- Oleaceae grown in tropical and subtropical parts of the world which has scendant or sub- erect shrub with young pubescent branches, broadly ovate or elliptic, opposite leaves. Commonly known as Motia or lily jasmine. Flowers are annually used for the extraction of perfumed oils and 250ml for the preparation of attar (Kusuma et al., 2012). The plants is considered cool and sweet used as a remedy in case of insanity, bitter, pungent cooling, tonic to brain, purgative cure tridosha, biliousness, itching sensation, allays fever, stop vomiting. For thousands of years nature has been a source of medicinal agents and an impressive number of modern drugs have been derived from natural resources from ancient times, based on the uses of the agents in traditional medicine many of these isolations were based on it. The disruption of soil structure increases mineralization rates in loams and clays more than in sandy soils and that this increase can be used (Bhatt et al., 2015). Jasmine is a climbing, trailing and erect flowering shrub. There are both deciduous and evergreen species in jasmine (Almeida et al., 2006). The main beauty and uniqueness of jasmine is its fragrance, which cannot be imitated by any known synthetic aromatic chemical and has a unique status in the perfume world. The taxonomic description of 23 species as well as key for identification. (Turker et al., 2008) gave taxonomic description of 21 species of jasmine with elaborate description of Jasminum sambac, Jasminum grandiflorum and Jasminum auriculatum. The harvesting of flowers is done from 2nd year after planting and the commercial yields commence from third year onwards (Hajhashmi et al., 2003)(Hamilton 2001). Leaves are opposite and alternate, simple, trifoliate or pinnate; leaflets are entire. One of the earliest accounts of descriptive studies in 43 jasmine species was accomplished by Hooker, who divided Jasminum into two main groups as: - (1) With simple leaves, calyx pubescent or glabrous, subulate or short. ii.) With compound leaves, either trifoliate or imparipinnate. About 160 species of jasmine in the tropical and sub-tropical regions of Asia, Africa and Australia and over 40 in India. (2) Leaves contain sambacosides A, E and F (Tanahashi, 1988). Flowers are white, yellow or rarely reddish, sometimes solitary, more often in cymose clusters of three to many, usually fragrant; 2 loculed with 1 to 4 erect ovules. Fruit is a berry, rarely with separate capsules and each having 2 seeds. Uses: (1) Flowers in bean oil or coconut oil for hair, facial or body use or as a perfume oil or Perfume base. (2)
Digestion with vegetable oil to make oil tinctures or liniments. (3) A favourite floral offering and adornment for altars. (4) Flowers used to make jasmine tea. Flowers yield a yellow pigment used as substitute for saffron. The nutritionally and environmentally supportive conditions (in vitro) of culture and maintenance of plant cells or organs in sterile is known as tissue culture. All product cells have the same genotype (unless affected by mutation during culture) are the clones produced by tissueculture. It has applications in research and commerce. Tissue culture is primarily used for plant propagation and is often referred to as micro propagation in commercial settings. In vitro micro propagation is a complicated process requiring many steps or stages (Murashige et al., 1978), proposed four distinct stages that can be adopted for overall production technology of clones commercially. Stages I-III are followed under in vitro conditions. Whereas stage IV is accomplished in greenhouse condition. (Debergh et al., 1981) suggested an additional stage 0 for various micro propagation systems. The meristems are net importers rather than synthesisers of IAA in higher plants (reviewed by Baker, 2000) and seems to be in contraction to the widely accepted idea that meristems are the sites of auxin biosynthesis. Cytokinins (Gul et al., 2000) produce some benefits by accumulating at damaged site in plants and induce formation of callus. Phytohormones play important role in stress responses and adaption and the exogenous application of auxins (Khan et al., 2004). Ethnobotanical Uses: Traditionally, this plant used as an antidepressant, analgesic, sedative, anti-inflammatory, antiseptic, expectorant and aphrodisiac. Wounds and snake bites can be cured by the roots. The flowers and leaves have decongestant and antipyretic properties. Apart from that inhaling Jasmine scent increases beta waves in the brain, which are associated with increases states of alertness (Kulkarni et al., 2004). Various diseases like conjunctivitis, diarrhoea, abdominal pain and dermatitis are treated with its flowers along with roots and leaves are also utilized for curing pain, diarrhoea and fever. It is also used for anaesthetic purposes (Kunming Institute of Botany, 1986; Jiangsu New Medical College, 1977). The efficiency of jasmine flowers was compared with Bromocriptine by reduction in serum prolactin level when it was put on breasts to suppress purpureal lactation. It has been reported that *Jasminum sambac* has antiulcer, antioxidant (Upaganlawar et al., 2009), antibacterial and antiviral activities (Zhao et al., 2008).

**MATERIALS AND METHODS**

The mother plants (2- month- old) were bought from the nursery (Ahmedabad- India). The fresh and young leaves, were surface fertilized by using sodium hypochlorite, ethanol, distilled water and sterile water.

a) Preparation of Media

Listed below media are prepared:

1. MS basal (without hormone)
2. 1.0 mg/1 BAP + 0.5 mg/1 NAA
3. 3.0 mg/1 BAP
4. ½MS + 3.0 mg/1 kinetin + 0.5mg/1 IAA
RESULTS
When in MS supplemented with NAA medium best result observed in nodal ex-plant compared to leaves. In MS supplemented BAP medium maximum number of shoots was observed in nodal ex-plant. While, MS fortifed with 2, 4-D medium the growth was best for callus and shoot formation. When MS was supplemented with Adenosine sulphate, this hormone

b) Preparation of MS Basal Medium without hormone

800 ml of distilled water is filled in a beaker

4.4 g of MS powdered medium (slowly added), 30 g of sucrose, and 8 g of agar technical are added accordingly to the beaker

By adding 200 ml of distilled sterile water, the medium is made up to 1 litre using volumetric flask

The pH of media is adjusted to 5 by using sodium hydroxide or hydrochloride acid

The media is then

The melting media is dispensed into sterile culture tubes for about one-third tubes’ height, in laminar air flow and each tube is labelled

Prepared media is observed and used after 1 week
showed the negligible effect in leaf ex-plant, while in node ex-plant the growth of callus and shoot were found after 9 weeks of inoculation.

