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Development of an In Vitro Regeneration System in Sorghum [Sorghum bicolor (L.) Moench] Using Root Transverse Thin Cell Layers (tTCLs)

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Abstract: An efficient and reproducible plant regeneration system was developed from cells or tissues of agronomically important Indian sorghum genotypes including 2 commercial cultivars (NSH27 & K8) of Sorghum bicolor (L.) Moench. Callus induction and plant regeneration were achieved on transverse thin cell layers (tTCL) of roots from aseptically germinated 7-day-old seedlings. Callus response depended on the genotype, the concentrations and composition of growth substances and number of in vitro regeneration cycles undergone by the donor plant. Murashige and Skoog (MS) medium supplemented with 4.5-18.1 μM 2,4-dichlorophenoxy acetic acid (2,4-D), 5.4-21.5 μM naphthalene acetic acid (NAA), 5.7-22.8 μM indole acetic acid (IAA) and 4.9-19.7 μM indole butyric acid (IBA), and combined with 10% (v/v) coconut water (CW) was used for callus induction. The calli were cultured on MS medium supplemented with 2.2-17.8 μM 6-benzylaminopurine (BAP) combined with 2.3 μM 2,4-D or 2.7 μM NAA. Highly efficient differentiations of multiple shoot buds were initiated within 4 weeks of culture. Root induction was achieved on half-strength MS medium containing IAA (2.9-28.5 μM). Rooted plants were successfully acclimatised, with the survival rate reaching almost 80%. These plants grew normally without showing any morphological variation.

Key Words: Callus induction, coconut water, hardened plant, MS medium, plant growth regulators, regeneration, rooting

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