



Zhong obtained his B.S. in Engineering from Qingdao Technological University in China. In Fall 2011, Zhong joined School of Civil Engineering at Purdue to start his M.S. study. In 2012 Summer, he transferred to Dept. of Ag and Bio Eng. to continue his study of M.S. in Engineering.



Agricultural & Biological ENGINEERING

Thesis Defense

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| Speaker: | Zhong Qiao |
| Title: | Nutrients recovery from anaerobically-digested dairy manure by struvite formation and its effect on gas releases |
| Major Professor(s): | Dr. Jiqin Ni |
| Date: | Thursday, August 01, 2013 |
| Time: | 1:30 PM |
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Abstract:

Manure management practice such as anaerobic digestion and lagoon storage has become important issue on large dairy farms partially due to water quality and air quality concerns caused by excess nitrogen and phosphorus. In this thesis, both bench-scale tests and pilot-scale storage tests were conducted to investigate the factors that influence nitrogen and phosphorus recovery by struvite formation from anaerobically-digested dairy manure and the effect of this process on the releases of ammonia (NH_3), nitrous oxide (N_2O), methane (CH_4), carbon dioxide (CO_2) and hydrogen sulfide (H_2S) during storage. The results of the bench-scale tests showed that over than 98% as phosphate removal rate and over than 97% as ammonium removal rate were achieved by struvite formation. The optimum pH value and initial $\text{Mg}^{2+}:\text{PO}_4^{3-}:\text{NH}_4^+$ molar ratio were found to be pH 8.5 and 1.3:1.3:1, respectively. The results of the pilot-scale storage test suggested that struvite formation significantly reduced the releases of NH_3 , N_2O , CH_4 and H_2S . However, the influence of struvite crystallization on the releases of CO_2 was less obvious unless initial molar ratio and pH were adjusted.