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Influence of genotype, explant and culture medium on callus induction in tomato (*Lycopersicon esculentum* mill.)

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SUMMARY

In vitro callus induction was attempted in five genotypes of tomato by culturing hypocotyl, cotyledon and young leaf explants on Murashige and Skoog's (1962) medium supplemented with NAA (0.5, 1.0, 1.5 and 2.0 mgl^{-1}) and BA (0.5 and 1.0 mgl^{-1}) alone and in combinations. Cent per cent callus induction was observed in three explants of five genotypes on different media tested. The genotypic differences were not evident for callus colour and morphology. However, differences were observed for the type of callus produced by different explants. Analysis of variance revealed significant differences among the genotypes, explants, media and their interactions for days to callus initiation and fresh weight of callus. Pusa Ruby as a genotype, young leaf as an explant and MS + 0.5 mgl^{-1} BA + 2.0 mgl^{-1} NAA as medium were the most appropriate for callus induction. The type of growth regulators and their concentrations were found critical for days to callus initiation and their concentrations were found critical for days to callus initiation and fresh weight of callus. Lower levels of BA and NAA were found suitable for production and maintenance of friable, prolific and morphogenic type of callus.

Key words : In vitro, Tomato, Callus, Explant, Medium

Tomato (*Lycopersicon esculentum* Mill.) is an economically important vegetable crop and is also amenable for various *in vitro* studies. *In vitro* culture studies in tomato have been carried out by using various explants such as leaves (Padmanabhan *et al*., 1974; Behki and Lesley, 1980; Kurtz and Lineberger, 1983), stems (Locy, 1983; Selvi and Khader, 1993), shoot tips (Mirghis *et al*., 1995), cotyledons (Le *et al*., 1991) and hypocotyls (Locy, 1983; Cano *et al*., 1990). These reports reveal that there is a differential response of various explants to different concentrations of auxin and cytokinin which indicate that the hormonal requirement is highly specific for the genotypes and type of the explants. Therefore, standardization of culture conditions for the genotype of choice deserves importance for various *in vitro* studies aimed at tomato improvement.

MATERIALS AND METHODS

Plant material :

Seeds of five genotypes of tomato viz., Pusa Ruby, Junagadh Ruby, Arka Vikas, Bhagyashree and Dhanashree were surface sterilized with 1.0% sodium hypochlorite solution for 15 minutes, rinsed in 4 to 5 changes of sterile double distilled water and germinated aseptically on MS basal medium solidified with 0.8% agar at pH 5.7 in conical flasks of 150 ml capacity. Two-week- old axenic seedlings provided the hypocotyl (1 cm) and cotyledon (5 mm^2) and four- week – old seedlings provided the young leaf (5 mm^2) explants.

Culture conditions :

Callus induction was tested on MS medium supplemented with NAA (0.5, 1.0, 1.5 and 2.0 mgl^{-1}) and BA (0.5 and 1.0 mgl^{-1}) alone and in combinations. All media were adjusted to pH 5.7 before addition of 0.8% agar, autoclaved at a pressure of 1.06 kg cm^{-2} and 121^{0}C temperature for 20 minutes. Cultures in 25 x 150 mm culture tubes (each containing two pieces of each explant with ten repeatations) were incubated uner 14 hour photoperiod of cool white fluorescent tubes (40 to 50 $mEm^{-2}s^{-1}$) at 26 $\pm$ 2^{0}C.

Statistical analysis :

The data recorded on days to callus initiation and fresh weight of callus after four weeks of culture were statistically analyzed using completely randomized design in a factorial format (Steel and Torrie, 1960) to find-out the effect of genotype, explant and medium alongwith their interactions.

RESULTS AND DISCUSSION

Per cent callus induction and type of callus :

Cent per cent callus induction was observed in all the three explants of five genotypes on different medium

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