

Research Article

Effect of nutrient supplementation and microbial inoculation on enrichment of vermicompost using earthworm (*Eisenia foetida* sav.)

■ B. NANDI, S.C. BHANDARI AND R. H. MEENA

Received : 17.07.2012; Revised : 05.08.2012; Accepted : 08.10.2012

MEMBERS OF RESEARCH FORUM :

Corresponding author :

B. NANDI, Department of Agricultural Chemistry and Soil Science, Rajasthan College of Agriculture, M.P. University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA
Email: rimipalnandi23@gmail.com

Co-authors :

S.C. BHANDARI AND R.H. MEENA, Department of Agricultural Chemistry and Soil Science, Rajasthan College of Agriculture, M.P. University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA

Summary

An enrichment study on vermicomposting of nutrient supplemented and microbially inoculated mixture of mustard crop residue and farm weeds with fresh cattle dung using *Eisenia foetida* was conducted in pits. Mixture of composting material was supplemented with 0.5 per cent urea, 1.0 per cent beneficiated rock phosphate, 0.15 per cent of ferrous and zinc sulphate and inoculated with lignocellulolytic microorganisms (*Trichoderma viride*, *Cellulomonas fimi* and *Bacillus* sp.), *Azotobacter chroococcum*, *Bacillus megaterium* and 500 adult earthworms pit⁻¹ were released according to treatments making seven combinations. During vermicomposting, composting mixtures were analysed for cellulase activity and microbial populations. At harvest, fresh vermicompost yield, earthworm density, C : N ratio, nutrient contents and humus fractions were recorded. Results revealed that combination of both nutrient supplementation and microbial inoculation positively influenced in increasing the macro and micro nutrient content, humus fractions, earthworm density and quality of vermicompost in respect of lower C : N ratio and less fresh vermicompost yield. Cellulase activity and microbial (bacteria, fungi and actinomycetes) populations were higher in enriched vermicomposting pit than control during the process of decomposition.

Key words : Enrichment, Vermicompost, Microbial, Inoculation, Cellulase, Humus, Earthworms

How to cite this article : Nandi, B., Bhandari, S.C. and Meena, R.H. (2012). Effect of nutrient supplementation and microbial inoculation on enrichment of vermicompost using earthworm (*Eisenia foetida* sav.). *Asian J. Soil Sci.*, 7(2): 242-244.

Introduction

India would need to produce additional 50 MT of foodgrain to feed its anticipated population in the next 10 years. This would need optimum and sustainable utilization of all natural resources with greater emphasis on crop residue management and recycling of agricultural wastes through various ways of composting. India produces nearly 7000 million tonnes of organic wastes which is either burnt or land filled thus creating important environmental hazards. Vermicomposting among other alternatives has been considered as a way of transforming some of these wastes into useful compost for plants and soil while diminishing their negative environmental impact. Further, nutritive value of compost can be enriched by the use of earthworm and nutrient supplementation. Agricultural residue composting is a complex process which can be mediated by inoculation of

lignocellulolytic microorganisms. Therefore, present study pertains to vermicomposting of mixture of mustard crop residue and farm weeds with fresh cattle dung, mineral fertilizers (N, P, Fe and Zn), microbial cultures (*Trichoderma viride*, *Cellulomonas fimi*, *Bacillus* sp.), *Azotobacter chroococcum*, *Bacillus megaterium*, earthworm *Eisenia foetida* were used and vermicompost produced was analysed and characterized for their nutritive value and quality in comparison to farmyard manure.

Resources and Research Methods

The present investigation was conducted in pits outside of Department of Agricultural Chemistry and Soil Science, Rajasthan College of Agriculture, Udaipur. A homogenous mixture of 60 kg of dried and chopped mustard crop residue and farm weeds in 5:1 (w/w) were mixed with 600 kg of fresh