In vitro regeneration of Acacia crassicarpa A. Cunn Ex benth through organogenesis from juvenile sources

ABSTRACT

Micropropagation through tissue culture technique offers an alternative to traditional vegetative propagation to mass propagate selected trees for large-scale forest plantation. Therefore, this study aimed to develop a protocol for the micropropagation of A. crassicarpa. Nodal stem segment and leaf obtained from 2 month-old aseptically germinated seedlings were used as explant in this study. Nodal stem segment was found to be the most appropriate explant for shoot formation when cultured on a MS medium supplemented with 6-benzylaminopurine (BAP). The highest mean number of shoots (5) and the longest mean shoot elongation (8 mm) occurred on a medium supplemented with 0.5 mg l-1 BAP. The longest mean shoot length (8 mm) and the highest mean number of explants per culture (7) were obtained on medium without any plant growth regulator. When cultured on a medium supplemented with 2,4-dichlorophenoxy acetic acid (2,4-D), nodal stem segment explant developed roots and callus (after 14 days). The highest mean number of roots (8.3 = 8) and the longest mean root length (12.0 = 12 mm) were obtained from the medium supplemented with 10.0 and 2.0 mg l-1 2,4-D, respectively. The highest mean number of roots (20.6 = 21) and the longest mean root length (10.4 = 10 mm) were obtained from the medium supplemented with 10.0 and 2.0 mgl-1 2,4-D, respectively, while the highest intensity of callus was produced on a medium supplemented with 8.0 and 10.0 mg l-1 2,4-D, and which was only able to produce root without any shoot formation. The calli produced were compact, watery and white in colour. Survival rate of plantlets was higher (100%) when transferred into the autoclaved mixture of soil, sand and peat (3:3:1) than those transplanted in an unautoclaved soil mixture (6.6%). Survival percentages of the plantlets in the culture room and greenhouse condition were 85 and 100%, respectively.

Keyword: A. crassicarpa; Acclimatisation; Auxin; Cytokinin; In vitro rooting; In vitro shooting; Leaf segment; Micropropagation; Murashige and Skoogôs medium (MS); Nodal segment; Organogenesis; Plant growth regulator