Efficacy of thidiazuron in in vitro propagation of carnation shoot tips: influence of dose and duration of exposure

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Date: 2003

Abstract

One of the main challenges facing production of good quality cut flowers is the lack of clean planting material especially among resource poor farmers who resort to multiplying their own propagules with detrimental results. Carnation (Dianthus caryophillus L. cv. Yair) is an important export crop among farmers in Kenya. Carnation production, however, is constrained by lack of clean planting materials. The main objective of this study was to evaluate the potency of thidiazuron (TDZ), a phenyl urea, in evoking morphogenic response invitro compared to combined auxin (NAA) and cytokinin (kinetin) from shoot tip explants of carnations as one possibility of producing en mass clean planting materials. In addition, the study was instituted to determine the optimum concentration and duration of exposure of TDZ in the number, length and general quality of shoots formed. Results from the study indicate that TDZ, at low concentrations of 0.1-1 μM, was just as effective as 0.2 mg-1 L NAA + 0.2 m-1 L kinetin in improving the number, length and quality of shoots regenerated from the explants cultured in vitro. Although multiple shoots were formed from explants cultured on media supplemented with high doses of TDZ (5 μM), they were dwarfed and of a poorer quality. Prolonged exposure of carnation shoot tip explants to high concentrations of TDZ was detrimental to plant regeneration. Sufficient morphogenic response could be achieved by exposing the explants to 1-5 μM TDZ for short durations of 3-10 days with subsequent transfer to MS basal medium devoid of any plant growth regulators.