

ABSTRACT

Coffee is one of the most important cash crops produced in the world with great economic returns to growers and national gross domestic product. Somatic embryogenesis is a morphogenetic processes leading to plantlet regeneration and these processes are coupled with changes in the levels of primary metabolites. The present experiment established relationships of endogenous substances with direct somatic embryogenesis of coffee 'Ruiru 11'. Laboratory experiments were set up at Coffee Research Institute, Ruiru-Kenya between 2014 and 2017. The set up was in a completely randomised design, replicated three times and repeated once. Third leaf pair explants were excised from 8-month-old greenhouse-grown mother plants and cultured in half strength Murashige and Skoog basal salts augmented with Thidiazuron. Once embryos had developed, the cultures were analysed for endogenous substances using HPLC and GCMS. Sucrose, phenolics, alkaloids, amino acids, fatty acids and their derivatives correlated positively, whereas fructose and glucose correlated negatively with the other biochemical components. Endogenous sucrose, chlorogenic acid, caffeine amino acid, fatty acids and their derivatives are potential biomarkers for coffee somatic embryogenesis, whereas endogenous fructose and glucose are inhibitors of the same. Further studies regarding the status of the biochemical components, especially in particular stages of embryo development should be conducted to establish treatments that can improve coffee direct somatic embryo development.