Genetic Stability of Micropropagated Ginger Derived from Axillary Bud through Cytophotometric and RAPD Analysis

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A protocol was developed for the *in vitro* propagation of ginger (*Zingiber officinale*) cv. Suprava using dormant axillary buds from unsprouted rhizomes. The dormant axillary buds embedded in the rhizome nodes were induced to sprout when cultured on MS medium supplemented with 6-benzyladenine (BA) alone (1–6 mg/l) or with a combination of BA (1–6 mg/l) and indole-3-acetic acid (IAA) (0.5, 1 mg/l). *In vitro* sprouted buds were transferred to the multiplication medium containing various combinations of auxins and cytokinins. MS basal medium supplemented with BA (1 mg/l), IAA (1 mg/l) and adenine sulfate (100 mg/l) was found optimum for the *in vitro* multiplication of shoots producing (8.2 ± 0.2) shoots from a single explant within 30 days of culture. The multiplication rate remained unchanged in subsequent subcultures. Rooting of shoots occurred in the same multiplication media. Upon transfer of the *in vitro* culture to *ex vitro* in pots, 96% of plants survived and established successfully under natural conditions. Tissue culture-raised plantlets of ginger could be conserved *in vitro* through subculturing at an interval of 4 months. The genetic stability of micropropagated clones was evaluated at regular intervals of 6 months up to 24 months in culture using cytophotometric estimation of 4C nuclear DNA content and random amplified polymorphic DNA (RAPD) analysis. Cytophotometric analysis revealed a unimodal distribution of the DNA content with a peak corresponding to the 4C value (23.1 pg), and RAPD analysis revealed monomorphic bands showing the absence of polymorphism in all fifty regenerants analyzed, thus confirming the genetic uniformity among *in vitro* grown somaclones of *Z. officinale*. This study is of commercial significance as axillary bud explants are available throughout the year for initiating a fresh culture of the elite ginger cv. Suprava to be used as a source of true-to-type disease-free planting material thereby minimizing the adverse effect of repeated subculturing from the same explant source.

Key words: Zingiber officinale, Micropropagation, Genetic Stability