Micropropagation of *allanblackia stuhlmannii* 'clusiaceae', an economically important wild tree species

Johnstone Omukhulu Neondo

A thesis submitted in partial fulfilment for the degree of Master of Science in Biotechnology in the Jomo Kenyatta University of Agriculture and Technology

2011
ABSTRACT

*Allanblackia stuhlmannii* is an endangered forest tree valued for its edible nut oil which has high potential for commercialization. This tree grows naturally in the Eastern Arc Mountains of Tanzania. Regeneration of *A. stuhlmannii* via seed is slow and low. Rooting of cuttings is poor, while survival rate of grafted materials is dismal. The limited regenerative potential of *A. stuhlmannii* hinders sustainable nut harvesting from the wild to meet market demand. A private-public partnership known as ‘Novella Africa’ is engaged in the domestication of members of *Allanblackia* spp. for commercial oil production. To achieve mass production, the amenability of *A. stuhlmannii* to micropropagation technique was examined in this study. A series of sterilization and micropropagation experiments were conducted on plant material collected from Amani Nature Reserve in Tanzania. Sodium hypochlorite, formaldehyde and Redomil® were the reagents used in the sterilization protocol. Explants were best surface sterilized after subjection to 2% Redomil® solution and exposure to 8% sodium hypochlorite solution for 10 minutes. Eight basal media were tested for their suitability in micropropagation of *A. stuhlmannii*. McCown’s WPM which had 88.89% explants survival rate was selected for micropropagation of *A. stuhlmannii*. Microshoots were induced from shoot tips and internodal explants of *A. stuhlmannii* cultured on WPM fortified with different treatments of PGRs, (P<0.05). All responding explants produced a single microshoot. Treatments 1.2mgL⁻¹BAP and 1.2mgL⁻¹KIN had explants with the highest mean shoot length, (P<0.05). Prolonged culture or subculture on the same medium did not promote further shoot production. Callus was induced from leaf discs cultured on McCown’s basal medium supplemented with Gamborg’s vitamins, 3% (w/v) sucrose, 1mgL⁻¹ KIN combined with 1.25mgL⁻¹2,4-D, however no somatic embryos emerged from the callus. Success in shoot proliferation and callus induction forms a basis for further research geared to regenerating *A. stuhlmannii* clonal plantlets through micropropagation.