

Anthraquinones production, hydrogen peroxide level and antioxidant vitamins in *Morinda elliptica* cell suspension cultures from intermediary and production medium strategies

ABSTRACT

The effects of medium strategies [maintenance (M), intermediary (G), and production (P) medium] on cell growth, anthraquinone (AQ) production, hydrogen peroxide (H₂O₂) level, lipid peroxidation, and antioxidant vitamins in *Morinda elliptica* cell suspension cultures were investigated. These were compared with third-stage leaf and 1-month-old callus culture. With P medium strategy, cell growth at 49 g l⁻¹, intracellular AQ content at 42 mg g⁻¹ DW, and H₂O₂ level at 9 mol g⁻¹ FW medium were the highest as compared to the others. However, the extent of lipid peroxidation at 40.4 nmol g⁻¹ FW and total carotenoids at 13.3 mg g⁻¹ FW for cultures in P medium were comparable to that in the leaf, which had registered sevenfold lower AQ and 2.2-fold lower H₂O₂ levels. Vitamin C content at 30–120 g g⁻¹ FW in all culture systems was almost half the leaf content. On the other hand, vitamin E content was around 400–500 g g⁻¹ FW in 7-day-old cultures from all medium strategies and reduced to 50–150 g g⁻¹ FW on day 14 and 21; as compared to 60 g g⁻¹ FW in callus and 200 g g⁻¹ FW in the leaf. This study suggests that medium strategies and cell growth phase in cell culture could influence the competition between primary and secondary metabolism, oxidative stresses and antioxidative measures. When compared with the leaf metabolism, these activities are dynamic depending on the types and availability of antioxidants.

Keyword: *Morinda elliptica*, Cell suspension culture, Anthraquinones, Antioxidant, Vitamins, Hydrogen peroxide, Lipid peroxidation