



Growth of Medicinal and Economical Plants in Vermicompost for Sustainable Development

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Abstract

Different concentrations of compost were used to test the growth of Plectranthus amboinicus, Morinda citrifolia and Jatropha curcas. Plants were allowed to grow for one month duration. The growth of the plant in terms of leaves, stem and root production were noticed. The results showed that 50% and 75% concentrations were found suitable for germination and growth of the plants.

Keywords: Eudrilus eugeniae, compost, concentrations, growth.

Introduction

Vermicomposting is an uncomplicated biotechnological process of composting, in which certain species of earthworms are used to enhance the process of waste conversion and produce a better end product. A revolution is unfolding in vermiculture studies for vermicomposting of diverse organic wastes by waste eater earthworms into a nutritive organic fertilizer and using them for production of chemical-free safe food, both in quantity and quality without recourse to agro-chemicals. Heavy use of agro-chemicals boosted food productivity, but affect the environment and society. It killed the beneficial soil organisms and destroyed their natural fertility, impaired the power of biological resistance in crops making them more susceptible to pests and diseases.

The best part is that the use of earthworms and vermicompost in farm production provides dual-benefit to crops. While promoting admirable growth it also protects the crops from pests and diseases and thus significantly reduces the use of chemical pesticides¹.

The chemical fertilizers might increase plant yields but they do nothing for plant health. Continued use of chemical fertilizers inevitably leads to a breakdown in the soil. This natural support for the plants is not available with chemical fertilizers. The distribution of the compost through the soil also helps to encourage healthy root growth. Vermicomposting produces a product that is naturally designed to benefit plants in several different ways. The most important aspect of compost produced by earthworms is that it is 100% organic. There are no harmful

chemicals and it does not need to be mixed with anything.

The aim of our experiment was to found the required quantity of vermicompost for the highest growth and yield of medicinal and economical plants.

Material and Methods

Earthworm *Eudrilus eugeniae* was maintained in cow dung medium. Compost was collected at regular intervals for testing the germination and growth of some selected plants. In order to test the effect of vermicompost on the growth of the plants, some vegetable plants were chosen and trails were performed with three replicates.

