USE OF MICROBIAL CONSORTIUM AND EARTHWORM, EISENIA FETIDA SAVINGY IN VERMICOMPOSTING AGRO-RESIDUES FOR POT CULTURE STUDIES OF VIGNA UNGUILICULATA (L.) WAP

(Abstract)

The present study attempts to evaluate selected indigenous composting microorganisms for formulating a microbial consortium to prepare a vermicompost along with earthworm, *Eisenia fetida* Savingy from five different agro-residues which are available in plenty in the study area, namely, Dindigul District, Tamilnadu, India, and to conduct pot culture studies using *Vigna unguiculata* (L.) Walp to test the efficacy of the vermicompost for its growth and yield.

From the total colony forming units, eighteen bacterial and thirteen fungal strains which showed predominant growth were isolated from various natural sources such as decayed leaf litter, decayed coir pith, decayed farmyard manure, decayed cowdung and the gut of earthworm, *E.fetida* and pure cultures were obtained. All these isolates were identified and screened and characterized for cellulolytic, lignolytic and phosphate solubilizing activities. Based on their growth performance, three bacteria viz., *Proteus* spp., *Bacillus* spp. 1 and *Serratia* spp. and three fungi viz., *Alternaria* spp., *Penicillium* spp. and *Aspergillus niger*-1, which exhibited higher levels of cellulolytic, lignolytic and phosphate solubilizing activities, were selected, mass cultured individually and then mixed in equal proportion to get a microbial consortium.

Five agro-residues such as the crop residue of tomato, *Lycopersicon esculentum* Mill., the crop residue of marigold, *Tagetes patula* L., the trash
of sugarcane, *Saccharum officinarum* L., the leaves of the grape plant, *Vitis vinifera* L. and the leaves of the banana plant, *Musa paradisiaca* L. were collected from different parts of four Revenue Blocks of Dindigul District, Tamilnadu, India, and separately pre-decomposted for 21 d. The pre-decomposted agro-residues were separately mixed with cowdung and vermicomposting trial was carried out using the microbial consortium and *E.fetida* individually and in combination for 60 d with proper control (without microbial consortium or *E.fetida*).

Analysis of the compost for physico-chemical characteristics, colony forming units of bacteria, actinomycetes and fungi, percentage of decomposition and worm number and biomass showed that composting of the agro-residues treated with the microbial consortium + *E.fetida* produced better vermicompost, rich in available nutrients for plant growth, than the composts prepared by the microbial consortium or *E.fetida*.

Pot culture studies were carried out in the Department of Biology, Gandhigram Rural University, Gandhigram, with cowpea, *Vigna unguiculata* (L.) Walp in earthen pots in triplicate for 75 d. The experiments were conducted with a control (vermicompost and NPK fertilizer free trial) and 11 treatments, viz., vermicompost application (T1-T5), NPK fertilizer application (T6) and vermicompost + 50 percent recommended dose of NPK fertilizer application (T7-T11). The growth and yield parameters of the plants were studied on the 15, 30, 45, 60 and 75 d after sowing. Vermicompost of *S.officinarum* + 50 percent of recommended dose of NPK fertilizer showed the highest yield.