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Influence of Organic and Chemical Fertilisers on Growth and Yield of Tomato (*Lycopersicon esculentum* L.) and Soil Chemical Properties

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Abstract

In order to study the effects of organic and chemical fertilisers on growth and yield of tomato (*Lycopersicon esculentum* L.) and soil chemical properties, a field experiment was conducted with completely randomised blocks design with three replicates in the 2006 growing season at the experimental research station of Shahid Beheshti University at Zirab, North of Iran. The treatments were vermicompost, solid waste compost, cattle manure and chicken manure as organic fertilisers, chemical fertiliser (NPK, 150-60-60) and non-fertilised control plots. Fertilisers had significant effects ($p < 0.05$) on stem height, number of leaves, branches and dry matter of tomato. Effect of fertiliser source on yield and yield attributes (number of flower plant⁻¹, number of fruits plant⁻¹, percentage of fruit set and average fruit weight) of tomato was significant ($p < 0.01$) too. Vermicompost and cattle manure led to the highest and lowest tomato yield among organic fertilisers, respectively. In most cases, vermicompost and NPK produced the best results. The highest and lowest fruit yield were obtained in NPK and vermicompost (8.7 ton ha⁻¹) and non-fertilised (3.2 ton ha⁻¹) plots, respectively. Between organic fertilisers in most cases, vermicompost and solid waste compost applied performed best. Soil chemical properties and microbial biomass were evaluated in this study. Results showed that the fertiliser source had significant effect ($p \leq 0.01$) on percentage of organic carbon, organic matter, total nitrogen, availability of P and K. Addition of organic fertiliser resulted in increased total organic C (TOC), total N and available P and K levels in the soil. Chemical fertiliser resulted in decreased TOC and basic cation contents, and lowering of soil pH. As a result, however, the yield was too low in some organic fertilisers in comparison with chemical fertiliser, but had positive effects on soil which resulted in modification of soil structure thereby increases the yield in the long term.

Keywords: Chemical fertiliser, Iran, organic manure, tomato