Direct shoot organogenesis and clonal fidelity confirmation of Tongkat Ali (Eurycoma longifolia) using molecular markers

ABSTRACT

Eurycoma longifolia is a medicinally potent plant found in the tropical forest of South-East Asia. Every part of the plant, especially the root is traditionally used as an aphrodisiac, anticancer and anti-inflammatory. E. longifolia is conventionally propagated by seeds but with low germination rate and efficiency. This has made an in vitro propagation of E. longifolia a desirable alternative. Hence, this study reports an effective method of direct organogenesis of shoot. In vitro seedling's leaves were cultured on Murashige and Skoog (MS) medium containing 1.0 mg L-1 6-benzylaminopurine (BAP), producing 1.8 ± 0.5 shoots per leaf with a regeneration frequency of 68.2%. The shoot buds were directly formed from leaves without intermediate callus formation. To obtain complete plantlets, the shoots were in vitro rooted with an average number of 4.2 ± 0.4 roots per shoot in half-strength MS (½MS) medium supplemented with 0.5 mg L-1 indole-3-butyric acid (IBA). Regenerated plantlets were successfully acclimatized to field conditions with an 85% survival rate. Genetic fidelity of the micropropagated plantlets was evaluated using Simple Sequence Repeat (SSR) and Inter Simple Sequence Repeat (ISSR) analysis. The results showed that the monomorphic banding patterns of in vitro raised plantlets and their mother plant were similar, confirming its homogeneity and the reliability of the multiplication system.

Keyword: Clonal fidelity; Eurycoma longifolia; Leaf explant; Shoot regeneration; SSR and ISSR