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Potential of activated coconut shell charcoal (ACSC) in *in vitro* culture of *Cocos nucifera* L. (coconut)

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The presence of plant growth regulators in combination with activated charcoal in tissue culture media results in undefined culture conditions. Different types/ batches of activated charcoal have varying adsorption capacities and can produce unreliable results. Coconut is a highly recalcitrant plant to *in vitro* regeneration and coconut tissues require guaranteed source of activated charcoal with consistent characteristics. Therefore, the objective of the study was to evaluate locally manufactured activated coconut shell charcoal (ACSC) (Haycarb PLC) as a potential source.

Immature zygotic embryos of coconut (variety Sri Lanka Tall) were cultured in basal media supplemented with different types of ACSC (A, B, C and D) and BDH charcoal (control).The optimum 2, 4-D levels were assessed by culturing of explants in media with varying 2, 4-D levels and HPLC analysis of free 2, 4-D in culture media. The suitability of the selected ACSC type was confirmed by culturing of plumule explants of coconut.

Immature zygotic embryo cultured in media containing 125 µM 2, 4-D + ACSC A and 175 µM 2, 4-D + ACSC B produced callus at frequencies (59 and 63 % respectively) comparable to that of control (63 %). HPLC analysis showed the presence of 1.5-2.5 µM (approx.) free 2, 4-D in all the three media despite the different 2, 4-D levels added. Based on HPLC analysis, the effective 2, 4-D levels to be used in combination with ACSC C/ D were determined (5 – 10 µM). However, immature zygotic embryos showed poor performance (14 and 40 % callus having a slow growth) in media containing ACSC C and D. Due to the poor mixing properties of ACSC A with the medium, only ACSC B was selected for further studies. Plumules cultured in media containing ACSC B and BDH produced comparable callusing (65 and 70 % respectively) and confirmed the suitability of ACSC B for coconut tissue culture at callusing stage.

The study enabled the selection of an effective ACSC type (B) for coconut tissue culture. Its use will result in reliable results and economical benefits over the use of imported charcoal types.

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