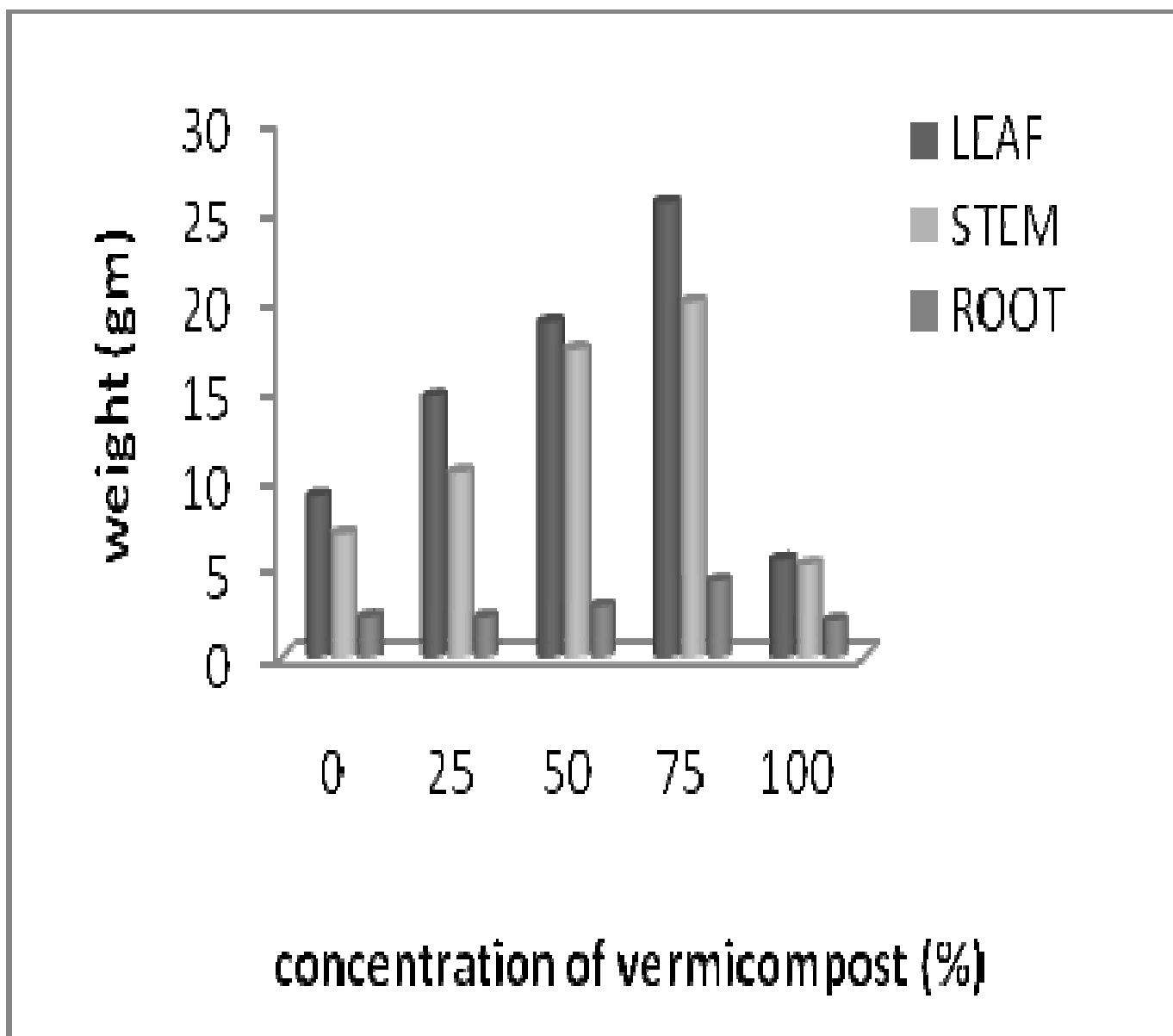


Figure-1

Growth of *Plectranthus amboinicus* in different concentration of Vermicompost media

Results and Discussion

Different concentrations such as 25%, 50%, 75%, 100% and 0% (red soil as control) prepared by vermicompost amended with soil for plant medium.

The following plants were selected to study the growth parameters *Plectranthus amboinicus* (Country borage), *Morinda citrifolia* (Mulberry) and *Jatropha curcas* (Jatropha). The growth parameters in the form of root weight stem weight and mass production or leaves weight were recorded. Plant growth tests

were studied in different concentration of vermicompost media. The obtained results are shown in the figure number 1, 2 and 3.

The highest leaf weight were observed in *Plectranthus amboinicus* (25.5g), *Morinda citrifolia* (22.1g) and *Jatropha curcas* (18.8) in 75% concentration of vermicompost medium followed by 50% and 25%. The lowest leaf weight 5.4g, 4.2 and 7.5g in 100% vermicompost medium respectively.

