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Analysis of Phenolic Metabolites for Rice Cultivar Breeding Fortified to Health-promoting in Selected Rice (*Oryza sativa* L.) Genetic Resources by LC-ESI-MS/MS

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[Introduction]

Rice (*Oryza sativa* L.) is one of the staple crop in the world as a resource of calories and nutrients. Recently phenolic metabolites increasingly appreciated as antioxidant nutrients, rice breeders have been making efforts to make valuable character containing antioxidant compounds in grain as well as high yield. This study aimed to examine the quantitative composition of phenolic metabolites in the selected Korean rice genetic resources to construct an integrative omics database for development of new rice breeding system. The analysis was conducted by LC-ESI-MS/MS in multiple reactions monitoring mode targeting 55 phenolic metabolites and two amino acid precursors.

[Materials and Methods]

Total 1,103 rice samples consisted of 414 accessions selected by RDA-Genebank and 689 accessions provided by Kongju National University. The optimized LC-ESI-MS/MS conditions were as follows: reversed-phase analytical column Thermo Syncronis C18 (150×4.6mm, 5μm) maintained at 25°C, the flow rate 500μL/min, injection volume 10μL, mobile phase 0.1% formic acid in water and 0.1% formic acid in acetonitrile gradient. Curtain gas 50psi, collision gas 2psi, ion spray voltage − 4400V, ion spray probe temperature 500°C, nebulizer gas 40psi, heating gas 50psi and interface heater was turned on. Nitrogen gas was used as curtain, collision, nebulizer, and heating gas. According to the present method and conditions, the limit of detection, limit of quantification, and matrix effect were also evaluated.

[Results and Discussion]:

In this study, total 22 phenolics were quantitated including 11 phenolic acids (i.e. salicylic acid, *p*-coumaric acid, ferulic acid, etc.), ten flavonoids (i.e. peonidin 3-O-*β* glucoside, cyanidin 3-O-*β* glucoside, (+),-catechin, etc.), and L-phenylalanine well known as phenolic precursor in phenylpropanoid biosynthetic pathway in plants. A total phenolic content measured in this study appeared 0.03μg/g to 1,280μg/g. The mean of the total phenolic content was 13.5μg/g. Among three group classification based on the total phenolic content, the top 10% group typically showed larger amounts of flavonoids, in particular peonidin 3-O-*β* glucoside and cyanidin 3-O-*β* glucoside compared to that of the middle and bottom 10% groups ($p<0.05$). This study would contribute to breed new rice cultivar fortified to health-promoting.

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