World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:12, No:10, 2018

Contributions of Microbial Activities to Tomato Growth and Yield under an Organic Production System

Authors : O. A. Babalola, A. F Adekunle, F. Oladeji, A. T. Osungbade, O. A. Akinlaja

Abstract : Optimizing microbiological activities in an organic crop production system is crucial to the realization of optimum growth and development of the crops. Field and pot experiments were conducted to assess soil microbial activities, growth and yield of tomato varieties in response to 4 rates of composted plant and animal residues. The compost rates were 0, 5, 10 and 20 t ha-1, and improved Ibadan and Ibadan local constituted the varieties. Fungi population, microbial biomass nitrogen, cellulase and proteinase activities were significantly higher (P≤ 0.05) at the rhizosphere of the local variety than that of improved variety. This led to a significantly higher number of branches, plant height, leaf area, number of fruits and less days to maturity in the local variety. Furthermore, compost-amended soil had significantly higher microbial populations, microbial biomass N, P and C, enzyme activities, soil N, P and organic carbon than control, but amendment of 20 t ha-1 gave significantly higher values than other compost rates. Consequently, growth parameters and tissue N significantly increased in all compost treatments while dry matter yield and weight of fruits were significantly higher in soil amended with 20 t ha-1. Correlation analysis showed that microbial activities at 6 weeks after transplanting (6 WAT) were more consistently and highly correlated with growth and yield parameters. It was concluded that microbial activities could be optimized to improve the yield of the two tomato varieties in an organic production system, through the application of compost, particularly at 20 t ha-1.

Keywords : compost, microbial activities, microbial contribution, tomato growth and yield
Conference Title : ICSEA 2018 : International Conference on Sustainable Environment and Agriculture
Conference Location : New York, United States
Conference Dates : October 08-09, 2018