Development of a Total Manure Treatment System Alternative to Lagoon-Sprayfield Technology in North Carolina. (A05-vanotti162411-Oral)

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Abstract:

We developed an alternative system for treatment of liquid swine manure where the lagoon is omitted. In this multistage system, solids and liquid are first separated with polymer, followed by N removal using nitrification and denitrification and then P extraction through a newly developed calcium precipitation process. The pilot system was evaluated for 2 yr at the Swine Unit at NCSU Lake Wheeler Rd. Field Laboratory using flushed swine manure from finishing houses. Solids separation with PAM reduced 98% of the volatile solids from the liquid stream. Instead of breaking down organic compounds, the oxygen in the aeration treatment following solids separation can be used efficiently to convert ammonia in the nitrification process. Nitrifying bacteria entrapped in polymer pellets removed > 90% of the ammonia. Soluble P was effectively recovered as calcium phosphate after removal of ammonia and carbonate buffers during nitrification and precipitation with hydrated lime. The system produced a sanitized effluent free of pathogens. Based on these results, a full-scale system was designed and constructed at a 4,360-pig farm in Duplin Co., NC for verification of Environmentally Superior Technology under the Smithfield Foods/NC Attorney General Agreement.

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