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Formulation of a low-cost organic fertiliser paste from selected invasive plants enriched with *Trichoderma* species for the cultivation of *Raphanus sativus*

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Excessive use of synthetic fertilisers is a significant drawback in modern agriculture, and it has several negative outcomes; unfavourable environmental effects and adverse impacts on human health and agriculture. The present study was conducted to produce an organic fertiliser paste from alien invasive plants enriched with either *Trichoderma harzianum* or *Trichoderma virens*. Fresh leaves and immature twigs of selected invasive plants, namely, *Annona glabra*, *Clidemia hirta*, and *Chromolaena odorata*, and a native plant *Pongamia pinnata* were randomly collected from the vicinity of the Gampaha District, sun-dried, and powdered. The materials (2.0 kg each) were mixed, and the mixture was digested with distilled water (42.0 L) for a month to form organic fertiliser. Previously isolated and identified *Trichoderma harzianum* (KT852821.1) and *Trichoderma virens* (KP985643.1) were formulated in a mixer of solid carrier materials (compost, straw, clay, and cow urine; 2:1:1:1, moisture content - 40 %) separately. From the stock solution (100 % w/v) of organic fertiliser paste, a concentration series of organic fertiliser (10 %, 20 %, and 25 %) was prepared and enriched with one of the above *Trichoderma* spp. They were used in six treatments (T10H, T10V, T20H, T20V, T25H, and T25V, where treatments indicated by H included *T. harzianum* while V included *T. virens*). Growth and yield of *Raphanus sativus* (Raddish) were investigated by applying the above treatments with tap water as the negative control and commercially available liquid organic fertiliser ("Maxicrop") as the standard, using pot trials in a randomized block design with 15 replicates for each treatment. *Raphanus sativus* seedlings were treated weekly for 02 months as follows: 1st week - 5 mL, 2nd week - 10 mL, 3rd week – 15 mL, 4th week -20 mL, and 100 mL. Data obtained for the growth parameters of *R. sativus* were analysed statistically using one-way ANOVA with Minitab 17. As per the results, T10H treatment (10 % diluted *C. odorata*, *A. glabra*, *C. hirta*, and *P. pinnata* extract only incorporated with *T. harzianum*) recorded significantly ($P \leq 0.05$), the highest average number of leaves (23±1), leaf area (111.6±7.4 cm^2), the height of the leaf biomass (6.1±0.35 cm), average leaf length (28.01±0.98 cm), root length (20.73±0.74 cm), the average girth of the root (13.11±0.65 cm), average dry weight of the whole plant (15.2±0.62 g/plant), dry weight of the shoot biomass (8.95±0.41 g/plant) and dry weight of the root biomass (4.78±0.29 g/plant) compared to the standard and the negative controls. Therefore, out of the six organic fertiliser combinations used in the experiment, T10H treatment can be recommended as the best organic fertiliser paste to maximize the yield of *Raphanus sativus*.

Keywords: Growth performance, Invasive plants, Organic fertiliser paste, *Raphanus sativus*, *Trichoderma* spp.

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