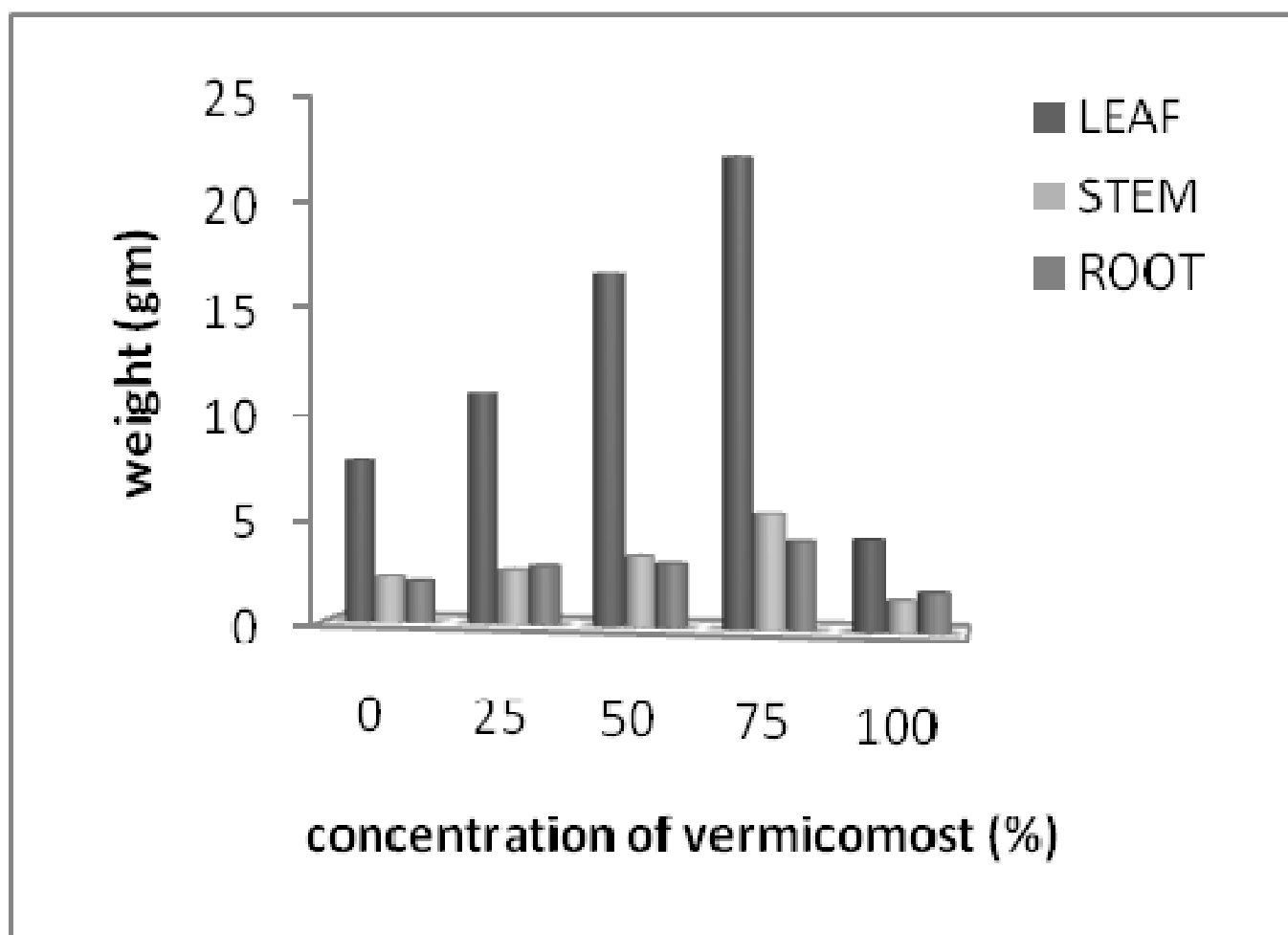


Figure-2

Growth of *Morinda citrifolia* in different concentration of Vermicompost media

The beneficial effect of earthworms on plant growth may be due to several reasons apart from the presence of macro nutrients and micronutrients in vermicasts and in their secretions in considerable quantities. The maximum weight of stems were obtained from plants *Plectranthus amboinicus* (19.8g), *Morinda citrifolia* (5.4g) and *Jatropha curcas* (4.2g) grown in 75% concentration of vermicompost medium and lowest 5.1g, 1.4g and 1.6g in 100% vermicompost medium.

The highest root weight gained in plants *Plectranthus amboinicus* (4.2gm), *Morinda citrifolia* (4.1g) and *Jatropha curcas* (3.8gm) collected from 75% concentration of vermicompost medium.

Edwards² reported that in a study with 25 types of vegetables, fruits or ornamentals, earthworm casts performed better than compost and commercial potting mixture amendments.

