COMPOSTING PROCESS OF SLAUGHTER HOUSE SOLID WASTE WITH ANAEROBIC AND A2O METHODS

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ABSTRACT

The Pegirian slaughter house (SH) produces 0.38 tons paunch manure, 5.26 tons faecal material and residual feed every day. Considering the SH’s solid waste has low C/N ratio, the anaerobic-anoxic-aerobic (A2O) composting method is considered to be appropriate for treating the waste. This research was aimed to compare A2O composting process and anaerobic processes; N and P concentration changes during composting process; ammonia emission removal using activated carbon and compost filters, and coliform removal.

Twenty four reactors of 60 L capacity with 20 kg of SH’s solid waste were used for implementing 50 day anaerobic and A2O composting methods. Each reactor was added with 2% of dolomite. Ammonia emission was removed with activated carbon and compost filters, which were installed in each reactor. During the composting period a number of parameters were measured. These parameters were: organic carbon, organic nitrogen, nitrate, nitrite, ammonium, phosphate, total phosphorous, ammonia, coliform, moisture content, pH, and temperature.

Results of this study showed that the A2O composting method had better performance than that of the anaerobic method. The nitrogen removal efficiency in the A2O reactors reached 36.21%. The removal efficiencies of ammonium in the anaerobic reactor was 25.65%; nitrate 78.43%, nitrite 50.66%, phosphorous 63.56% and phosphate 43.25%. In the A2O reactors, the removal efficiencies of ammonium was 47.58%, nitrate 83.26, phosphorous 42.48 %, and phosphates 40.13%. The leachate from the A2O reactor had pH values of 6.77-7.46; ammonium 67.46-138.00 mg/L, nitrate 16-0.06 mg/L, nitrite 1.12-4.33 mg/L, phosphorous 2.47-3.08 mg/L, phosphate 165.73-462.27 mg/L, COD 2185.50-6322.00 mg/L, and organic nitrogen 193.83-333.27 mg/L. Ammonium removal efficiencies by the activated carbon filter ranged from 80.89 to 82.14%, and those by mature compost filter were 68.86 to 69.67%. The removal efficiencies of coliform in A2O and anaerobic reactors were 99.98 % and 99.87% respectively.

Keywords: anaerobic, A2O, compost, filter, slaughter house, solid waste