AMMONIA EMISSION REDUCTION USING ZEOLITES IN ANAEROBIC-ANOXIC-OXIC COMPOSTING PROCESS OF SLAUGHTER HOUSE SOLID WASTE

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ABSTRACT

Slaughter house (SH) solid waste has not been managed properly. It is only collected and disposed of to landfill almost without any processing. This condition may result in air, soil and groundwater contamination. In order to solve the environmental pollution problem, composting is considered as an effective and efficient alternative technology for treating the SH solid waste. The objective of this study was to evaluate the performance of anaerobic-anoxic-oxic (A2O) composting method using zeolites for reducing ammonia emission. The A2O composting method and the use of zeolites is expected to reduce nitrogen and phosphate concentrations in the solid waste, and and to reduce ammonia gas emission during the composting process.

The A2O composting process was performed in varied phase durations of 25-10-15 days, 30-10-10 days, and 15-10-25 days. This variation was intended to examine the optimum duration of the A2O composting stages. Other variation was the addition of dolomite in different concentrations of 2%, 5%, and 10% from a total weight of 50 kg of SH solid waste in each reactor. The addition of dolomite was meant for alkalinity controller. Zeolites was used as ammonia adsorption, and the performance was compared to that of activated carbon.

The results showed that ammonia emission during the composting process could be reduced by activated carbon and zeolites. Ammonia removal efficiency by activated carbon was slightly better than that of zeolites with removal percentage 97.65% (activated carbon) and 96.187% (zeolites). Ammonia absorption kinetics by both media followed first order reaction, with a reaction rate of 0.117 mg/day for activated carbon and 0.110 mg/day for zeolites. Both followed Freundlich’s isotherm adsorption model.

Kata kunci: A2O, ammonia emission reduction, composting, slaughter house, solid waste, zeolites.
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