

EFFECT OF ORGANIC AND INORGANIC FERTILIZER ON RICE (*Oryza sativa* L.) GRAIN QUALITY

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The fertilizer plays an important role in rice grain quality. Moreover, excessive use of inorganic fertilizer may result in toxic heavy metal accumulation in rice grain. This study was thus conducted to evaluate the effect of different input systems on grain quality and heavy metal accumulation in rice. The Bg300 rice variety was grown under three input systems including organic (100% organic manure) (T₁), reduced (50% of the fertilizer recommendation by the Department of Agriculture (DOA) + 50% organic) (T₂), and conventional (100% recommendation by DOA) (T₃). The grains were analysed for milling properties (head rice, broken rice and milling recovery), nutritional characteristics (ash, fat, crude fibre, crude protein, carbohydrates and micronutrients) and heavy metal (Cd, Pb and As) accumulation. The initial moisture content was not significantly different among treatments. T₁ resulted in significantly low ($p < 0.05$) ash (0.87%) and percentage of head rice (62.6%) compared to that of T₂ and T₃ which showed similar results ($p > 0.05$) of (1.05%, 1.05%) and (67.7%, 69.0%), respectively for the two parameters. The milling recovery, fat, crude fibre, and micronutrient (Zn, Cu, Mn and Fe) contents were not significantly influenced by input systems ($p > 0.05$). Crude protein and carbohydrate contents were significantly different ($p < 0.05$) among input systems. The highest crude protein and carbohydrate contents were recorded in T₃ samples and T₁, respectively. The percentage of broken rice significantly varied ($p < 0.05$) among input systems whereas T₁ showed the highest while T₃ the lowest. The Cd was detected below the permissible level (0.4 ppm) according to the codex standards 193-1995 in all treatments while other heavy metals were not detected. The recommended levels of conventional fertilizer (Urea, TSP, MOP and ZnSO₄) treated rice showed superior grain quality characteristics and are safe for human consumption.

Keywords: Fertilizer, Grain quality, Heavy metals, Nutritional characteristics