Metabolite profiling, antioxidant, and a-glucosidase inhibitory activities of germinated rice: nuclear-magnetic-resonance-based metabolomics study

ABSTRCT

In an attempt to profile the metabolites of three different varieties of germinated rice, specifically black (GBR), red, and white rice, a 1H-nuclear-magnetic-resonance-based metabolomics approach was conducted. Multivariate data analysis was applied to discriminate between the three different varieties using a partial least squares discriminant analysis (PLS-DA) model. The PLS model was used to evaluate the relationship between chemicals and biological activities of germinated rice. The PLS-DA score plot exhibited a noticeable separation between the three rice varieties into three clusters by PC1 and PC2. The PLS model indicated that α-linolenic acid, γ-oryzanol, α-tocopherol, γ-aminobutyric acid, 3-hydroxybutyric acid, fumaric acid, fatty acids, threonine, tryptophan, and vanillic acid were significantly correlated with the higher bioactivities demonstrated by GBR that was extracted in 100% ethanol. Subsequently, the proposed biosynthetic pathway analysis revealed that the increased quantities of secondary metabolites found in GBR may contribute to its nutritional value and health benefits.

Keyword: Germinated rice extract; Metabolic pathway; Metabolite profiling; Multivariate data analysis; Rice variety.