In vitro Regeneration by Indirect Organogenesis of Selected Kenyan Maize Genotypes using Shoot Apices

Abstract

The study reports a reliable and reproducible regeneration system of two open pollinated varieties-OPV`s (Katumani KAT and dry land cultivar DLC1), a hybrid (DH01) and an inbred line (TL08) using shoot apices as explants via organogenesis. The shoot apices were cultured on Murashige and Skoog (MS) basal media supplemented with 9 µM 2,4-dichlorophenoxyacetic acid (2,4-D) and 8.88, 17.75, 26.64, 35.52 or 44.40 µM N⁶-benzylaminopurine (BAP) with (+) or without (-) 296 µM adenine for calli induction. The most effective combination for calli induction was modified MS media containing 26.64 µM BAP and 296 µM adenine. Calli was maintained on MS media with 9 µM 2, 4-D and 4.44 µM BAP for calli proliferation. Calli of TL08 genotype directly formed shoots on the media containing 9 µM 2, 4-D and 26.64 µM BAP, while the KAT, DLC1 and DHO1 formed a mixture of embryogenic and organogenic calli on the media supplemented with 9 µM 2, 4-D and 4.44 µM BAP. The frequency of callus formation was genotype dependant with KAT 55%, DLC1 35%, DH01 47% and TL08 44%. The number of shoot formed by the selected varieties ranged from 4.9 to 5.7 shoots depending on the genotypes. The number of shoots formed on the media supplemented with 296 µM adenine was higher than that on media without adenine. Shoots were regenerated from organogenic calli after 4-6 weeks depending on the genotype and the presence or absence of adenine, with plant regeneration varying from between 29-55%. Root induction was promoted using MS media supplemented with 1.97 and 2.95 µM Indole-3-butyric acid (IBA). Seeds from in vitro regenerated plants (R₀) produced normal plant (R₁) in the field trial and were comparable to the plants grown with the mother seeds**.**

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