Metabolite diversity of fruits of selected African eggplant accessions for improved health and nutrition

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Abstract

African eggplants, the wild relatives of cultivated eggplants are among the nutritionally important and valuable crops consumed in Africa. They have been reported to adapt and thrive well under stress conditions. Therefore there is need to identify and characterize these metabolites from the African eggplant fruits. Seeds of the selected accessions were obtained from World Vegetable Centre (AVRDC), Tanzania; grown in the greenhouse and subjected to drought stress. The fruits were harvested at three stages of ripening; mature green, breaker and mature red stages. Metabolite profiling using non-targeted GC-MS metabolomic approach was performed and identification was carried out with the Golm, Germany metabolomics library software. A total of 68 metabolites were detected in the fruits and distributed into major compound classes comprising of amino acids and their derivatives, organic acids, sugars and sugar alcohols and nitrogen compounds. Significant changes (p<0.05) in metabolite contents were observed and potentially important metabolites with respect to stress responses were characterized. Proline, glutamate, γ -amino butyric acid, 3-chlorogenic acid, glucose, sucrose, myo-inositol, citrate, guinic acid and ornithine increased with stress. Principal component analysis showed a clear discrimination between the different accessions, ripening stages and stress. From the study, it is evident that some metabolites are important in drought stress tolerance. The findings also indicate that harvesting the fruits at mature stages has improved nutritional benefit. In conclusion, these crops are of great significance because of their high nutritional value and may also be necessary in maintaining healthy/proper functioning of the human system.

Keywords: Drought stress, African eggplants, metabolite profiling, fruit ripening