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Studies on *In Vitro* Plant Regeneration of Ginger (*Zingiber officinale* Rosc.)

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ABSTRACT

Ginger (*Zingiber officinale* Rosc.) is a herbaceous perennial which is valued as an important spice and medicinal crop throughout the world and it is vegetatively propagated through rhizomes. This study was done to regenerate *in vitro* plantlets of ginger (*Zingiber officinale* Rosc.) at the Tissue Culture Laboratory in the Department of Crop Science, Faculty of Agriculture, Eastern University of Sri Lanka.

Rhizomes with buds were collected from field grown ginger and rinsed thoroughly in running water followed by distilled water and then dipped in 70% ethanol for 1 min. Thereafter, they were surface sterilized using Captan 0.3% followed by Doxycycline 0.2% for 10 minutes and finally with commercial bleach, 20% of Clorox prior to culture on MS medium. Sterilized rhizome buds of various sizes *viz.*, 0.5 cm, 1.0 cm and 2.0 cm were excised and cultured on MS medium with 3.0 mg/l BAP and 0.5 mg/l NAA to select the suitable size of explants for the establishment of culture. The results revealed that explants of 0.5 cm long exhibited high rate of survival (66.67%) and morphogenic response (44.44%) among the three different explant sizes for the establishment of culture.

Non emerging and emerging rhizome buds (0.5 cm long) were sterilized and cultured on 3.0 mg/l BAP and 0.5 mg/l NAA to select suitable type of explants for the establishment of culture. Emerging buds gave the quickest response (6.83 days) for initial shoot bud formation and the high percentage of morphogenic response during the establishment period of six weeks.

Further experiment was carried out to find out the optimal concentration of BAP for the establishment of culture from emerging rhizome buds selected from the previous experiment. The results showed that explants in 3.0 mg/l BAP and 0.5 mg/l NAA exhibited early shoot bud initiation (9.87 days) and produced higher number of normal shoots in initial cultures than those in 5.0 mg/l BAP and 0.5 mg/l NAA. Late sprouting and high degree of abnormalities resulted in explants cultured in 5.0 mg/l BAP. Histological studies revealed that the shoots originated from the Primary Thickening Meristem.

Emerging buds with shoot sprouting were collected from MS medium containing 3.0 mg/l BAP and 0.5 mg/l NAA thereafter they were transferred to the MS medium with 5.0 mg/l BAP and 0.5 mg/l NAA for shoot multiplication. Microshoots were placed on 3.0 mg/l BAP and 0.5 mg/l NAA medium for shoot elongation and root formation. After four weeks of culture, *in vitro* plantlets were successfully acclimatized in *ex vitro* conditions.

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