

## ABSTRACT

Coffee is one of the most important crops cultivated in the world for use in beverages and confectionaries. Embryogenesis is a complex process that begins with a single cell and ends with the formation of mature embryos. Somatic embryo development involves accumulation of complex metabolites and storage reserves. This present experiment identified and quantified endogenous phytochemicals and amino acids present during somatic embryogenesis of 'Ruiru 11'. Laboratory experiments for this study were set up in the Coffee Research Institute, Kenya at Ruiru. Third leaf pair explants were excised from 8-month-old greenhouse-grown mother plants sterilized and cultured in half strength Murashige and Skoog basal salts augmented with Thidiazuron. Once embryos had developed, the cultures were analysed for phytochemicals using GCMS and HPLC. The results showed that palmitoleic and stearic acids were highest (23.3  $\mu\text{g/g}$  and 69.9  $\mu\text{g/g}$  respectively) in brown embryogenic cultures. Cis 7,8 epoxy-2-methyl octadecane was highest (253  $\mu\text{g/g}$ ) in green embryogenic cultures. (Z)-3-Tetradecene was highest (25  $\mu\text{g/g}$ ) in brown non-embryogenic cultures. Z, Z-3,13- Octadecadien-1-ol and (Z)-7-Hexadecenal were highest (32.1  $\mu\text{g/g}$  and 70.2  $\mu\text{g/g}$  respectively) in green embryogenic cultures. Alanine content was highest (4.4  $\mu\text{g/g}$ ) in embryos of brown cultures. Amino acids, fatty acids and their derivatives are potential biomarkers for embryogenesis. Other phytochemicals should be identified and their role in coffee somatic embryogenesis determined. Further studies regarding the status of the phytochemicals identified in the present study, especially in particular stages of embryo development are needed to propose treatments to improve coffee somatic embryo development. Keywords: Amino acids, Biomarkers, Fatty acids, Somatic embryos