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Effect of Expired Yoghurt Powder as a Soil Amendment on Growth, Yield and Chlorophyll Content of Radish (*Raphanus sativus* L.)

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Abstract

The disposal of expired dairy products that are rich in organic carbon and nitrogen is one of the major challenges faced by the dairy industry and causes significant economic, environmental and health issues. Recycling of expired dairy products including yoghurt is an ideal solution to protect the environment and to utilize them in a sustainable manner. Therefore, the present study was carried out to find out the performance of organic soil amendment prepared from expired yoghurt powder (EYP) on growth, yield and chlorophyll content of Radish (*Raphanus sativus* L.). A pot experiment was set up according to Completely Randomized Design with four treatments {soil without fertilizer (T1), soil with 1% EYP+157 mg K₂O/pot (T2), soil with 2% EYP+157 mg K₂O/pot (T3), soil with inorganic fertilizer (T4)} with five replicates. In T4 treatment, a mixture of inorganic fertilizers as a basal dressing (before seed sowing) and top dressing (after 3 weeks) was applied at a rate of 177 mg N, 346 mg P₂O₅ and 157 mg K₂O/pot and 177 mg N, 157 mg K₂O/pot, respectively according to the Department of Agriculture (DOA) recommendation. The root diameter (cm), root volume (cm³), root length (cm), total leaf area (cm²), number of leaves, shoot fresh weight (g), root fresh weight (g) and chlorophyll content (relative green index) were measured. Data were analyzed using Minitab (version 17) and SAS (version 9.1.3) software packages. One way ANOVA was conducted to examine the differences between treatments followed by mean separation using Duncan's multiple range test. Root diameter, root length, root volume, root fresh weight (48.6±0.88 g and 32.30±1.83 g in T4 and T2, respectively) were significantly higher (p<0.05) in inorganic fertilizer (T4) and 1% EYP (T2) treatments than other treatments. The leaf area and chlorophyll content were significantly higher (p<0.05) in all the treatments compared to soil without fertilizer treatment (T1). The highest fresh shoot weight (77.4±9.37 g) was obtained in inorganic fertilizer (T4) treatment showing significant difference (p<0.05) than 2% EYP (T3) and soil without fertilizer (T1) treatments. According to the results, 1% EYP (T2) treatment showed similar growth and yield performance with inorganic fertilizer (T4) and is recommended as a soil amendment for radish. However, the fungal attacks and pest attraction to EYP limit its application as a soil amendment and further studies are suggested to overcome the limitations.

Keywords: Expired yoghurt powder, Growth and yield parameters, Organic soil amendment, *Raphanus sativus* L.