In a recent research study, 2, 4- D was reported to be the most responsive combination in terms of shoot initiation, which, however, produced only one shoot per nodal segment (Selvakumar et al., 2001). Sub-culturing of the regenerated shoots of the present study on the same medium resulted in stunted growth of the shoots having compressed inter-nodes. Lowering the concentrations of both plant growth regulators to half of their original strengths improved the growth, and elongated shoots with 8-10 internodes could be obtained with the next three weeks of the culture. Lowering the concentration of BAP has also been improve
differentiation of shoot buds in the case of P. indica (Anonymous 1989). Further dissection of the in vitro raised shoots of the present study into each nodal segment followed by their inoculation on MS-9 medium resulted in the production of 32-40 shoots/plant within the next five weeks of culture. Hence, the multiplication rate as revealed in the present study significantly exceeds that of a study (Selvakumar et al., 2001) within a relatively shorter time period. The presently reported direct shoot regeneration protocol can be exploited commercially to multiply elite clones more rapidly and within a shorter time period, and can also be used for developing the useful medicinal plant for its conservation and strategies.

Leaves from such in vitro raised plantlets served as explants for genetic transformation studies.

Table 1 - Effect of culture media (half-strength MS= Different concentrations of Auxins=2%(W/V) on shooting response of Jasminum sambac L.

<table>
<thead>
<tr>
<th>NAA (mg/l)</th>
<th>BAP (mg/l)</th>
<th>2,4-D (mg/l)</th>
<th>ADS (mg/l)</th>
<th>Percent of shoot initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.05</td>
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<td>0.20</td>
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<td>0.80</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>0.5</td>
<td>2.0</td>
<td>1.0</td>
<td>4</td>
<td>85</td>
</tr>
</tbody>
</table>

Table 2- Different concentrations of treatment affecting growth and characters

Graph 1- Different hormones on media
Graph 2- Graph showing different concentrations of hormonal treatment

Though NAA at its high level induces more multiplication rate, it also induces the callus indicating imbalance of Auxin-Cytokinin ratio with basal medium reported rapid and reproducible regeneration in vitro protocol with BAP for Jasminum sambac (L.) via nodal shoot multiplication. Similar observation was also reported by (Hossain, M. A. et al., 2008). Observations and statistical analysis

Each treatment had 20 replications and each experiment was repeated three times. The data pertaining to mean percent of cultures producing multiple shoots and mean number of shoots per culture were recorded after 4- weeks intervals. The data were analysed statistically by the Duncan’s multiple range test (Harter, 1960) (P0.05).

**DISCUSSION**

Auxins are the most likely candidates in the regulation of developmental switches (Nomura and Komamine, 1985 and Feher et al., 2003). The influences of exogenously applied auxins particularly 2,4-D on the induction of leaf are well documented (Kim et al., 2003). It is suggested that 2,4-D above certain concentration has a dual effect in the culture medium as an auxin directly (Michalczuk et al., 1992a and 1992b) and as a stress inducing agent (Feher et al., 2001, 2002 and 2003). However, at higher concentrations of auxins the number and frequency of callus induction decreased. The results were obtained has many differences with in amount of using 2,4-D hormone. Their results in compare with our research have significant in diameter and weight of callus. Therefore, we can introduce these hormone concentrations for Jasminum callus induction. As auxins are indole or indole-like compounds that stimulate cell expansion, particularly cell elongation. Auxins also promote adventitious root development. Indole Acetic Acid (IAA), a naturally occurring auxin, and Naphthalene Acetic Acid (NAA). While BAP, increases resistance to disease, high salt levels increases flowering
and fruit set (Yeung, 1995). Cytokinin promote shoot formation, but need auxins as well to promote mitosis. 2,4-D is used in plant cell cultures as a dedifferentiation (callus induction) hormone. (Bibl Latifeh Davallo et al., 2014) reported that callus induction was noticed in MS medium, which consisted of different auxins using leaf ex-plant. Among the auxins investigated, 2,4-D was more effective than the other auxins with the highest percentage (68%) of callus initiation. However, used 2,4-D at mid-level concentrations gave best percentage of organic callus induction.

CONCLUSION

Plant origin received much attention in recent years in terms of ethnobotanical and traditional uses as they were tested for their efficacy and they were concluded to be non-toxic for human usage. Investigation of molecular mechanism of actions of isolated phytoconstituents, toxicity studies in phytochemical investigations, biological evaluation on experimental and animal models obviously deserve scrutiny. Multiplication of *Jasminum sambac* L. through *in vitro* propagation, various ex-plants (leaf and node) were inoculated on Murashige and Skoog (revised) medium supplemented with different plant hormones PGR's like NAA, BAP, 2,4-D and Adenosine Sulphate (ADS) in different concentrations. Maximum multiplication was observed from nodal ex-plant, while average multiplication was observed in leaf ex-plant.

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REFERENCES


