Evaluation of temporal changes of nutrient composition of vermiwash and the impact of vermiwash on seed germination and early vegetative growth of *Solanum lycopersicum*

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Abstract

Vermiwash is a liquid extract and an organic medium containing macro and micronutrients, plant growth hormones and beneficial microorganisms. The present study was undertaken to (i) evaluate the chemical characteristics and macro-nutrients present in the vermiwash and to study the changes of those parameters with the storage time and (ii) to study the effect of vermiwash on seed germination and on early vegetative growth of tomato (*Solanum lycopersicum*) variety Thilina, measured up to 18 days from planting. In order to prepare the vermiwash, a 500 L tank was filled with layers of broken pebbles, coarse gravel, sand and as organic materials chopped grasses, leaves of *Gliricidia sepium,* paddy straw and partially decomposed cow dung were incorporated along with locally available earthworms (*Eudrillus* spp.). After five days of establishment, vermiwash was collected daily for 14 days, and four different concentrations of vermiwash were prepared as treatments which were selected based on preliminary experiments (10%, 25% and 50%, and water for control). To study the effect of vermiwash on germination and early growth of tomato, 20 mL from each concentration of vermiwash were carefully applied, to the tomato plants grown in trays and each treatment had 5 replicates, having 23 plants for each replicate. According to the analysed results of established vermiwash, pH and electrical conductivity (EC) have slightly changed whereas total nitrogen content and phosphorous content have significantly increased while Potassium content have exhibited a significant decrease. The pH and EC of stored vermiwash, which was kept in dark for 14 days, have not shown any significant change with time. In the plant house study, a significantly higher germination percentage was observed in the plants treated with 25% vermiwash. When the early growth is considered, root length, shoot length and dry weights were significantly higher in the vermiwash treated plants, compared to control, from which, the 50% concentrated vermiwash had better results compared to 10% and 25%. The present study suggests that systematically prepared vermiwash is an effective biofertilizer which would facilitate increased uptake of nutrients by the plants resulting in higher shoot length, root length and dry weight.

Keywords: Earthworms, Growth parameters, *Solanum lycopersicum*, Vermiwash

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