

Impact of Domestic Cooking Process on Total Phenolic and Total Flavonoid Contents in Selected Commercially Available Rice (*Oryza sativa L.*) Varieties in Sri Lanka

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Abstract

Sri Lankan rice (*Oryza sativa L.*) is well known for its therapeutic value due to the presence of bioactive phenolic and flavonoid compounds. This study aimed to assess if the domestic cooking process affect their content. Twenty-five rice samples representing different traditional, improved and imported varieties which are commercially available in Sri Lanka were selected. The total phenolic content (TPC) and total flavonoid content (TFC) were analysed in raw, washed and cooked fractions which were produced by a standardized domestic cooking process. The TPC and TFC values were compared according to the rice variety, pericarp colour and average cooking time. The TPC and TFC of aqueous extraction of lyophilized grain powders were quantified (triplicates) spectroscopically and results were expressed as Gallic Acid Equivalents (GAE) and Quercetin Equivalents (QE) mg g⁻¹, in dry weight basis respectively. The results indicated that, both TPC and TFC in the tested grains were significantly reduced from raw, washed and cooked fractions gradually ($p < 0.05$). The mean (\pm SD) reduction of TPC and TFC due to the cooking process were 53.30% (\pm 14.35) and 26.90% (\pm 8.76) respectively. The highest TPC (3.73 mgGAE g⁻¹) and TFC (1.88 mgQE g⁻¹), in cooked rice were found in traditional, red *Pachchaperumal (Siyapath-el)* variety while the lowest values were found in imported, white *Indian Basmati* (TPC = 0.95 mgGAE g⁻¹) and improved, white, *Sudu Kekulu* variety (TFC = 1.12 mgQE g⁻¹). TPC varied significantly ($p < 0.05$) in the order of Traditional > Improved > Imported while TFC showed a similar non-significant ($p > 0.05$) trend. Both TPC and TFC in red pericarp varieties were significantly higher than white varieties ($p < 0.05$). TPC strongly correlated with TFC in raw ($\tau_b = 0.618$, $p < 0.05$) and cooked fractions ($\tau_b = 0.540$, $p < 0.05$). Longer average cooking time (per 100 g portion of raw rice) showed a weak positive correlation to the percentile reduction of TPC ($\tau_b = 0.053$, $p > 0.05$). The domestic cooking process significantly reduces the content of bioactive components in rice grains, which may affect their Nutra-pharmaceutical potential.

Keywords: *Cooking, Bioactive compounds, Rice*