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Beyond Classical Approaches

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LEAF EPICUTICULAR WAX ANALYSES OF *CRYPTOCORYNE* SPECIES IN SARAWAK

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ABSTRACT

The study on the leaf epicuticular wax of the *Cryptocoryne* species has provided significant information on the species identification and this study is aimed to identify the different concentrations of hydrocarbon compounds that made up the leaf epicuticular wax of *Cryptocoryne*. The information obtained will be used as a chemotaxonomic marker for the species studied as the probable presence of hydrocarbons in certain species only. The study on leaf epicuticular wax that was conducted via the gas chromatography flame ionization detector (GC- FID) revealed different concentrations of hydrocarbons. From the results obtained, the predominant carbon chain length ranges from 20 to 34 carbon atoms for all *Cryptocoryne* species that were studied. The highest concentrations of carbon atoms in the following species thus can be used as a chemotaxonomic marker for these particular species - *C. auriculata* (1102.256 ng/g for C_{33} *n*- triatriacontane), *C. ciliata* (1026.985 ng/g for C_{31} *n*- hentriacontane), *C. keei* (1886.189 ng/g for C_{17} *n*- heptadecane), *C. striolata* (2243.760 ng/g for C_{24} *n*- tetracosane), *C. pallidinervia* (322.998 ng/g for C_{29} *n*- nonacosane) and *C. zaidiana* (522.138 ng/g for C_{34} *n*- tetratriacontane). The distribution of hydrocarbon homologues, which may extend to the range of longer carbon chains, can be observed in samples collected from the wild – *C. auriculata* collected from Sg. Strass, *C. purpurea* collected from Sg. Stungkor and *C. uenoi* collected from Sg. Sabal, as compared to the ten (10) species that were obtained from the greenhouse cultivation. Differences in the hydrocarbon compounds are attributed to the varying environmental conditions of which the samples were collected from. The results gathered through this study will contribute to a very profound amount on the existing data of *Cryptocoryne* as it would help to relate to the various aspects of the species' development such as photosynthesis, evolutionary studies, taxonomic works and any potential cultivation values to increase the declining population.

Keywords: *Cryptocoryne*, chemotaxonomic, GC-FID, hydrocarbon

INTRODUCTION

Cryptocoryne is a genus under the family Araceae. All *Cryptocoryne* has almost similar creeping characters, with rhizome part and the leaves are arranged in a rosette. The most distinguishing and distinct character of *Cryptocoryne* lies in the inflorescence of the species (Andersen *et al.*, 1998). The spadix of the genus is entirely enclosed by a spathe in a basal "kettle" formed on connate spathe margins (Mayo *et al.*, 1997). The "kettle" holds both the male and female flowers and above the "kettle', the spathe continues as a narrow tube that opens up into the limb (Andersen *et al.*, 1998).

Epicuticular waxes composed of surface lipids that form crystalloids or a smooth film exterior to the cuticle. The epicuticular waxes coat the surfaces of fleshy organs, such as the leaves, to function as a means of preventing the organs from experiencing desiccation, pest attacks such as pathogenic fungi and bacteria, to control the leaf temperature (Maffei *et al.*, 2004) and to reduce leaching of organic and inorganic substances from the leaf interior (Schreiber and Schönherr, 1993 in Koch, 2006). According to Skorupa *et al.* (1998), hydrocarbons patterns that may exist in the foliar epicuticular waxes can be useful evidence for the taxonomic purposes at the interspecific, specific and infraspecific hierarchic levels.

n- alkanes hydrocarbons make up to 73% of leaf waxes and are among the most commonly found in the leaf epicuticular waxes of higher plants. Therefore, the use of n- alkanes in chemotaxonomic studies of trees and herbaceous plants is widely applied, and this analyses together with other chemical markers, are indispensable tools in other fields (Nikolíc *et al.*, 2010).