

## **Cell wall-glycolipids profiling of oil palm roots during *Ganoderma boninense* infection using gas chromatography-mass spectrometry**

### **ABSTRACT**

Better understanding of the cell wall (CW)-glycolipids changes associated with basal stem rot (BSR) disease is essential for identifying the pathogen-host interaction to improve management and diagnostic measures. The aim of this study was to investigate the CW changes in the glycolipids profile of oil palm roots during *G. boninense* infection. We carried out lipidomic analysis of glycolipids fractionated from CW-lipids of oil palm seedlings artificially infected (AI) with *G. boninense*. Oil palm roots were harvested at three (first interval) and six months (second interval) post-AI from infected and control (uninfected) seedlings and were subjected to gas chromatography-mass spectrometry (GC-MS) based global lipidomic analysis. Principal component analysis (PCA) and partial least square-discriminant analysis (PLS-DA) confirmed 11 impaired glycolipids (six in the first and five in the second interval) associated to cell-signalling and break down of energy. Pyruvate metabolism and glycolysis or gluconeogenesis are the most perturbed pathways during the pathogenesis as revealed by pathway impact analysis. The possible utilisation of the glycolipids as biomarkers for diagnostic of *Ganoderma* infection was authenticated using the receiver operating characteristic (ROC) curve analysis. The current research suggests five glycolipids [Phosphatidylcholine (PC)(6:0/0:0), PC(2:0/2:0), Phosphatidic Acid (PA)(18:4(6Z,(Z,12Z,15Z)/0:0), PA(14:0/ 0:0) and  $\gamma$ -linolenic acid] as the potential biomarkers which may be further investigated for the early detection of BSR.