

P221

## Screening of the total phenol content and analysis of phenolic compound in rice (*Oryza sativa* L.) genetic resources

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### Abstract

Rice (*Oryza sativa* L.) is one of the most consumed staple food crop which is energy source as carbohydrate and also is considered as the important antioxidant sources including various phenolic compounds. According to the increasing demand of healthy life, the concern to antioxidant also is increasing because of its health-promoting effect. Phenolic compounds are one of the plant secondary metabolites class, which shows various benefits to preventing or treating chronic diseases. In this study, we have measured the total phenol content from total 647 rice samples using the Folin-Ciocalteu method, and then were selected 30 rice genetic resources classified with high, middle, and low group on the basis of total phenol content. The average of the total phenol content of each group was high-group ( $6892.9 \pm 488.5 \mu\text{g GAE/g}$ ) > middle-group ( $1428.1 \pm 76.0 \mu\text{g GAE/g}$ ) > low-group ( $97.6 \pm 11.4 \mu\text{g GAE/g}$ ). The selected rice samples were analyzed with LC-MS/MS to find the composition and concentration of individual phenolic in rice grain. High-group and middle-group contained large amounts of protocatechuic acid and (+)-catechin whereas low-group showed limited amount. Among high-group samples, rice samples with black pericarp color (IT 174089, IT 220079, and IT 259958) had high content of peonidin-3-O-glucoside. Further, these black rice samples were special since polydatin, rarely found stilbenoid in rice grain, was detected. Overall, both the sum of phenolic acid and the sum of flavonoid were high-group > middle-group > low-group. Also, each group exhibited different phenolic compositions; high-group consisted of flavonoid more than phenolic acid, middle-group and low-group was comprised of phenolic acid rather than flavonoid, and non-pigmented rice was composed by fully phenolic acid. The total phenol content had positive relationships with the sum of phenolic compound ( $r = 0.64$ ), the sum of flavonoid ( $r = 0.74$ ) at the significance level of  $p < 0.0001$ . In addition, protocatechuic acid and quercetin showed positive correlation with above phenolic composition parameters; in order,  $r = 0.98, 0.65$  for protocatechuic acid and  $r = 0.73, 0.78$  for quercetin ( $p < 0.0001$ ). In conclusion, the total phenol content assay showed the possibility of utilization as a phenolic composition indicator in rice grain. Also, this result was suggested study pigment on other material.

Keywords: rice, phenol Compounds, total phenol compound, secondary metabolites compounds, LC-MS/MS

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