

SUMMARY

Root and tuber crops, which are the only supplementary source of energy for cereal based diet especially among the low income strata in Sri Lanka, are in immediate need of increasing the production through crop improvement. Moreover, use of conventional techniques for improvement of these crops is found to have some limitations. In this respect, utilization of tissue culture technology holds much promise. In order to reach those objectives tissue and meristem culture techniques were applied on three main root and tuber crops namely, cassava, sweet potato and potato.

Growth media supplemented with various levels of hormones and nutrients in different combinations were examined for establishment of callus and meristem cultures. Induction of cassava callus was positively influenced by higher levels of 2, 4-D while kinetin favoured its continuous growth. 2, 4-D had similar effect on both initiation and growth of potato callus. Regeneration of plantlets, though failed with cassava calli, occurred in potato calli at lower proportions of auxin to kinetin.

Modified Murashige and Skoog medium was found to be satisfactory for meristem culture of cassava; provided with appropriate levels of inorganic constituents low levels of auxin combined with kinetin determined the state of morphogenesis. Potato meristems were established in the Eeuwens medium more successfully; low levels of 2, 4-D and kinetin accelerated both initiation of growth and elongation. Addition of benzyl adenine and naphthalene acetic acid to the Eeuwens medium was responsible for generation of plantlets with slow rate of growth. Extended incubation of meristem-derived potato cultures resulted in formation of minitubers that were, except in size, showing a similarity to seed potato. Meristem culture technique was accomplished for elimination of potato leaf roll virus from infected plant materials.