SECTION B

201/B

Determination of physical properties, milling, cooking, eating and nutritive qualities of BG 305 and AT 303 rice (*Oryza sativa*) varieties in raw and parboiled forms

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The study was undertaken to determine physical properties, milling, cooking, eating and nutritive qualities of BG 305 and AT 303 rice (*Oryza sativa)* varieties in raw and parboiled forms with the aim of appraising breeders and rice processors on relative merits of different varieties to improve the inherent quality of rice and to optimize rice processing operations.

Grain length, thickness, moisture content, hardness, true and bulk densities and porosity were assumed as physical properties. The milling qualities such as total milling yield (TMY), head rice yield (HRY), husk percentage and the broken percentage were measured. Nutritive qualities such as crude protein, crude fat, total ash, starch, crude fibres, vitamin B complex and mineral content were assessed in both raw rice and parboiled rice. Eating quality of rice was tested using sensory tests by employing a panel of trained persons to assess odour, texture, stickiness and overall acceptability. Determination of cooking quality comprised of tests for cooking time, water uptake ratio, volume expansion, grain elongation and alkali digestion. Panel test results were used to determine eating quality of the rice.

The results indicated that grain dimensions, bulk density and hardness varied significantly between the two varieties ($p < 0.05$). The hardness, true density and porosity of parboiled rice were significantly higher than that of raw rice. Parboiled AT 303 showed the highest hardness (5.67 Kg) and lowest was in raw BG 305 (3.16 Kg). A positive correlation ($r = 0.73$) was observed between grain length and porosity. The broken percentage was very low in parboiled rice ($p < 0.05$) which was 0.14 and 0.63 in BG 305 and AT 303 respectively. The total milling yields, head rice yields, vitamin and mineral contents were significantly higher ($p=<0.05$) in parboiled rice. The grain elongation, water uptake ratio and volume expansion were significantly high ($p < 0.05$) in raw rice while cooking time and alkali digestion were high ($p < 0.05$) for parboiled rice. Alkali digestion values indicated that BG 305 and AT 303 have high-intermediate and high gelatinization temperatures respectively. The physical, milling, cooking and nutritive qualities were significantly different among the varieties tested and also between raw and parboiled rice.

Keywords: parboiled, head rice, varieties, grain hardness