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## Vermicomposting in the Mekong Delta — Nutrient Fluxes and Sanitation of Vermicomposts from Different Substrates

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### Abstract

Farming systems with a small number of pigs or cattle are frequent in the Mekong Delta, Viet Nam where untreated manure is used as organic fertiliser. Because of sanitation concerns there is a need to treat the manure prior to field application. Composting in a hot rotting process is not possible if the amount of manure is low, therefore vermicomposting may be an alternative to treat smaller amounts of substrate. Vermicompost is used as a fertiliser and the earthworms may be used as a N rich feed. In a vermicomposting experiment carried out in Can Tho, Viet Nam, nutrient fluxes and sanitation process in three different substrates were studied.

Two hundred grams of *Eisenia fetida* were applied to 4,5 kg biogas sludge, cattle excrements and pig excrements. The composting process was monitored for two months. Worms and substrates were analysed on Kjeldahl-N, carbon, phosphorus, potassium and heavy metals at the beginning and the end of the experiments. Additionally, substrates were analysed on Coliformes, *E. coli*, *Salmonella* and Helminth eggs. During the composting process moisture content was controlled and adjusted to 85 % and pH, temperature and weight were monitored.

The data showed a significant reduction in the numbers of Coliformes, *E. coli*, *Salmonella* and Helminth eggs. Also, a significant decrease of the nutrient masses in the substrates caused by leaching was observed, but heavy metal concentrations remained unaffected. Although the number of worms was lower at the end of the experiment, a significant uptake of nutrients and heavy metals by the worms was observed. Nitrogen concentrations in the worm biomass increased significantly from 0,01 g N/g DM in the biogas sludge to 0,08 g N/ DM and in both excrements to 0,10 g N/g DM. Only vermicomposting of pig excrements caused significant nitrogen losses (12 %).

The sanitation effect by vermicomposting seem to be similar than by hot rotting. But vermicomposting causes lower nitrogen losses and it produces a highly valuable product (worms) that can be sold as feed.

**Keywords:** Biogas sludge, cattle excrements, *Eisenia fetida*, Mekong Delta, nutrient fluxes, pig excrements, sanitation, vermicompost, Viet Nam