The effect of vermicompost on radish *(R. sativus)* growth, before and after vermicompost maturation.

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Introduction

Vermicomposting agricultural wastes can potentially create a value-added product, that can be sold to increase farm income and diversification, and also be used on-farm, as a soil conditioner and plant fertiliser.
Vermicompost made from agricultural wastes has been shown to increase plant growth by 43% [1], and marketable yield by 58% [2]. Studies suggest that vermicompost should be used with fertilisation to achieve best results [2, 3], as it does not contain enough readily available nutrients to meet plant requirements. Studies show that vermicomposts can have biostimulant properties when combined with fertilisation [4]. It has been well established that maturation is a very important step in thermophillic composting [5]. This study also aims to look at the effect of maturation on the plant-growth effects of vermicompost.

Material and Methods

Vermicompost was made from dewatered cattle manure slurry, and fed to *Eisenia foetida* in 1 m capacity, flow-through vermicomposting beds. The vermicompost was harvested and stored in a cool, dry place. One week, and one month after harvesting, radish seedlings were planted up in a low-nutrient, commercially available peat-based compost, amended with 0, 5, 10, 20, and 40% vermicompost. Twenty seedlings were potted up in each mix, ten were fertilised every two weeks, and the remaining ten were un-fed. Root, and leaf, fresh and dry weights were measured. Oven-dry soil samples were analysed for pH and electrical conductivity (EC), using a 1:10 soil water solution. All variables were ranked, and analysed with two-way ANOVAs, followed by Kruskal-Wallis multiple comparison tests. Significance was defined as $p \leq 0.05$.

Results

Without fertilisation, leaf fresh weight was reduced by 15%, in 5 and 10% vermicompost, after one week maturation, but growth in these treatments increased by an average of 30% after one month maturation. This trend was also seen in root fresh weight. The fresh weight of plants grown without fertiliser in 20 and 40% vermicompost, were higher than the control in both trials. This difference was significant ($p<0.05$), in trial 2 (harvest + 1 month). In the fertilised plants, the leaf fresh weight is not affected by vermicompost concentration, but after both one week and one month, increasing vermicompost concentration had a negative impact on root fresh weight.

Conclusion and perspectives

Addition of vermicompost to compost, without additional fertiliser had a positive effect on plant growth. This is likely to be from additional nutrients supplied by the vermicompost. No effect on leaf fresh weight was observed when the plants were fertilised. Root fresh weight, of the fertilised plants, were negatively affected by the addition of vermicompost. The combination of high vermicompost EC, plus additional nutrient salts, may explain the reduction in root weight. There was a significant effect of maturation on the vermicompost.

References

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