

## **Combination of composted poultry manure and inorganic fertilizers enhance growth and yield of tomato (*Lycopersicon esculentum* Mill.) in a rooftop growing system**

### **ABSTRACT**

Rooftop vegetable productions are becoming an important part of the recent rejuvenation of urban agriculture particularly in densely populated urban areas. However, due to weight limits often associated with rooftop growing systems, rooftop plant growing media including soil, may not contain optimal fertility levels required to maximize plant growth and productivity. Therefore, the success of rooftop vegetable production often depends on proper fertility management schemes to create optimal plant growing conditions. Therefore, an experiment was conducted to investigate combine impacts of composted poultry manure (CPM) and inorganic fertilizers on growth and yield of tomato under rooftop growing conditions. The experiment was arranged in a completely randomized design (CRD) with eight treatments and three replications. The treatments included T<sub>1</sub>: Control (no CPM and no NPK), T<sub>2</sub>: 4 ton CPM ha<sup>-1</sup>, T<sub>3</sub>: N<sub>55</sub>P<sub>15</sub>K<sub>50</sub> kg ha<sup>-1</sup>, T<sub>4</sub>: N<sub>110</sub>P<sub>30</sub>K<sub>100</sub> kg ha<sup>-1</sup>, T<sub>5</sub>: N<sub>165</sub>P<sub>45</sub>K<sub>150</sub> kg ha<sup>-1</sup>, T<sub>6</sub>: 4 ton CPM ha<sup>-1</sup>+ N<sub>55</sub>P<sub>15</sub>K<sub>50</sub> kg ha<sup>-1</sup>, T<sub>7</sub>: 4 ton CPM ha<sup>-1</sup>+ N<sub>110</sub>P<sub>30</sub>K<sub>100</sub> kg ha<sup>-1</sup>, and T<sub>8</sub>: 4 ton CPM ha<sup>-1</sup>+ N<sub>165</sub>P<sub>45</sub>K<sub>150</sub> kg ha<sup>-1</sup>. The results showed that NPK fertilizers alone and CPM combined with NPK fertilizers greatly improved tomato plant growth and fruit yield. However, maximum plant growth and tomato yields (68 t ha<sup>-1</sup>) and economic benefits (benefit: cost ratio 6.9) were achieved with 4 t ha<sup>-1</sup> CPM amendment and 100% recommended doses of NPK fertilizers. Control treatment (T<sub>1</sub>: -CPM, -NPK) had the lowest tomato yield (6.2 t ha<sup>-1</sup>). Composted poultry manure alone contributed for around 15.0 t ha<sup>-1</sup> tomato yield and supplemented for around 30 kg ha<sup>-1</sup> N fertilizer. Combine application of 4 t ha<sup>-1</sup> CPM and 100% RDF of NPK fertilizers indicated as the agreeable combination in this study for optimal tomato plant growth and yield under rooftop growing conditions.