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Metabolite Profiling of Brown Rice and Germinated Brown Rice Seeds of Korea-native Sharei Rice: WD3 and Cultivated Rice: Sindongjin

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[Introduction]

Analysis of the natural variations in rice using metabolomics techniques is thought to be not only useful to understand the biological traits of rice such as the yield and defense responses, but also helpful to improve rice quality, including its taste and nutritive value (Fernie et al. 2006). In order to improve nutritional value of rice, there will be need a comprehensive analysis by metabolite profiling because the nutritional quality of a food crop depends, in part, on the metabolite components present in it. Therefore, the aim of this experiment is to evaluate the most potential metabolite compounds that are responsible for the non-germinated and germinated seeds of WD3 and SDJ.

[Materials and Methods]

The Sharei-rice: WD3 and Sindongjin (SDJ) as a check variety were used in this experiment. Metabolite profiling to quantify the major constituents in the germinated and non-germinated seeds of WD3 and SDJ were analyzed by using Ultra-Performance Liquid Chromatography (UPLC) coupled with tandem mass spectrometry (MS/MS). Orthogonal partial least squares-discriminant analysis (OPLS-DA) was conducted to develop discriminatory models. OPLS-DA model was evaluated by cross validation of R^2 (Goodness of fit model) and Q^2 (Predictive power of model) values. To support the potential biomarkers identification and further understanding of this study, PubChem (<http://nim.nit.gov>) and Chemspider (<http://www.chemspider.com>) were queried.

[Results and Discussions]

The obvious separation between the WD3 and SDJ in both germinated and non-germinated conditions were observed. Fifty three features as the potential and fifty features as the unknown compounds were found in the WD3 and SDJ with and without germination conditions. The potential compounds are acids (25 compounds), amine and amide (10 compounds), amino acids (4 compounds), alcohol (2 compounds), ammonium salt (5 compounds) and the remaining (sugar, urea, vitamin, imidazolium, dispiro, macrolide and acetate). Such marker metabolites might also be correlated to the contents of nutritionally important metabolites claimed to be responsible for the advantageous properties of germinated rice.

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