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Cryopreservation of Embryogenic Callus in Sweetpotato

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Objectives

Sweetpotato is an important food crop in the subtropics and tropics mainly propagated vegetatively and conserved by filed gene banks. These method are not desirable for long-term storage. Embryogenic callus might provide alternative system for germplasm storage if cryopreservation of apical meristem are not readily available and it is also important because they are frequently used in genetic transformation protocol

Materials and Methods

1. Materials: Embryogenic callus derived from apical meristem of Ipomoea batatas L. cv. Yulmi
2. Methods
   - Preteatment of 0, 1, 10 mg/L ABA in liquid MS medium containing 0.4 M sucrose and 1 mg/L 2,4-D
   - Cryoprotection solution of various concentration of glycerol at 0.54, 1.08, 1.62, 2.0 M, DMSO at 0.64, 1.28, 2.0 M only and combination of 2.0 M DMSO + 0.54 M glycerol, 0.64 M DMSO + 2.0 M glycerol

Results and Discussion

Cryopreservation of embryogenic callus derived from apical meristem culture was attempted by slow prefreezing method (two-step method) with various cryoprotectants in sweetpotato cv. 'Yulmi'. Precultured embryogenic calli on medium containing 10 mg/L ABA prior to slow prefreezing in liquid nitrogen indicated higher survival rate than 1.0 mg/L ABA pretreatment. The cryoprotectant comprising 1.28 M DMSO in 0.4 M sucrose solution gave the best survival (over 46%) of sweetpotato cells exposed to liquid nitrogen as determined by TTC reduction and FDA staining method. Cryopreserved calli cultured on MS medium with 1.0 mg/L 2,4-D were grown for 4 weeks in the dark and induced embryos after another 4 weeks. They were subcultured on MS medium supplemented with 0.1 mg/L 2,4-D + 0.1 mg/L kinetin for 2 weeks and regenerated into normal plantlets in MS basal medium.

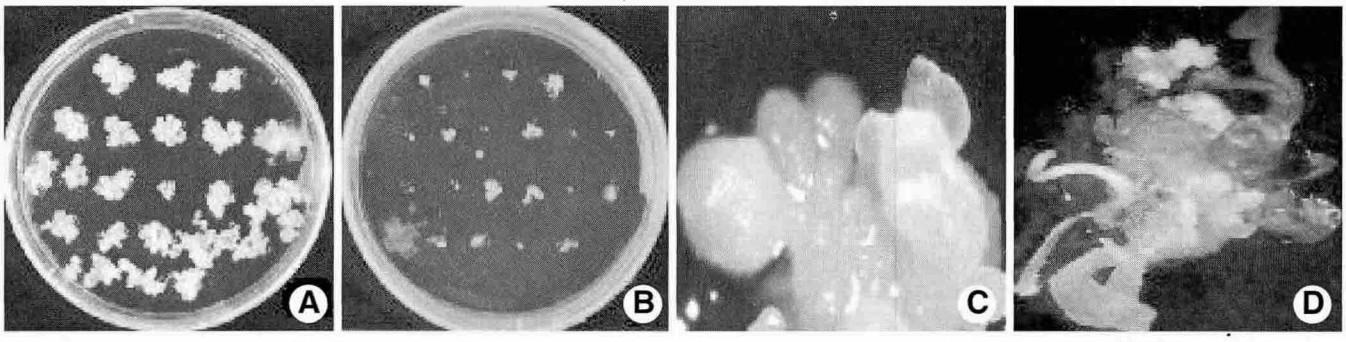

Figure 1. Cryopreservation of embryogenic callus. A, non-cryopreserved callus; B, cryopreserved callus by 1.28 M DMSO cultured on MS medium with 1.0 mg/L 2,4-D for 8 weeks; C, D, somatic embryos, and plantlets regenerated from cryopreserved embryogenic callus.

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