

Title: Metabolomics of parboiled and non-parboiled rice on metabolites, antioxidant capacity, and minerals content in raw rice, cooked rice, and rice gruel

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Abstract: The phenolic metabolites, antioxidant properties, and minerals of rice are highly affected by various hydrothermal treatments including cooking process. The purpose of this study was to use a metabolomic strategy to compare the effects of parboiling on metabolites, antioxidant capacity, and mineral content in raw rice, cooked rice, and rice gruel. The antioxidant properties of raw rice, cooked rice, and rice gruel, as well as specific phenolic metabolites and other phenolic compounds, were studied using multivariate analysis. MetaboAnalyst was utilized to determine the metabolic pathway. Cooked parboiled rice had higher Zn and Fe levels as compared to cooked non-parboiled rice. Parboiled rice lost 18.82% P, 9.27% K, 9.67% Mg, and 16.90% total phenol content, while non-parboiled rice lost 19.20% P, 17.92% K, and 25.19% phenol due to gruel removal during preparation. Notably, epicatechin was the most abundant metabolite in all samples, followed by 3,5-hydroxybenzoic acid, caffeic acid, and rutin hydrate, and positively correlated with Total phenolic content (TPC) and antioxidant activity. Parboiled rice with gruel can be a healthier choice for consumers than other parboiled or non-parboiled rice.

Keywords: Parboiled rice, Non-parboiled rice, Cooked rice, Rice gruel, Rice metabolites, Antioxidant activity and mineral contents

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