

Secondary Metabolites and Morphological Diversity in the Leaves of *Perilla* Landrace from Korea

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Screening and identification of genetic resources based on their phytoconstituents and morphological characters potentially provide baseline data for researchers, breeders, and nutraceutical companies who wish to formulate a nutrient-dense diet and health beneficial supplement. Thus, we evaluated the amount of total phenolic content and major phenolic compounds; examined if phenolic compounds could be used as distinguishing factors for perilla genetic resources; and investigated the relation between some quantitative and qualitative morphological characters with the contents of phenolic compounds in 360 accessions obtained from National Agrobiodiversity Center gene bank, Jeonju, Korea. Total phenolic content (TPC) was estimated using Folin-Ciocalteu colorimetric assay. Individual phenolic compounds were determined using an Ultra-High Performance Liquid Chromatography system equipped with Photodiode Array detector. Considerable variations were observed in TPC (7.99 to 117.47 mg GAE/g DE), rosmarinic acid (RA) (ND to 19.19 mg/g DE), caffeic acid (CA) (ND to 0.72 mg/g DE), apigenin-7-*O*-diglucuronide (ADG) (ND to 1.24 mg luteolin equivalent (LUE)/g DE), scutellarein-7-*O*-glucuronide (SG) (ND to 4.32 mg LUE/g DE), and apigenin-7-*O*-glucuronide (AG) (ND to 1.60 mg LUE/g DE). RA was the most dominant phenolic compound in most accessions (95.3%) followed by SG. The adaxial leaf color was light green, green and dark green in 13.8%, 65.0%, and 21.1 % of the accessions, respectively. 78.8% of the accessions had light green color at the abaxial side with the remaining being described as green. Most of the accessions (96.9%) were cordate shape, the remaining being eclipse. Intensities of green pigment at abaxial and adaxial leaf surfaces were correlated with contents of individual phenolic compounds and TPC whereas leaf length and width had no correlation with TPC, CA and RA, and negatively correlated with ADG, AG, and SG. Leaf shape was not related with content of phenolic compounds, color of leaves, or the length or width of leaves. Accessions IT57426, IT157434, IT267710, and IT267712 which contained relatively high contents of TPC and major phenolic compounds (RA and SG) could be used for further research in breeding and bioassay test. Our study result showed the contents of total phenolics and individual phenolic compounds along with the morphological characters could be useful distinguishing factors for perilla genetic resources.

Key words: Total phenolic contents, *Perilla frutescens* var. *frutescens*, Leaf color, Rosmarinic acid, Scutellarein-7-*O*-glucuronide

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