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## ABSTRACT

For sustainable farming, the nutrient content of conventional vermicompost (VC) is not sufficient to meet the desired crop growth and yield. Enrichment of VC with specific nutrients as a new technological up-gradation is thus required for maintenance and improvement of soil health for quality food production. Experiments were conducted in pots to study the chemical and bio-chemical parameters of enriched VC and its application effect on lateritic soil. Four pot experiments were conducted during 2012 to 2015 at research farm of Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur, India. In the first experiment, chemical and bio-chemical properties of VC prepared from different organic wastes and microbial inoculants were studied. The organic wastes; water hyacinth (WH), paddy straw (PS) and saw dust (SD) and microbial inoculants such as TV (cellulolytic fungi), AZC (nitrogen-fixing bacteria), PSB (phosphate solubilizing bacteria) and KSB (potassium solubilizing bacteria) were used in the experiment. Earthworm (*Eisenia foetida*) biomass, growth performance, and cocoon production were significantly higher in VC prepared from WH and PS as compared to SD. Microbial inoculation to the organic waste significantly improved the quality of the VC. In the second experiment, effect of rock minerals i.e. rock phosphate (RP), dolomite (DM) and mica (MC) addition in organic wastes (WH and PS) along with microbial inoculants was assessed on VC quality. Use of the rock minerals such as RP at 20%, DM at 15% and MC at 10% along with microbial inoculants into organic wastes enhanced the earthworm growth rate, hence improved the quality of VC with respect to higher available macronutrients (N=26%, P=19% and K=10%) as compared to control. In the third experiment, the shelf-life and chemical properties of the rock minerals enriched VC was studied. The effective shelf life of VC was 90-105 days in storage, when available N, P and K content of the VC were increased. In the fourth experiment, the nutrient release pattern and chemical and biological properties of lateritic soil with application of enriched VC was analyzed. Application of enriched VC prepared from combined use of rock minerals (RP, DM and MC) at 15% each with microbial inoculants was effective in improving chemical and biological properties of lateritic soil as compared to conventional VC.

**Key words:** Vermicompost, Enriched vermicompost, Microbial inoculation, Rock minerals, Soil fertility,