

RESEARCH ARTICLE

Differential Metabolites Markers from Trunking and Stressed Non-Trunking Sago Palm (*Metroxylon sagu* Rottb.)

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Abstract: Background: Sago palm is an important agricultural starch-producing crop in Malaysia. The trunk of sago palm is responsible for the starch to reach maturity for harvesting after ten years. However, there are sago palms that fail to develop their trunk after 17 years of being planted. This is known as a stressed “non-trunking” sago palm, which reduces the economic value of the palms.

Objective: The study was initiated to compare the differences in metabolite expression between trunking and non-trunking sago palms and secondly to determine the potential metabolite-makers that are related to differential phenotypes of sago palms.

Methods: Metabolites were extracted using various solvents and analysed using NMR spectroscopy and GC-MS spectrometry. Data obtained were subjected to principal component analysis.

Results: The study determined differential metabolites expression in the leaf extracts of normal trunking sago palm compared to the non-trunking palms. Metabolite groups differently expressed between trunking and non-trunking sago palm are oils and waxes, haloalkanes, sulfite esters, phosphonates, phosphoric acid, thiophene ester, terpenes and tocopherols. GC-MS analysis of Jones & Kinghorn extraction method determined two sets of metabolite markers, explaining the differences in metabolites expression of trunking and non-trunking sago palms in ethyl acetate and methanol extract of 89.55% comprising sulfurous ester compounds and 87.04% comprising sulfurous ester, sulfurous acid and cyclohexylmethyl hexyl ester, respectively.

Conclusion: Two sets of metabolite markers were expressed in the trunking and non-trunking sago palms. These metabolites can potentially be used as markers for identifying normal and stressed plants.

Keywords: Non-trunking, sago, metabolites, differential expression, *Metroxylon sagu*, metabolite markers.

1. INTRODUCTION

Metroxylon sagu Rottb., commonly known as sago palm, belongs to the family of Palmae, and

subfamily Calamoideae [1]. It has long been cultivated as an agricultural crop in Malaysia mainly in Sarawak state, as well as throughout the Southeast Asia regions, especially in Papua New Guinea and Indonesia. Compared with other species of genus *Metroxylon* such as *M. vitiense* Benth., *M. amicarum* Beccari, *M. paulcoxii* McClatchey and *M. salomonense* Beccari [2], only *M. sagu* is both hapaxanthic indicating the excessive storing of

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