

COMPARATIVE ANALYSIS OF NUTRITIONAL AND FUNCTIONAL ATTRIBUTES OF COOKED RICE FROM SELECTED RAW AND PARBOILED NEW IMPROVED RICE VARIETIES IN SRI LANKA

T.S.B. Mahanama¹, R. Liyanage², C.A.K. Dissanayake¹, I.G.G. Kasunamala³,
C.H. Piyasiri⁴, M.A. Wickramasinghe² and P.D. Ariyasena²

¹Department of Animal and Food Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.

²National Institute of Fundamental Studies, Hanthana, Sri Lanka.

³Division of Applied and Natural Sciences, University College Matara, University of Vocational Technology, Sri Lanka.

⁴Rice Research and Development Institute, Bathalagoda, Sri Lanka.

Rice is the staple food in Sri Lanka, significantly contributing to the nutritional status and dietary intake of the population. This study compared the nutritional and functional properties of cooked rice from raw and parboiled forms of three new improved rice varieties available in Sri Lanka: Bg 375, Bw 372, and Ld 376. Parboiling was performed using a domestic rice cooker, followed by sun drying to 14% moisture content. Both raw and parboiled rice samples were dehusked, polished, cooked with adequate water (rice: water ratio for raw rice - 1:3, parboiled rice - 1:4) for 40 – 50 minutes, air-dried, and then oven-dried until a constant weight was achieved. The dried grains were ground, sieved, packed, and stored in a refrigerator for analysis. Results showed that parboiled Bg 375 had the highest moisture content (wet basis, w/w%) at 77.63 ± 0.71 ($p < 0.05$), while raw Bw372 exhibited the highest ash content (dry basis, w/w%) at 1.35 ± 0.17 ($p < 0.05$) and fat content (2.00 ± 0.08 , dry basis, w/w%). Among all samples, dietary fiber content was highest ($p < 0.05$) in parboiled Bg 372 (14.21 ± 0.71) and parboiled Bg 375 (13.29 ± 0.39). Parboiled Bg 375 had the highest resistant starch content (dry basis, g 100g^{-1}) at 5.41 ± 0.00 ($p < 0.05$), while parboiled Bw 372 and Ld 376 recorded the highest total phenolic content (TPC) (43.38 ± 0.92 mg GAE g^{-1} CW basis) and oxygen radical absorbance capacity (586.59 ± 0.003 mmol TE mg^{-1}), respectively. Prebiotic activity assay scores ranged from 0.21 ± 0.01 to 1.48 ± 0.06 . Overall, raw rice samples exhibited significantly higher ($p < 0.05$) moisture (74.67 ± 1.99 , wet basis, w/w%) and fat content (1.49 ± 0.52 , dry basis, w/w%) compared to parboiled samples. In contrast, parboiled rice displayed enhanced levels of dietary fiber (12.86 ± 1.45 , dry basis, w/w%), resistant starch (4.55 ± 0.87 , dry basis, g 100g^{-1}), ash (1.03 ± 0.15 , dry basis, w/w%), and TPC (37.00 ± 4.87 mg GAE g^{-1} CW basis), suggesting that parboiling improves the functional properties of rice, potentially offering greater health benefits compared to raw rice.

Keywords: Dietary fiber, Prebiotic activity, Resistant starch