

Low Cost Issue Culture of Selected Cassava(*Manihot esculenta* Crantz) and Sweet Potato(*Ipomoea batatas*(L) Lam) Varieties

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Drought has become a major contributor to food insecurity in sub-Saharan Africa. Drought-tolerant crops such as cassava and sweet potato can help alleviate this situation. However, lack of affordable healthy planting materials of farmer-preferred varieties is a major constraint to sweet potato and cassava production. Conventional tissue culture technology offers an important solution to this but it is very costly, making plantlets out of reach for resource poor farmers. Hence, it is necessary to have low cost options for micropropagation of planting materials. One way of doing this is to substitute the conventional source of Murashige and Skoog (MS) media salts with alternative sources that are available locally. This study sought to compare the cost of regenerating selected cassava and sweet potato varieties using alternative nutrient sources and the conventional MS nutrient sources. Another objective was to find out if there is any genotype-dependent response to regeneration using different media. Two varieties of each crop (KEMB 36 and Tainung for sweet potato and Muchericheri and KME 1 for cassava) were subjected to three treatments with different media composition and replicated nine times. In the first medium (LCM 1), Easygro™ vegetative fertilizer (27:10:16 (N: P: K) + microelements) from Osho Chemical Industries Limited was used as an alternative source for MS basal salts. In the second media (LCM 2), the conventional sources of four MS macronutrients were substituted individually with locally available fertilizers while Stanes Iodized Microfood® was used as the low cost source of micronutrients. Table sugar was used as an alternative source of carbon while the modified conventional MS medium (CM) was used as the control. Growth parameters including numbers of nodes, roots, leaves and plant height were recorded at 7 and 14 days intervals for cassava and sweet potato, respectively. This was carried out over a period of five weeks for cassava, and six weeks for sweet potato. The use of LCM 1 for cassava micropropagation led to a reduction of 96.3% in the cost of the nutrient medium while LCM 2 led to savings of up to 95.5%. For sweet potato a cost reduction of 96.9% was realized with LCM 1 while LCM 2 led to cost reduction of 94.4%. LCM 1 produced better results compared to LCM 2 for cassava regeneration for all the four parameters assessed. The two cassava varieties had regeneration indices of 3-7 nodes per plantlet during initiation and 3.7-6.9 nodes per plantlet during multiplication on all the media. Leaf formation for the two cassava varieties after the sixth week of culture ranged between 2.7 and 7.3 leaves per plantlet on all the media during initiation and 4-7 leaves during multiplication. Muchericheri produced significantly ($p < 0.05$) higher number of roots on LCM 1. The two cassava varieties had no significant ($p > 0.05$) differences in root production on LCM 2. Sweet potato varieties produced better results on LCM 2 compared to LCM 1. KEMB 36 had a regeneration index of 7.8 nodes per plantlet on LCM 2 during initiation while Tainung had a mean of 3.8 nodes per plantlet after the sixth week of culture. The two

sweet potato varieties recorded regeneration indices of 3.3-7.1 nodes per plantlet during multiplication. The variety KEMB 36 had better leaf production on LCM 2 compared to Tainung and vice versa on LCM 1 during initiation. Acclimatization of cassava was best on vermiculite while for sweet potato it was on a mixture of rice husks and red soil in the ratio 1:2. This study has shown that it is possible to reduce the cost of cassava and sweet potato tissue culture by adopting alternative nutrient sources. However, the differential responses among varieties calls for further investigation.