

**Biochemical studies of *Cocos nucifera* L. (coconut) embryogenesis**S C Fernando<sup>1\*</sup>, C S Ranasinghe<sup>1</sup>, L K Weerakoon<sup>1</sup> and K Hirimburegama<sup>2</sup><sup>1</sup> Coconut Research Institute, Lunuwila<sup>2</sup> Department of Plant Sciences, University of Colombo, Colombo 3

Metabolite levels in correlation with developmental events of embryos are potential markers of embryogenesis. A search for such biochemical markers in *Cocos nucifera* L. (coconut) will be useful in developing a reliable protocol for clonal propagation of coconut. Therefore, with the objective of generating information on possible biochemical markers, comparative studies on somatic and zygotic embryogenesis of coconut were undertaken.

In this study, the accumulation of proline, total sugar and abscisic acid during embryogenesis as potential markers were assayed. Callus derived from plumules were treated with abscisic acid to induce somatic embryogenesis and the different types of tissues produced during the process were sampled for the analysis. Zygotic embryos of 11 to 16 months after pollination were also analysed as a reference to confirm markers. With maturity, the content of proline in zygotic embryos decreased (2.90 - 0.27 mg/ g DW), whereas that of total sugar (0.56 - 0.45 g/ g DW) and abscisic acid (112 - 135 ng/ mL sap) did not change significantly. With the development of embryogenic structures, the content of proline and total sugar in the *in vitro*-cultured tissues also showed a similar trend whereas content of abscisic acid showed unreliable results. Proline and total sugar levels of tissues bearing embryogenic structures were lower (0.65 mg/ g DW and 0.11 g/ g DW respectively) than those devoid of embryogenic structures (3.19 mg/ g DW and 0.18 g/ g DW respectively). Proline levels of zygotic embryos of the same maturity showed a high tree-to-tree variation, and proline and abscisic acid levels in the *in vitro*-cultured tissues of similar type were also highly variable. The heterozygous nature of coconut palms and the asynchronous development of *in vitro*-cultured tissues might have contributed to the variable levels of proline in tissues. However, total sugar levels of those tissues were more stable and, therefore, further studies on the accumulation of sugar are worthwhile in developing biochemical markers of coconut embryogenesis.

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