

**RAPID *IN VITRO* MULTIPLICATION FOR REGENERATION AND
GC-MS STUDY ON IDENTIFYING CHEMICAL CONSTITUENTS OF *IN VITRO* PLANTLETS OF *Gyrinops walla***

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Abstract

Gyrinops walla is an endemic and endangered tree species of Sri Lanka, exploited due to its precious agarwood which has huge demand for its unique scent. In addition to conserve the existing tree species, promising methods for mass propagation and regeneration system is need to be developed to ensure the sustainable supply of seedlings. Application of tissue culture methods for clonal propagation has gained momentum to meet the huge demands for fragrance products as well as for reforestation programmes. By means of, the present study was conducted to establish a protocol for *in vitro* rapid multiplication and to develop the chemical profiles of *in vitro* grown *G.walla* plantlets using headspace GC-MS analysis. An efficient plant regeneration system was established on MS media supplemented with different concentrations and combinations of plant growth regulators via proliferation of shoot tips and axillary buds. MS media supplemented with 1.0 mg/L BAP was best for establishment (80.0 % and 86.0 %, respectively), stem elongation (1.8 cm and 1.0 cm respectively) and proliferation (3.6 and 9.6 shoot buds/ explant respectively) for both shoot tips and axillary buds. Regenerated axillary buds and shoot tips could be further multiplied (10.6 ± 0.93 shoot buds/ regenerated shoot) and elongated (4.0 ± 0.26 cm) by transferring to MS medium supplemented with 40 g/L sucrose and 1.0 mg/L BAP combined with 0.1 mg/L IBA, while 66.0 % multiplied shoots could be *in vitro* rooted by transferring to ½ MS basal media supplemented with 0.1 mg/L NAA. Whereas, 100.0 % success was recorded in *ex vitro* rooting experiment after dipping in 1000 mg/L IBA solution for 30 minutes and transferring to 1:1 soil and sand medium in polythene sleeves. All the rooted shoots were successfully acclimatized in sand: soil media at 1:1 ratio. 4-Hydroxypyridine 1-oxide, 2-Tetradecene, (E)-, 1-Hexadecene, E-15-Heptadecenal, 18-Norabietane and Eicosane were the similar compounds identified in both *in vitro* grown plantlets and agarwood of *G.walla*. Hence, the present study has opened up the possibilities for establishing an efficient plant regeneration system and paves the way for the production of resinous compounds through *in vitro* grown plantlets of *G.walla*, first time in Sri Lanka.

Keywords: Agarwood, Gas Chromatography-Mass Spectrometry, *Gyrinops walla*

Theme: 4, Advances in Functional Food and Phytopharmaceuticals