

Productivity and Economic Feasibility of Okra (*Abelmoschus Esculentus*) under Combined Onion Biowaste and NPK Fertilization

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Abstract:

Applying inorganic fertilizer is essential for improving crop productivity. However, excessive usage of inorganic fertilizer may lead to soil acidification and negatively affect long-term soil fertility and plant growth. The use of onion biowaste fertilizer in combination with NPK fertilizer on okra has been explored as a sustainable alternative to relying solely on inorganic fertilizer. This study investigated the effects of combining onion biowaste with NPK fertilizer on the yield performance and economic profitability of okra (*Abelmoschus esculentus*). The experiment was conducted in a greenhouse using a Randomized Complete Block Design (RCBD) with five treatments and five replications. The treatments were T0 as control (100% NPK fertilizer), T1 (100% onion peel fertilizer), T2 (50% NPK fertilizer + 50% onion peel fertilizer), T3 (30% NPK fertilizer + 70% onion peel fertilizer), and T4 (70% NPK fertilizer + 30% onion peel fertilizer). Yield and profitability of okra were significantly different with the highest was from the combination of onion biowaste and NPK fertilizer. Treatment T2 (50% NPK fertilizer + 50% peel onion fertilizer) consistently outperformed other treatment with the highest fresh pod yield (9250.25 kg ha⁻¹) and achieved gross profit margin 62.80%. The results indicate that integrating onion biowaste with NPK fertilizer can improve crop growth and productivity while lowering dependence on chemical inputs. This practice provides a more economical and environmentally friendly option for smallholder farmers by minimizing fertilizer-induced pollution and transforming household onion waste into a valuable agricultural resource.

Keywords:

NPK, okra, onion peel biowaste, profit, yield.