



## Sustainable Management of the Invasive Alien Weed *Mimosa pudica* Through Vermicomposting: Impacts on Nutrient Enrichment, Earthworm Reproduction, and Crop Growth Performance

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### Abstract

**Introduction and Objectives:** An experiment was conducted during the Rabi seasons of 2023 and 2024 at the Department of Soil Science, University of Chittagong, Bangladesh, to evaluate the nutrient status and earthworm fecundity of vermicompost produced from the invasive weed *Mimosa pudica* using *Eisenia fetida*, and its effects on the growth of Chinese cabbage (*Brassica rapa* var. *pekinensis*) and Radish (*Raphanus sativus*).

**Method:** Eighteen treatments (vermicompost, compost, and initial mixtures) were prepared using *Mimosa pudica* and three bulking materials at different ratios. Eight fertilizer treatments were used in a pot experiment. The soil was sandy loam with low fertility, and experiments ran from October 2023 to February 2024.

**Results:** Treatment T5 recorded the highest earthworm biomass ( $11.35 \pm 2.53$  g), indicating its suitability for vermicomposting. Vermicomposts had higher pH, EC, and nutrient concentrations (TKN, TAP, TK, TCa, TMg), and lower C/N ratios compared to composts and initial mixtures, confirming better maturity and quality. All of the fertilizer treatments made both crops grow much better. Most Chinese cabbage was grown in T5 (146 kg/ha), followed by T1 and T6. The treatment with plywood sawdust had the lowest yield, which suggests that it could be toxic. Radish, on the other hand, had the highest yield in TRFD (153.67 kg/ha), followed by T1, T2, and T5. This suggests that radish is less sensitive to sawdust toxicity. Compared to the control, all treatments caused a big increase in leaf area. For Chinese cabbage, T6 and T5 worked best, and for radish, T-RFD and T2 worked best. Overall, vermicompost made from *Mimosa pudica* greatly improved the quality of nutrients, the performance of earthworms, and the yield of crops.

**Conclusion:** The above findings indicate that vermicompost produced from the invasive alien weed *Mimosa pudica* improves the overall growth and yield of Chinese cabbage and Radish.

**Keywords:** Invasive alien weed, vermicompost, Chinese cabbage, Radish.

