Discrimination of *Ipomoea aquatica* cultivars and bioactivity correlations using NMR-based metabolomics approach

ABSTRACT

Ipomoea aquatica Forsk is a green leafy vegetable that is a rich source of minerals, proteins, vitamins, amino acids, and secondary metabolites. Different types of *I. aquatica* cultivars are grown for consumption but little is known about the metabolites variation. Proton nuclear magnetic resonance (^{1}H NMR) spectroscopy combined with multivariate data analysis was applied for metabolic profiling of three *I. aquatica* cultivars including "broad leaf (K-25)", "bamboo leaf (K-88)", and "special pointed leaf (K-11)". The orthogonal partial least squares discriminant analysis (OPLS-DA) indicated a clear separation among cultivars. The relative levels of various compounds, such as amino acids, organic acids, sugars, and phenolic compounds were specific to each cultivar. The K-11 cultivar was different from the other cultivars due to a high phenolic content. The content of sugars and some amino acids was higher in K-88 and K-25 possessed a higher content of organic acids. The *in vitro* study revealed that the *I. aquatica* cultivars exhibited potent antioxidant and α-glucosidase activities. The results of this study indicate that the K-11 cultivar was the most active due to the abundance of epicatechin, 4,5-dicaffeoylquinic, protocatechuic acid, and rutin.

Keyword: Ipomoea aquatic; Cultivars; Multivariate data analysis; Nuclear magnetic resonance; Antioxidant; α-Glucosidase inhibitory activity