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Recycled Urban Organic Waste Markedly Increased Growth, Agronomic Performance and Yield of Cabbage (*Brassica Oleracea* L. Var. Capitata): a Food Security Option in the Era of Climate Change

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Abstract

Organic waste recycling for agriculture is an important practice that has a high potential to improve soil fertility and crop yield with little environmental cost. A sole or combined application of waste sourced bio-fertilisers are an option for sustainable crop production in the era of climate change. However, a limited and site specific researches has been reported on the combined effects of organic and inorganic fertilisers. A field experiment was conducted to evaluate the plant growth performance and head yield of cabbage in response to combined application of bioslurry and NP inorganic fertilisers at Hawassa in southern Ethiopia during the 2017 cropping seasons under rain-fed condition. Treatments consisting of four levels of bioslurry (10 m³, 30 m³, 50 m³ and 70 m³ ha⁻¹) and five levels of NP (0%, 25%, 50%, 75% and 100% of the recommended rates) were laid out in randomised complete block design with three replications. The results revealed marked effect of the organic treatments on agronomy and head yield of cabbage. The interaction effects of bioslurry and NP had significantly ($p < 0.05$) affected plant height, number of expanded leaves, days to head initiation, days to 50% heading, days to first harvest, head height, total yield, above ground fresh and dry biomass, and harvest index. Highest value of plant height, number of unfolded leaves, above ground fresh weight, above ground dry weight, head weight, and total yield were recorded for the combined application of 50m³ bioslurry with 75% of the recommended NP ha⁻¹. Treatments that received 50 m³ bioslurry in combination with 75% RNP ha⁻¹ gave the highest marginal rate of return of 6891%, indicating that for every 1.00 birr invested for 50 m³ bioslurry with 75% of the RNP ha⁻¹ of fertiliser, farmers can obtain an additional 68.91 ETB. Therefore, the combined application of 50 m³ ha⁻¹ bioslurry with 75% RNP can be recommended for cabbage production in the research area and similar agro-ecologies.

Keywords: Organic, Southern Ethiopia, Vegetable and Waste