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Biochemical analysis of immature inflorescence explants of Coconut (Cocos nucifera L.) to support in vitro clonal propagation

Immature inflorescence material is a promising source of explants for coconut tissue culture. However, a reliable protocol for regenerating plants from these explants is yet to be developed. Selection of inflorescence tissues at the correct developmental stage is vital for successful *in vitro* culture. Biochemical characterization of immature inflorescence explants at different stages of development could provide valuable clues in its morphogenic potential. Thus, accumulation of proline, starch and total sugar in a series of inflorescence maturity stages from

Sri Lanka Tall coconut palms was assessed with the aim of determining a possible correlation between these biochemical characteristics and the morphogenic potential of inflorescence tissues. Samples for analysis were collected from unopened inflorescences of –1 to –13 stages, in decreasing order of maturity (i.e. considering the youngest open inflorescence as 0 stage, -1 [the inflorescence which is to be opened next] is the most mature stage whereas –13 is the most immature stage).

A significant variation in the levels of proline, starch and total sugar was observed in inflorescence tissues at different stages of maturity. Previous studies have shown that inflorescence of an external spathe length of about 10 cm are more suitable for *in vitro* culture. In the present study, mean spathe length which corresponds to –8 stage is close to 10 cm and therefore this stage could be considered as more suitable for *in vitro* culture. In seeking a possible correlation between this morphological feature and the biochemical characters analysed, total sugar content might be important as significantly higher level of total sugars was observed in -7, -8 and -9 stages when compared to the other stages. In regard to proline content, a very low level was observed in more mature stages (-1 to -3) whereas no significant variation was observed in -4 to -11 stages. The starch content was found to be relatively high in -13 to -8 stages and a declining trend was observed thereafter.

Content of total sugar showed a more distinct pattern in relation to different maturity stages, when compared to proline and starch. The higher accumulation of total sugars in -7 to –9 stages might have some significance in morphogenesis, especially as an energy source. Thus total sugar content might be a possible biochemical marker for assessing the morphogenetic potential of inflorescence explants. However, further studies especially on sugar profiles are needed to confirm this view.