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Introduction

- Manure lagoon systems are designed to hold and treat animal farm wastewater for a predetermined period of time.
- When excessive solids build-up or sludge was found, significant odor, and low quality/quantity of flushing water would become the issues.

Objectives

- Documents experience to prepare for and complete land application of lagoon effluent with heavy solids from a flush dairy lagoon in central Missouri.

Materials and Methods

- The freestall barn uses mattress bedding with supplemental cedar shavings, and houses 140-160 lactating cows.
- Preparation included measuring lagoon sludge depth and lab analysis of sludge characteristics, and scouting for crop fields for land application, prior to contacting contractors for a bidding process.
- A contractor team utilized specialized equipment to dilute, agitate, pump and land apply approximately 8 million gallons of diluted lagoon solids in < 9 days.
- Lagoon effluent was sampled throughout the process to monitor the nutrients.
- Tools: pump trailer with a boom, dilution pump, booster pump, 8-inch lagoon agitators, boat agitator, toolbar+13 Dierich shanks, open spool hose humper ...



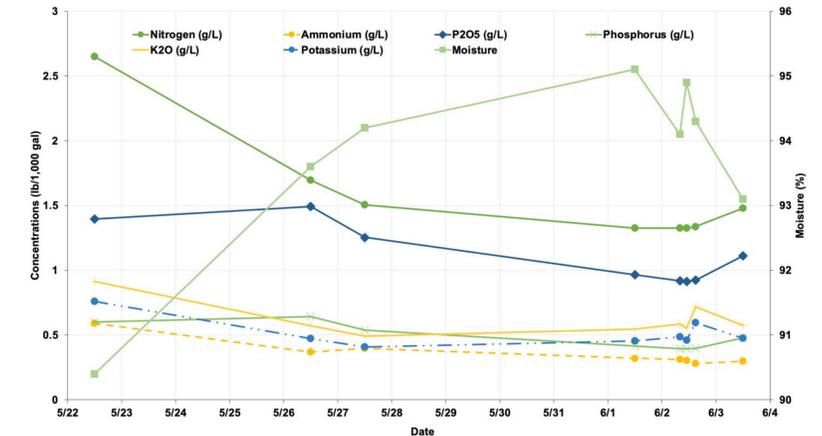
PTO-drive lagoon agitators and agitation boat in operation.

Results and Discussion

- The initial slurry had 10-13% solids content, so dilution water was needed.
- Effluent was applied to 220 acres, including neighbor's crop fields 1.5 miles away.
- The application rate of important manure nutrients did show variation, suggesting improvement to the real-time effluent nutrient measurement and land application rate adjustment could be improved to provide more consistent nutrients to the crop fields.
- A pull-plug sediment basin was selected after reviewing cost and visiting with a farmer who operated a PPSB and was satisfied with the overall operation and performance (Canter et al., 2021).



A dilution pump was used to pump water from the nearby lake (left) to the dairy lagoon (right) with agitation boat and lagoon agitation working in the background.



Concentrations and moisture content of slurry samples from the lagoon.



PPSB in operation and floating solids mat formation.

Conclusions

- Nutrients in effluent were decreasing concentration as moisture content increased.
- Sludge survey and effluent sampling are important to estimate the nutrients/solids.
- Planning ahead will help the overall operation and avoid unnecessary expenses.
- Simple, non-mechanical technologies are available to reduce the solids loading.

Acknowledgement

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