Plant Archives Volume 20 No. 2, 2020 pp. 8000-8002 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

IN VITRO PROPAGATION OF *DRACANEA SANDERIANA*

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Abstract

Dracanea sanderiana is an important ornamental plant propagated by vegetative means that consider as slow rate multiplication. In this study an *in vitro* protocol was developed to propagate *D. sanderiana* using single node explants placed on MS. medium supplemented with 6- benzyl -amino-purine at (BAP 0.0, 1.0, 2.0, 4.0 mg/l) and naphthalene acetic acid at (NAA 0.0, 0.5 mg/l) growth regulators. Results showed that the best combination of growth regulators at 1.0 mg/l BAP and 0.5 mg/l NAA gave the highest shooting (76.92%), shoots length (2.75) and leaves number (8), same media were suitable for shoot multiplication. All combinations induced rooting except free hormones medium. Young stem segments responded better than adult stem. Internodes and leave segments failed to give any response.

Key words: *In vitro* propagation, *Dracanea sanderiana*, single node culture.

Introduction

D. sanderiana (Lucky Bambo) belongs to the family Agavaceae. It is distributed in tropical and subtropical Africa and India. Varieties of *D. sanderiana* are popular foliage as indoor ornamental plants at hotels, residences and restaurants (Guanthilake and Abeywickrama, 2011) and it is thought to bring prosperity and luck were growen in houses (Damen *et al.,* 2018). This genus have 50 species of woody stem plants, many of them studied for *in vitro* propagation like *D. fragrans*, *D. marginata* and *D. dermensis* (Vinterhalter and Vinterhalter, 1997). Some of *Dracaena* species possess medicinal properties and exhibited fungicidal and bactericidal activities. Plant cutting of *D. saneriana* can be grown into bare rooted plants in water or other root promoting media without soil around their root system **(**Kakuei and Salehi, 2015). Vegetative propagated plants accumulate bacteria, fungi and viral disease. *D. sanderiana* produces several steroidal saponins which showed activity on leukemia and extract of *D. sanderiana* reported to improve the clotting process in mice (Liu *et al.,* 2010) and (Aslam *et al.,* 2013). Despite their ornamental and medicinal properties, not much work has been done on *D. sanderiana* species in *in vitro* conditions. To overcome these problems and offer rapid vegetative multiplications of plants. Micropropagation is technique for producing healthy plants. Even propagation through seeds has limitations like seed dormancy, low rate of germination. In vitro technique is also used in the commercial field for propagating ornamental plants in large numbers **(**Kakuei and Salehi, 2015). Direct and indirect methods of regenerated of shoots has been studied through many investigators (Vinterhalter, 1989) and (Beura *et al.,* 2005). The objective of this study was micopropagation of *D. sandariana* and optimizes culture conditions that could use in future.

Materials and Methods

This experiments were conducted in the laboratory of plant tissue culture/ Biology Department – College of Science for Women.

D. sanderiana were purchased from nursery. After proper surface sterilization of explants with sodium hypochloride (commercial bleach) at concentration (1:1) (v:v) (bleach: DW.) for 5 min. (for leaves explants) and 10 min. (for nodes and internodes explants), explants from adult and young shoots were placed on MS. Medium supplemented with a combination of BAP. (0.0, 1.0, 2.0 and 4.0)mg/l and NAA. (0.0, 0.5) mg/l for direct shooting.

For callus initiation internode and leaf explants were placed on MS. Medium supplemented with BAP. (0.0, 1.0 and 2.0) mg/l and NAA. (0.0, 1.0 and 2.0) mg/l . Acclimatization process for planlets two months old were conducted by transporting the samples to sterilized peatmoss after washing them with benlate in two weeks period.

Results and Discussion

Results indicate that commercial bleach is very effective for sterilization and contamination rate was very low in all cultures producing healthy plants, this results are the same as many other studies that use bleach for sterilization (Kakuei and Salehi, 2015) and (Khorramabad *et al.,* 2014).

In this study two types of nodal explants were used as source for direct regeneration of axillary buds stimulation, adult and young nodes Fig. 1. Adult explants failed to give rise for new *in vitro* shooting as compared with young nodes due to *in vitro* cultures demand juvenile tissue for initiation especially woody specieses like *D. sanderiana* (Mahesh, 2008) similar response by (Aslam *et al.,* 2013) in their research on the same plant.

