International Journal of Soil Science 7 (1): 28-38, 2012
ISSN 1816-4978 / DOI: 10.3923/ijss.2012.28.38

Responses of Some Soil Biological, Chemical and Physical Properties to Short-term Compost Amendment

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ABSTRACT

Compost amendment has a positive influence on soil properties and thus can serve as a soil management strategy for a sustainable crop production system. Changes in soil biological, chemical and physical properties in response to 2 separate applications of compost were estimated using 3 rates of compost (0, 10 and 20 t ha^{-1}) on two varieties of tomato (UC82B and BESKE) in 2006 and 2007. Soil samples were taken at 6 and 12 months after the first compost application and 12 and 24 months after the second application for analysis. Results revealed that total microbial count was significantly ($p \leq 0.05$) higher after amendment but fungal count was significantly higher only at 12 months in plots amended with 20 t ha^{-1} than in control after the first compost application. Microbial Biomass Nitrogen (MBN) significantly increased in plots amended with 20 t ha^{-1} while Microbial Biomass Phosphorus (MBP) and Microbial Biomass Carbon (MBC) increased with increase in rate of amendment up to 1 year after second compost amended. Furthermore, MBP, MBC and soil organic matter were higher at 1 than 2 years after compost the second compost amendment. At 2 years after compost amendments, bulk density significantly decreased by 4.8%, aggregate stability improved by 15.7% and total porosity significantly increased by 2.9%. Also, plots amended with 20 t ha^{-1} compost and planted to Beske had significant reduction in bulk density and increase in hydraulic conductivity compared with those planted to UC82B. However, aggregate stability was higher in all plots with Beske. Conclusively, compost amendment led to an improvement in soil organic carbon and microbial activities which significantly improved soil physical quality particularly in plots sown to Beske variety.

Key words: Aggregate stability, bulk density, microbial biomass, microbial populations, total porosity