

Compost Quality Analysis for Crops Productivity, Profitability, and Soil Health Improvement

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Abstract

Mymensingh city with 83,682 inhabitants mainly comprises onsite systems i.e septic tanks and pits. When the pit or septic tank is full, the usual practice is to engage professional sweepers to manually empty them and deposit the wastes in mostly the nearby water bodies and open environment which creates environmental degradation. A compost plant was designed and established by the Mymensingh City Corporation and NGO Forum for Public Health, OXFAM Bangladesh and it has been in operation since 2020 to tackle faecal sludge generated from pit toilets and septic tanks, and solid waste from households exploring sanitation service chain. This compost plant is being produced with the objective that it will be put to further use in different agricultural fields. To ensure the proper use, it is needed to assess the quality of the compost and is to be carried out its potential on crop productivity, profitability, and soil health. The experiment was laid out in a randomized complete block design with three replications consisting of two *Boro* rice varieties; (i) BRRI dhan89-an inbred and (ii) Heera-1-a hybrid; and ten chemical fertilizer and CC combinations; (i) BRRI recommended dose of fertilizer (RDF), (ii) CC @ 5 t ha⁻¹, (iii) RDF + CC @ 2 t ha⁻¹, (iv) RDF + CC @ 1.5 t ha⁻¹, (v) RDF + CC @ 1 t ha⁻¹, (vi) RDF + 0.5 t ha⁻¹, (vii) 75% RDF + CC @ 2 t ha⁻¹, (viii) 75% RDF + CC @ 1.5 t ha⁻¹, (ix) 75% RDF + CC @ 1 t ha⁻¹ and 75% RDF + 0.5 t ha⁻¹. The size of the unit plot was 5 m² (2.5 m × 2 m) and the spaces between blocks and plots were 1 m and 0.5 m, respectively. Although highest grain yield was obtained by application of 100% RDF + Co-compost @ 2 t ha⁻¹ in both varieties, the yield was very close to this value when the RDF was reduced to 75%. Apart from productivity, considering both soil health improvement and profitability integration of 75 % RDF with Co-compost @ 1.5 t ha⁻¹ combination would be economic for *Boro* rice growers in Bangladesh. To conclude, co-compost could be a potential soil conditioner and a supplementary source of plant nutrients to reduce chemical fertilizer dependence in rice cultivation, which could ultimately decrease environmental pollution, improve soil health, and ensure sustainable rice production. The co-compost plant has also created an opportunity to gain scientific and hands-on knowledge on the technical and operational aspects of the co-composting of FS and SW in cities in Bangladesh.

Keywords: Co-compost, Quality Assessment

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