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Metabolite profiling of Neptunia oleracea and correlation with antioxidant and alpha-glucosidase inhibitory activities using H-1 NMR-based metabolomics

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Abstract

Neptunia oleracea is a plant consumed as vegetable and used as a traditional herb to treat several ailments. This study evaluated metabolite variations among N. oleracea leaf and stem subjected to air drying (AD), freeze drying (FD) and oven drying (OD) using proton nuclear magnetic resonance (H-1 NMR) based metabolomics. The correlation was also studied for the metabolite content with total phenolic content (TPC), DPPH free radical scavenging and a-glucosidase inhibitory activities. A total of 18 metabolites were identified from N. oleracea extracts, including 10 primary metabolites, 5 flavonoids and 3 phenolic acids using NMR. Ultra-high performance liquid chromatography tandem mass spectrometry analysis (UHPLC-MS/MS) confirmed the presence of the secondary metabolites and revealed the flavonoid derivatives present. All the identified phenolics are first reported from this plant. Multivariate data analysis (MVDA) showed strong correlation between the metabolites with the antioxidant and a-glucosidase inhibitory activities of FD N. oleracea leaves. The compounds suggested to be responsible for the high activity of FD leaves include vitexin-2-O-rhamnoside, catechin, caffeic acid, gallic acid and derivatives of quercetin, kaempferol and myricetin. This study demonstrates that FD N. oleracea leaves are a potential natural source for antioxidant and a-glucosidase inhibitors. (C) 2016 Phytochemical Society of Europe. Published by Elsevier B.V. All rights reserved.

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