

ABSTRACT

Biocomposting plays an important role in managing the agro based industrial waste in organic farming to minimize the soil hazards, the present work has been designed to investigate the “Bioconversion of paddy and coffee husks as organic manure and its effect on plant growth and soil fertility” using *Pleurotus eous*, *Pleurotus florida*, *Trichoderma asperelloides* and *Eisenia fetida*.

The results of microbial population study revealed significant increase of bacteria, fungi and actinomycetes in C6 (Raw coffee husk + 6.5g *Pleurotus eous*, 6.5g *Pleurotus florida*, 7g *Trichoderma asperelloides* + *Eisenia fetida* (5t/ha) followed by C3 (Raw paddy husk + 6.5g *Pleurotus eous*, 6.5g *Pleurotus florida*, 7g *Trichoderma asperelloides* + *Eisenia fetida* (5t/ha) on 20, 40, 60 and 80 days. Observations with FT-IR and FESEM revealed the morphological structure, maturity and stability of biocomposts as well as physico - chemical parameters clearly showed that among 6 biocomposts, C6 showed significant reduction in lignin, cellulose, EC, organic carbon, C:N ratio and increase in total nitrogen, phosphorus, potassium, calcium and magnesium in comparison to other biocomposts, raw paddy and coffee husks. The pot culture experiments were conducted with control and 6 treatments (T1, T2, T3, T4, T5 and T6) on moth bean, black gram, fenugreek and kalmegh. T6 showed significant growth in all biometric parameters (root length, shoot length, number of leaves, number of nodules, fresh weight and dry weight) and yield parameters (number of pods/plant, length of the pod, number of seeds/pod, weight of the seeds/ pod, fresh and dry weight of the pods) when compared to control and other treatments. Biochemical parameters (protein, carbohydrate, chlorophyll 'a', chlorophyll 'b', total chlorophyll in leaves, leghaemoglobin in nodules, protein and carbohydrate in seeds) of all the four test plants was maximum in T6. Phytochemical screening of methanol seed and leaf extracts of fenugreek and kalmegh grown under treatment 6 showed various phytochemicals when compared to control.

Treatment 6 methanol seed (moth bean, black gram, and fenugreek) and leaf (kalmegh) extracts revealed notable antioxidant and antibacterial activity. Fenugreek and kalmegh methanol seed and leaf extracts of best treatment (T6) showed maximum scavenging activity and antibacterial activity. Pre and post-harvest soil analysis showed

maximum increase in initial soil pH, electrical conductivity, available nitrogen, phosphorus and potassium in Treatment 6 when compared to control and other treatments of all the four plants. Therefore, biocomposted paddy and coffee husk produced by *Pleurotus eous*, *Pleurotus florida*, *Trichoderma asperelloides* and *Eisenia fetida* was found to be an efficient organic manure. Application of this biocompost has rejuvenated the depleted soil fertility, enriched the available pool of nutrients enhanced the biometric, biochemical, yield parameters, antioxidant, antibacterial activities and phytochemical contents of the test plants. Hence, it can be concluded that biocomposting of paddy and coffee husk has immense potential for recycling and recovery of plant nutrients from agro industrial wastes.