ABSTRACT

The purpose of this study was to optimize a reproducible regeneration system for chickpea (*Cicer arietinum* L. cv. PB-2008). Ability of different explants viz. shoot tip (ST), cotyledonary node (CN) and node (N) was tested for callus induction on MS medium supplied with various concentrations of auxins (2,4-D and NAA) alone or in combination with cytokinins (BAP and TDZ). MS medium without plant growth regulators was used as control. Callus initiation duration, callus induction frequency, callus index and callus morphology were determined. Results revealed that 2.0 mg/l NAA alone was found more effective for callus induction. In combined composition of PGRs i.e. 2.0 mg/l NAA+ 0.5 mg/l BAP showed callus induction with minimum callus initiation duration (5 days) from CN explant. Shoot regeneration from callus was achieved by gradual decrease in concentration of plant growth regulators. For regeneration of shoots from callus, culture medium was fortified with 0.5 mg/l NAA. Eight different combinations of IBA + IAA were prepared as a root induction medium. The maximum frequency of root induction was observed at 1 mg/l of IBA in combination of 1 mg/l IAA in 15 days with 80 % root induction frequency. For direct regeneration, it was observed that among the tested concentrations, 2 mg/l IBA showed significant shoot and root multiplication response in chickpea. Likewise the shoot formation and root formation frequency was 100 % at this concentration. Among the explants, the maximum number of shoots (25) and roots (22) was produced by cotyledonary node explants with 16 cm shoot length and 12 cm root length. Different concentrations of IBA showed auto root induction after 2 weeks of explant inoculation. Likewise the shoot formation and root formation frequency was 100 % at 1mg/l NAA. Among the explants, the maximum number of shoots (22) and roots (26) was produced by cotyledonary node explant with 16 cm shoot length and 19 cm root length. After the establishment of roots, the plantlets were removed from their agar medium, washed under running tap water and transferred to plastic pots containing different mediums (soil, sand, litter, manure and peat moss alone or with combinations). Plastic pot containing peat moss shown 75% survival rate (after 20 days) when plantlets were shifted from *in vitro* to *ex vitro* condition. After 20 days of shifting plant length increased 14 cm to 18 cm. The major purpose of this study was to overcome the recalcitrant behavior of chickpea towards tissue culture.