B-37: Differential effects of sucrose, glucose and fructose on embryogenesis and whole plant development from tomato callus

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The effects of 3 different carbohydrate sources (CHO) on somatic embryogenesis and plantlet development from tomato (*Lycopersicon esculentum* Mill. cv. Rodeo) callus were studied. Callus was initiated using leaf explants on an MS medium containing sucrose as the CHO source and NAA (2 mg l^{-1} and BA (1.0 mgl^{-1}) as hormone supplements. The experiments were planned in a randomized complete block design with either sucrose, glucose and fructose as the CHO source in the induction (EIM) and sub-culture (SCM) media. The transfer from the EIM to SCM was done in 9 different combinations. Both EIM and SCM media contained 0.5 mg l^{-1} NAA and 0.2 mg l^{-1} 2ip as hormones. The CHO levels at all stages of the study were maintained at 3% level. Callus growth was determined as (final weight-initial weight) x 100 / initial weight. All 3 CHO sources were equally effective in calli growth in EIM. Both glucose and fructose produced bi-polar shaped green coloured embryos or embryo like structures (ELS) (110 and 85 g^{-1} callus respectively) whereas sucrose as the CHO source produced globular shaped pale yellow embryos and ELS (60 nos g^{-1} callus). The number of embryos and ELS produced with glucose or fructose as the CHO source was significantly higher as compared with sucrose ($p<0.05$). In SCM the number of embryos formed followed the same pattern as in the EIM medium (85, 65 and 40 g^{-1} callus for glucose, fructose and sucrose respectively).

Both glucose and fructose failed to promote complete plantlets. Fructose promoted mainly the formation of shoots (85 nos. g^{-1} callus) while glucose promoted the growth of roots (60 nos. g^{-1}callus) However, sucrose as the CHO source promoted complete plantlets (80 nos g^{-1} callus) having both shoots and roots.