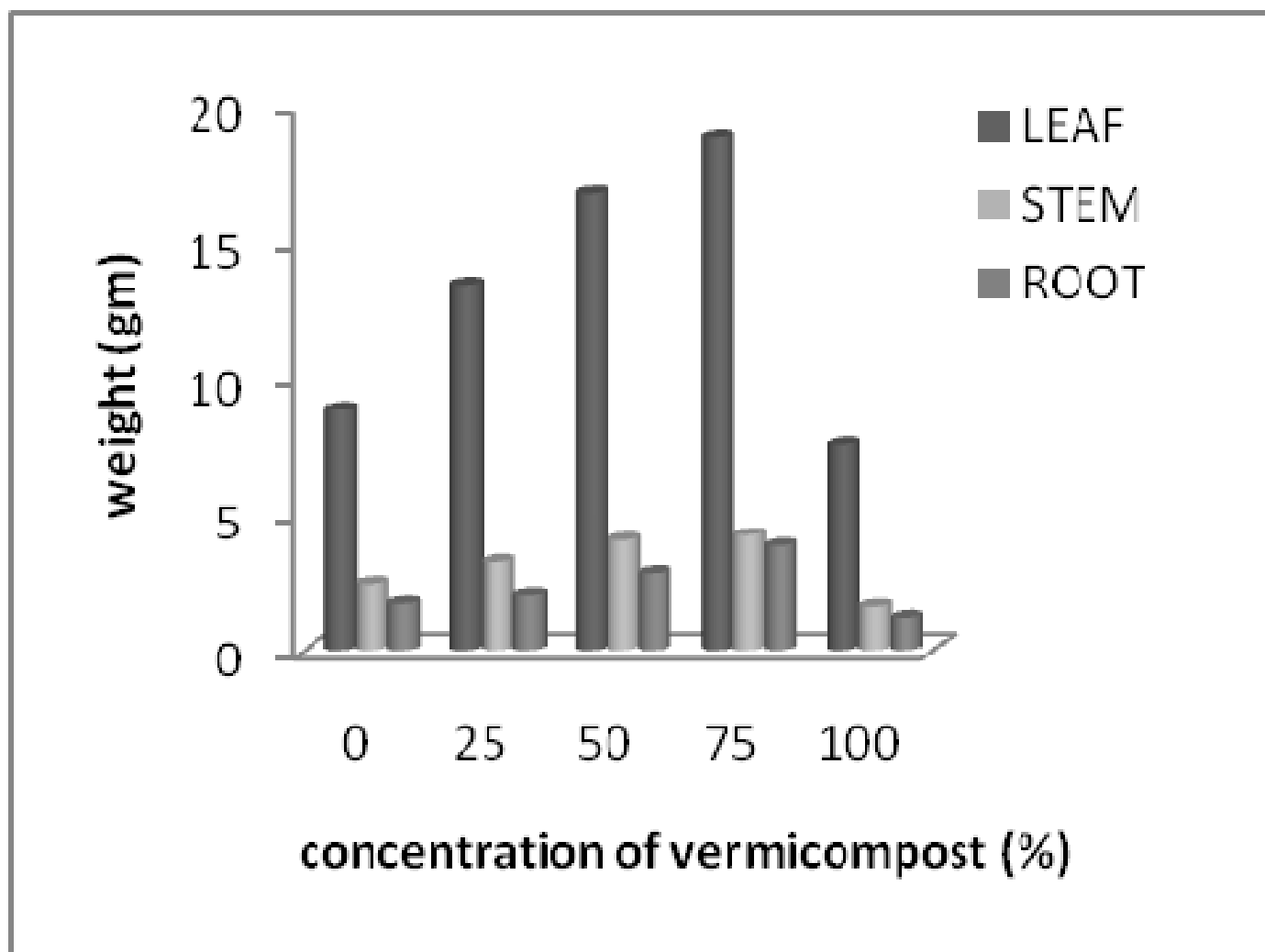


Figure-3

Growth of *Jatropha curcas* in different concentration of Vermicompost media

The beneficial effects of earthworm cast utilization in other horticulture settings have also been reported³. Cantanazaro⁴ demonstrated the importance of the synchronization between nutrient release and plant uptake and showed that slower release fertilizers can increase plant yield and reduce nutrient leaching. In 75% concentration of vermicompost promote required nutritions to the plants compare than the 50%, 25% and control. In 100% medium, the plants growth was retarded because of high amount of minerals in the plant medium.

Growth promoting activity of vermicompost was tested using a plant of maize (*Zea mays*) was measured. It was indicated that plant growth promoting hormones are present in vermicompost⁵. The fresh weight of flowers such as *Chrysanthemum chinensis* increased with the application of different levels of vermicompost⁶.

Vermicompost plays a major role in improving growth and yield of different field crops, vegetables, flowers and fruit crops. The application of vermicompost gave higher germination (93%) of mung bean (*Vigna radiata*) compared to the control (84%). Further, the growth and yield of mung bean was also significantly higher with 80% vermicompost application. Likewise, in another pot experiment, the fresh and dry matter yields of cowpea (*Vigna unguiculata*) were higher when soil was amended

with 70% vermicompost than with bio digested slurry⁷.

This result shows that the plant growth also depend upon the quantity of vermicompost applied in the plant medium.

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