Assessing Swine Sludge Bioactivity and Mineral Composition by strata

1. Summary

Swine manure is stored in open earthen lagoons where the top liquid is used frequently for crop irrigation. Solids accumulated at the bottom of the lagoon, referred to as sludge, are only removed once every 20 years. While these solids have been analyzed as a mixture before, no studies attempted to track changes in composition with depth. Furthermore, no attempts were made to assess the change in biological activity in the accumulated sludge by depth.
In this study we use multiple (4) solids core sampler to ensure the recovery of an intact sludge profile (2" diameter, 1 ~ 2' depth). Subsequently, the sludge core is frozen then sliced into discrete samples (3" height each) before freeze drying to facilitate analyses.

2. Analyses:

- FTIR Analysis→ To quantify changes, if any, in organic matter structures with depth in the lagoon.
- ICP-AES Analysis → To quantify changes, if any, in elements such as phosphorus, calcium, copper, and zinc.

3. Rationale

Findings from this study will help provide insights into changes in swine rations and feeding efficiency over a 10 to 20 year time-horizon. It will also provide producers with a more accurate estimate of the value of these recovered solids as soil amendment/crop fertilizer. This is particularly critical since heavy metals, such as copper and zinc, can cause soil toxicity when applied in excess of crop needs.