# EFFECT OF SOME GROWTH REGULATORS AND IRRADIATION ON PROPAGATION AND ANATOMICAL STRUCTURE OF *DRACAENA SURCULOSA* LINDL. AND *BEAUCARNEA RECURVATA* LEM. PLANTS BY USING TISSUE CULTURE TECHNIQUE.

**By**


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APPROVAL SHEET

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**Title of Thesis:** Effect of Some Growth Regulators and Irradiation on Propagation and Anatomical Structure of *Dracaena surculosa* Lindl. and *Beaucarnea recurvate* Lem. Plants by Using Tissue Culture Technique.

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## ABSTRACT

The aim of this study was to investigate the micropropagation of *Dracaena surculosa* and *Beaucarnea recurvate* plants, as affected with type and strength of culture media supplemented with different auxin and cytokinis. Micropropagation of *Dracaena surculosa* : application of Clorox(20%) for 15min gave the best disinfection and the highest survival percentage of during surface sterilization. Using full MS medium resulted in the highest number of leaves performed and shoot length. MS medium supplemented with 1mg/l of BA produced the maximum number of proliferated shootlets /explant ,number of leaves / shoot and the greatest leaf area, MS plus 2mg/l BA gave the highest contents of chlorophyll-a , b and carotenoids. Cultivation of shoot tip on MS medium supplemented with 40 mg/l $AdSO_4$+ 2mg/l BA produced the highest shootlets/explant , the longest shoot length, number of leaves / shoot. The highest contents of chlorophyll-a was recorded with 40mg/l of $AdSo_4$. The highest values for number of roots and root length were recorded with 1mg/l IBA The maximum percentage of survival of acclimatized plantlets (100%)was recorded from using a mixture of peatmoss, peatmoss plus sand at (1:1v/v) and Peatmoss plus perlite at (1:1v/v).Micropropagation of *Beaucarnea recurvata*, application of Clorox (20%) for 15min resulted in the best disinfection , highest percentage of survival and the minimum value of contamination. Using full MS medium was the best for seed germination, number of leaves performed and shoot length. Cultivate of the shoot tips on MS medium supplemented with 3mg/l l BA and 1mg/l NAA produced the highest values of shootlets/explant, shoot length, and the highest fresh and dry weights of shootlets, of chlorophyll-a , b and carotenoids contents. Cultivate of the shoot tips on MS medium supplemented with 3mg/l I BA + 40mg/l of $AdSo_4$ produced the highest number of shootlets/explant ,shoot length , leaves /shoot , leaf area , stem diameter, fresh , dry weights of shootlets, and highest of chlorophyll-a , b and carotenoids contents. The highest values for number of roots and root length were recorded with 1mg/l IBA. The treatments of peatmoss plus perlit plus vermiculite at (1:1:1 v/v/v) produced the highest survival percentage, plantlet length (cm) and number of leaves/plantlet. Irradiation of *Dracaena surculosa*, with gamma rays resulted as a change in chemical and anatomical structure of shoot tips. Application of 10Gy resulted in the highest number of shoots formation ,shoot length and leaves/shoot, as well as the number and the length of roots. The highest of chlorophylls (a , b) and cartenoids contents were obtained from application of 10Gy. The largest mesophyll and diameter of vascular bundles (µ) the leaves diameter, epidermis thickness, cortex thickness and vascular cylinders dimensions (µ) of the stems and roots were recorded as a result of 10Gy treatment. The RAPD profiles of plantlet irradiated with gamma rays of treated plants with radiation at the rate of 10 Gy produced new fragments, however subjecting the plants to gamma rays at the rate of 15Gy caused full damage for DNA and death of plants. Irradiation of *Beaucarnea recurvata* with gamma rays, application of 5Gy resulted in the highest values of the number of shoots ,shoot length and leaves/shootlet, as well as number and length of roots. The highest of chlorophylls (a and b) contents were determined from application of 5Gy. The largest mesophyll and diameter of vascular bundles (µ) of the leaves diameter, epidermis thickness, cortex thickness and vascular cylinders dimensions (µ) of the stem and root were recorded as a result of 5Gy treatment. The RAPD profiles of plantlet irradiated with gamma rays of treated plants with radiation at the rate of 5 Gy produced new fragments, however subjecting the plants to gamma rays at the rate of 15Gy caused full damage for DNA and death of plants.

**Key words:** Micropropagation**,** growth regulators**,** ,Irradiation , Gamma rays, *Dracaena*, *Beaucarnea*, RAPD.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| NaOCl | Sodium hypochlorite |
| $HgCl_2$ | mercuric chlorid |
| B5 | Gamborg *et al* (1968) |
| MS | Murashige and Skoog(1962) |
| SH | Schenk and Hildebrandt ( 1972) |
| NN | Nitsch and Nitsch medium(1969) |
| KM | Keratinocyte Medium |
| QL | Quoirin and Lepoivr Medium (1977) |
| LS | Linsmaier and Skoog medium(1965) |
| WPM | woody plant media(1980) |
| BA | 6-benzyl adenine |
| NAA | Naphthalene acetic acid |
| IAA | Indole acetic acid |
| IBA | Indole-3-butyric acid |
| Kin | Kinetin |
| TDZ | Thidiazuron |
| $AdSO_4$ (AS) | adenine sulphate |
| mg | Milligram (s) |
| mg/l | Milligrams per liter |
| DW | Dry weight |
| F.W. | Fresh |
| Kr | kilo rad |
| µ | micro($10^{-3}$ m) |
| µm | micromiter ($10^{-6}$ m) |
| Min. | minute |
| Fig. | figure |
| ˚C | Degree Celsius |
| cm | Centimeter |
| γ | Gamma |
| Gy | Gray |
| DNA | Deoxyribo nucleic acid |
| PCR | Polymerasa chain reaction |
| RAPD | Randum Amplification Polymorphisms DNA |
| bp | Base pair |
| Mw | Molecular weight |
| v/v | Volume by volume |
| LSD | Least significance difference |

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