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Organic Amendment Based on Tobacco Waste Compost and Farmyard Manure: Influence on Soil Biological Properties and Butter-Head Lettuce Yield

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Abstract: Agro-industrial waste presents an alternative to inorganic fertilizer. It is possible to use tobacco waste as a soil amendment due to its high organic matter and low toxic element content. Tobacco waste compost (TWC) and farmyard manure (FYM) were applied to Typic Xerofluvent soil at various ratios, and butter-head lettuce (Lactuca sativa L. var. Capitata L.) was grown. The effects on soil organic C and total N content, soil microbial biomass, soil respiration, activity of 4 enzymes (dehydrogenase, urease, alkaline phosphatase, and β-glucosidase), and lettuce yield were determined. Organic materials were applied at the rate of 50 t ha^{-1}. Significantly ($P < 0.05$) higher values were observed for C_{org}, total N, soil respiration, and dehydrogenase, urease, and alkaline phosphatase activity in 25% FYM + 75% TWC and 100% TWC soils than in the control. The microbial biomass C level in the soils increased in response to all compost treatments. b-glucosidase activity values did not show statistical differences between any of the organic amendment treatments. The application of TWC and FYM resulted in a significant increase in lettuce yield when compared to the control. The results suggest that the incorporation of TWC as an alternative organic amendment might improve soil chemical and biological parameters, as well as crop yield in dryland and especially in Mediterranean soil, which are both characterized by low organic matter content.

Key Words: Tobacco waste compost, farmyard manure, lettuce, microbial and enzyme activity, organic C, total N

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