Optimization of a Somatic Embryogenesis Protocol from Nodal Cuttings and Leaf Explants of *Camellia sinensis* (L.) O. Kuntze

M.A.S. Gunathilake[1], K.K. Ranaweera[2*], M.A.B. Ranatunga[2*] and L.M.H.R. Alwis[1*]

[1]Department of Export Agriculture, Uva Wellassa University, Badulla, Sri Lanka*
[2]Plant Breeding Division, Tea Research Institute of Sri Lanka, Talawakelle, Sri Lanka.*

Tea is the main agricultural foreign exchange earner in Sri Lanka. Tea is commonly propagated by vegetative cuttings; the mostly adopted practice commercially, thus unable to fulfill the annual planting material requirements. Somatic embryogenesis (*se*) is considered as a rapid mass propagation method in woody perennials; however, in tea, potential has not been explored yet. This study was aimed to identify optimum growth regulator combinations to produce embryogenic calli from nodal cuttings and leaves of tea and to identify optimum conditions for somatic embryo induction from leaf calli. Sterilized field-grown explants *viz* nodal cuttings and leaf segments of TRI 2025, TRI 2043, and leaf calli of TRI 2043 were established on solid MS media with different plant growth regulator combinations under aseptic conditions. Ten replicates were used for a growth regulator combination and callus initiation was visually observed at weekly intervals. Initiated calli were qualitatively rated for callus mass. The highest callusing of nodal cuttings was observed in MS medium contained 0.11 mg L^{-1} TDZ, 0.1 mg L^{-1} IBA, 3 mg L^{-1} GA3, 8.6 mg L^{-1} AgNO3 for TRI 2025 while MS media contained 0.11 mg L^{-1} TDZ, 0.1 mg L^{-1} IBA, 3 mg L^{-1} GA3 was reported as the best for TRI 2043. The highest calli induction from leaves was observed in MS medium contained 0.11 mg L^{-1} TDZ, 1.86 mg L^{-1} NAA for TRI 2025, and MS medium contained 0.0044 mg L^{-1} TDZ, 0.1 mg L^{-1} IBA, 3 mg L^{-1} GA3 for TRI 2043. Meanwhile, results showed that early signs of somatic embryo induction in solid MS medium containing 0.044 mg L^{-1} TDZ, 0.1 mg L^{-1} IBA, and 3 mg L^{-1} GA3 for leaf callus of TRI 2043. Among two cultivars, TRI 2025 showed a high response for calli initiation with higher callus mass in both nodal and leaf explants than TRI 2043. Identified combinations can be used to obtain embryogenic calli from nodal cuttings and leaf explants and results provide a foundation for developing a *se* protocol for tea.

Keywords: Tea, Explant, Somatic embryogenesis, embryonic callus.