F-P-23

Quantitative Analysis of Marker Compounds and Matabolic Profiling of *Zanthoxylum piperitum* (Chopi) according to Different Parts and Harvest Times

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Zanthoxylum piperitum ("chopi" in Korean) has been used as traditional medicinal plants with high anti-inflammatory, antioxidant, and antifungal activities. The aims of the study were to identify marker compounds and to investigate metabolites variation of chopi according to different parts and harvest times. Every month from June to September, chopi were harvested with three different parts: leaves, leaf-twig mixtures, twigs. Using liquid chromatography-tandem mass spectrometry (LC-MS/MS), two main marker compounds (quercitrin and quercetin-3-*O*-glucoside) were characterized in 70% ethanol extracts of chopi. Quantification of the two marker compounds were subsequently conducted by high performance liquid chromatography (HPLC), representing that contents of these compounds were higher in leaves and leaf-twig mixtures rather than twigs. For the comprehensive analysis of metabolites associated with production of marker compounds, 35 primary metabolites were identified using gas chromatography-mass spectrometry (GC-MS). Multivariate analysis results represented that plant parts were main contributors to the separation of chopi. However, significant differences were not observed between leaves and leaf-twig mixtures samples. The partial least square (PLS) predictive model revealed that monosaccharides (fructose, galactose, glucose, mannose, xylose) and branched-chain amino acids (isoleucine, valine, leucine) were important determinants for the production of marker compounds together with alanine, inositol, GABA, and theronic acid. This study could be extended to stabilize and utilize chopi as an industrial material, as well as to find good candidates with various nutritional traits.

[This work was supported by the SME Technology Development Support Project grant funded by the Ministry of SMEs and Startups (MSS) (No. S3226168).]

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