Shoot organogenesis of *Aloe vera* (L.) under *in vitro* conditions

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ABSTRACT

Aloe (*Aloe vera* L.) is an important medicinal perennial herb belonging to the family Liliaceae which is used worldwide in drug and cosmetic industry. Although it propagates vegetatively in its natural state, however, propagation rate is slow to meet demand of high quality planting material for commercial cultivation. Therefore, it is necessary to use *in vitro* propagation for rapid plant production. The present study was performed for shoot organogenesis of *Aloe vera* (L.) under *in vitro* conditions in the Tissue Culture Laboratory of the Department of Crop Science, Faculty of Agriculture, Eastern University of Sri Lanka.

Aloe plants were collected from a net house and used in this experiment. The explants (shoot tips and leaf base) were disinfected by 70% ethanol for 30 sec and 20% of clorox (5.25% active ingredients) with 2-3 drops of tween 20 for 30 min. Subsequently they were washed with distilled water to make the material free from sodium hypochlorite. Shoot tips (1.5 cm long and 0.5 cm width) excised from young and mature mother plants were dissected into four quarters vertically. Thereafter sterilized explants were cultured on MS medium with 2 mg/l BAP and 0.5 mg/l NAA to select suitable mother plant for initial establishment. The explants excised from the young plants showed higher morphogenic response within two weeks of culture.

Two different types of explants namely shoot tips (as mentioned above) and leaf bases (0.5 x 0.5cm^2) were evaluated for better initial culture establishment. Both types of explants were placed on MS medium supplemented with 2 mg/l BAP and 0.5 mg/l NAA. Among these two explants, shoot tips gave the quickest response for

initial shoot bud formation within two weeks of culture which exhibited the morphogenic response of 49.80%. Further, experiment was carried out to select suitable medium for the initial culture establishment and subsequent multiplication of shoot tip explants of *Aloe vera*. Sterilized shoot tips were then inoculated on MS medium supplemented with different growth regulators *viz* BAP and TDZ in concentrations ranging from 1 mg/l to 3 mg/l along with 0.5 mg/l NAA. The results revealed that there was a significant difference ($p<0.05$) in different hormone combinations in terms of percentage of explants showing bud formation. Highest percentage of explants showing bud formation was obtained in medium supplemented with 3 mg/l BAP followed by 1 mg/l TDZ. MS medium supplemented with 3 mg/l BAP and 0.5 mg/l NAA produced highest numbers of shoot buds per explants.

On the other hand when increased the concentration of TDZ from 1 mg/l to 3 mg/l the percentage of explants showing bud formation was reduced. The medium containing less concentration of TDZ (1 mg/l) with NAA (0.5 mg/l) produced multiple shoots (clumps of buds). The result indicated that TDZ at higher concentrations (3 mg/l) in combination with NAA produced high degrees of abnormalities. Explants placed at 3 mg/l BAP as 1st and 2nd medium for 8 weeks produced significantly ($p<0.05$) higher numbers of microshoots when compared to the explants placed at 1 mg/l TDZ in 1st medium for first four weeks and 3 mg/l BAP in 2nd medium for another four weeks. Transfer of microshoot buds from 1 mg/l TDZ to 3 mg/l BAP favoured the production of prominent and elongated shoots.

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