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Callogenesis in cultured plumule explants of coconut (Cocos nucifera L.)

Tissue culture is the only way open for clonal propagation of coconut. A reliable clonal propagaion method is yet to be developed. Plumules excised form mature zygotic embryos have shown to be a potential explant for developing a model systme fo rclonal propagation of coconut. The objective of this study was to develop suitable culture conditions for callogenesis in plumule explants of Sri Lanka Tall coconut.

Eleven to twelve month-old mature zygotic embryos which were precultured in the Eeuwens Y3(Y3) medium for two weeks, were used for plumule excision. Excised plumules were cultured in different basal media (Y3, Murashige and Skoog and medium 72 developed at the Coconut Reserch Institute, Sri Lanka) to determine a suitable culture medium. Histological analysis was conducted to identify the cellular origin of callus.

Consistent callus production was observed in the three media tested. The callusing frequency depended on the 2,4-D level in the medium. The time taken for callus initiation was highly variable (three to ten weeks). The fresh weight of callus increased with time up to the eight week of culture and showed a subsequent stabilization. Analar grade sucrose in the medium could be easily substitute with household sugar. Histologicl analysis revealed that the meristematic cells were formed by the division of provascular cells and protodermal cells. The callus formed was highly heterogeneous and consisted of partly dedifferentiated cells.

The present study demonstrates that plumule explants are suitable for obtaining embryogenic callus. Embryogenic calli formed are of importance to regenerate plants through somatic embryogenesis. Plumule culture will be useful in developing a model system for clonal propagation of coconut and multiplying improved seed material developed through conventional breeding methods.