EFFECT OF ORGANIC AND INORGANIC FERTILIZER AND CROP ROTATION ON QUALITY OF BG300 RICE GRAINS

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A comparative study was carried out to assess the impact of diverse fertilizer inputs, crop rotation intensities, and cultivation seasons on the grain quality of *Bg300* rice variety. Three input systems, 100% recommended fertilizers by Department of Agriculture (DOA) (T1- conventional), 25% of DOA recommended fertilizer + 75% organic (T2- integrated) and 100% organic fertilizer (T3–organic) were used for the rice cultivation. Sunn hemp was cultivated as the inter-seasonal crop. The harvested grains were analysed for proximate composition (moisture content (MC), ash, protein, fat, fibre, & carbohydrate), micronutrients (Fe, Cu, Zn, & Mn) and heavy metals (As, Cd, & Pb). The experiment was arranged as a three factor-factorial randomized complete block design and conducted during *Yala* (2020) and three *Maha* (2018/2019, 2019/2020, 2020/2021) seasons. The highest MC (13.61± 0.29%) was recorded from medium crop rotation intensity in *Maha* 2020/2021, while the lowest (11.99 ± 0.29%) from same rotation intensity in *Maha* 2018/2019. The highest ash content was reported in T1 (1.18 ± 0.01%) compared to T2 (1.13 ± 0.01%) and T3 (1.08 ± 0.01%), signifying ($p<0.05$) the mineral inputs. Protein level of the grains were affected by the input system and seasonal interaction, where T1 recorded the highest 8.83 ± 0.14% in *Yala* 2020 compared to 6.01 ± 0.14% of T3 in *Maha* 2020/2021. Neither fat nor fibre contents were significantly ($p>0.05$) different across the fertilizer inputs and crop rotations. Moreover, the highest and the lowest grain carbohydrate contents were observed in organic (76.63 ± 0.37%) and reduced (74.58 ± 0.37%) input systems respectively. Micronutrient contents were significantly affected ($p<0.05$) by the input system and season. Cd and As were detected below the permissible level (0.4 and 0.2 ppm), while, Pb was detected above the permissible level (0.2 ppm). The grain quality of the organic input system was higher in compared to conventionally managed system with mineral fertilizer inputs.

Keywords: Crop rotation, Grain quality, Mineral fertilizer, Organic system