ABSTRACT

The present study highlights the *in vitro* regeneration potential of two varieties of chickpea (*Cicer arietinum* L.), and genetic fidelity assessment of regenerated plants. In order to overcome the recalcitrant behavior of chickpea towards tissue culture, it is important to develop a competent regeneration protocol. One desi type chickpea variety, BK-2011 and other kabuli type variety, CM-2008 were selected for this study to establish a quick and repeatable *in vitro* regeneration system. Four explants *viz.* single cotyledon with half embryo axis, cotyledonary node, node and shoot tip excised from seven days old *in vitro* grown seedlings were cultured on Murashige and Skoog's (MS) medium fortified with different plant growth regulators. Various concentrations of auxins (2,4-D and NAA) alone or in combination with cytokinins (BAP and TDZ) were employed for callus induction. Of these, 3.5 mg/L NAA+ 0.5 mg/L BAP proved the best for callus induction in both the varieties. Shoot regeneration from callus was achieved by a slight increase in cytokinin concentration and gradual decrease in auxin level. At the concentration of 1.5 mg/L BAP + 0.5 mg/L NAA, variety BK-2011 showed the maximum number of shoots (12) per callus as compared to CM-2008 with 8 shoots per callus. For direct regeneration, six concentrations (0.5- 3.0 mg/L) each of BAP and kinetin alone and in combination with IAA (0.5 mg/L) were tested. Among the cytokinins used, BAP was observed to lead to a significant increase in shoot multiplication response. However, results indicated that a combination of different cytokinins and auxins was a better choice as compared to cytokinins alone. The regenerated shoots were successfully rooted at 0.5 mg/L IBA in ½ strength MS medium. Of the two varieties used, BK-2011 showed more potential of regeneration as compared to CM-2008. The genetic stability of regenerated plants was assessed by RAPD analysis. Of the 10 randomly selected RAPD primers, 3 primers produced score able DNA bands with size range of 210 bp to 1300 bp. RAPD analysis confirmed the genetic stability of plants obtained from direct regeneration method while some variations were indicated in plants regenerated through an intervening callus phase.