Results showed in table 1 revealed that adding BAP at 1 mg/l with 0.5 mg/l NAA give us the best growth for high shooting percentage (76.92%), means of shoot length (2.75 cm.) and means of leave number (8) for every single node explants. The combinations of BAP at 2 and 4 mg/l with 0.5 NAA gave convergent response of shooting percentage (44.44, 50)% respectively but different in shoot length the first one with (2.25 cm.) and the second developed shorter shoots (light green in color) with (7 and 5) leave respectively. Cytokinins are preferred for effective multiplication especially BAP for different species of *Dracanea* with high concentration (Hou Zanming, 2001) and (Mudoi *et al.,* 2013), while replacing explants on MS. Medium free hormones show no response. A synergistic effect of cytokinins and auxines is required for axillary shoots development and multiplication for *Dracanea* spp. and many woody plant species (Singh *et al.,* 2001) and (Dewir *et al.,* 2019).

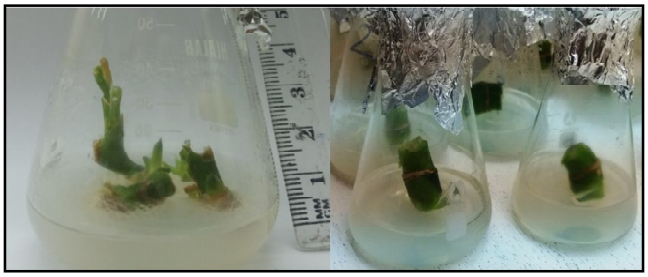

Fig. 1: Young (right) and adult nodal explants(left) after two weeks.

Table 1: Effect of different concentrations of BAP and NAA on growth and development of shoots.

Treatment Mg/l	Shoot--ing %	Means of shoots length (cm.)	Means of lea--ves number
0.0 BAP+ 0.0 NAA	0.0	0.0	0.0
1 BAP+ o.5 NAA	76.92	2.75	8
2 BAP+ o.5 NAA	44.44	2.25	7
4 BAP+ 0.5 NAA	50	1.0	5

Table 2: Effect of different concentrations of BAP and NAA on rooting.

Treatment Mg/l	Shoot--ing %	Means of roots length (cm.)	Means of ro--ots number
0.0 BAP+ 0.0 NAA	0.0	0.0	0.0
1 BAP+ o.5 NAA	80	15	2
2 BAP+ o.5 NAA	80	20	2
4 BAP+ 0.5 NAA	50	5	1.0

In this investigation multiplication media were suitable for rooting process as showed in table 2, regenerated shoots on media supplemented with BAP at (1 and 2 mg/l) and (0.5 mg/l) NAA gave 80% rooted viable plantlets without phenotypic aberration Fig. 2, have (15 and 20 cm.) length respectively and 2 roots for every explants. The treatment of explants with BAP 4mg/l and 0.5mg/l NAA gave less induction for rooting percentage, length and number. Control treatment also has no response in

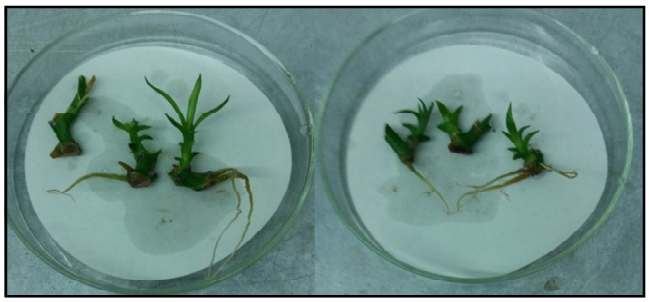

Fig. 2: (right) rooted plantlets supplemented with (2BAP and 0.5NAA) (left) rooted plantlets supplemented with (3BAP and 0.5NAA).

Fig. 3: surviving plant of *D. sandariana* after proper hardening.

rooting, its similar to (Badawy *et al.,* 2005) in their experiments on *D. fragrant* explants that replaced on MS. Media free from growth regulators failed of shooting and rooting.

Surviving of plants after hardening process was 80% of healthy with normal appearance Fig. 3.

For callus initiation internode and leaf segments failed to give any response through all treatments and no callus were formed in contrast with (Liu *et al.,* 2010) in their research on *D. surculosa*.

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