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### **Phosphorus Removal of Dairy Wastewater via Lime Precipitation**

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#### Abstract:

Phosphorus recovery from dairy manure has the potential to address both environmental issues, by improving water quality and nutrient cycling, and economic issues, by extending P reserves and generating additional revenue for livestock producers. The purpose of this study was to evaluate the efficacy of a lime precipitation system without biological pretreatment to remove phosphorus from dairy wastewater. Three dairy manure and wastewater management systems were investigated in South-central Idaho and Southeastern Louisiana, namely: separated parlor wastewater, separated flushed manure, and an anaerobic lagoon system receiving raw parlor water. Lime precipitation was found to remove 83% of TP and 99.7% of the dissolved P, with the addition of 4.17%, by volume, of a 1:9 Ca(OH)<sub>2</sub> to water solution. Using the same lime solution, a 66% reduction in dissolved and total P was observed with a 10%, by volume, addition to separated flushed dairy manure with approximately 45 total solids. Additions of 5% of Ca(OH)<sub>2</sub> solution, by volume, resulted in 63% and 78% in dissolved and TP when tested on non-separated parlor wastewater. A 5% lime slurry addition, by volume, was found to have a 6-log reduction on fecal coliforms indicator organisms from raw dairy parlor wastewater and a 5.5-log reduction when added to the lagoon effluent.

#### Impact Statement:

If the proposed lime precipitation system was implemented to treat lagoon effluent, it is anticipated that an 8-log reduction in fecal coliforms would be observed, greatly reducing the potential risk of pathogenic organism during the application of treated manure. This reduction in potential pathogens in runoff or from direct discharges will reduce the impact from animal feeding operations on the water bodies used as drinking water, recreational, fisheries resources.

Category: Agricultural BMPs

Type of Presentation: Poster Presentation