

## **Untargeted Metabolite Profiling of Wild and In Vitro Propagated Sabah Jewel Orchid *Macodes limii* J.J. Wood & A.L. Lamb**

### **ABSTRACT**

*Macodes limii* J.J. Wood & A.L. Lamb is a terrestrial jewel orchid native to Sabah, recognised for its sparkling golden-yellow venations, uniformly distributed on its leaves. Despite its high ornamental value, the exploration of the plant's medicinal potential remains ambiguous. The current study was conducted to gain a fundamental understanding of the metabolite composition and regulation in *M. limii* plants from two different growing environments: wild and in vitro cultivation, as well as to analyse their phytochemical contents and antioxidant activity. The metabolite profiling of the *M. limii* plant extracts through gas chromatography-mass spectrometry (GC-MS) and liquid chromatography-tandem mass spectrometry (LC-MS/MS) analysis has tentatively identified compounds from various classes including sugars, carbohydrates, sugar alcohols, amino acids, organic acids, phenolic derivatives and lipid and lipid-like compounds. Subsequently, the multivariate statistical analysis confirmed the existence of significant metabolite variations across distinct growth environments. Notably, the leaf extract derived from wild-grown plants displayed the highest levels of total phenolic and flavonoid content, contributing significantly to its higher antioxidant activity as measured by the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. The discovery has offered a fundamental understanding of the metabolites in *M. limii* jewel orchids, indicating that in vitro regenerated plants may represent a viable alternative for further investigating their therapeutic potential, thus helping to alleviate the impact on wild populations.