NUTRIENTS RECOVERY FROM BELT PRESS FILTRATE WASTEWATER

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Support provided by: El Paso Water Utilities, USDA-NIFA and Texas A&M AgriLife Research

BACKGROUND

El Paso Water Utilities produces a large quantity (about 175 million gallons per year) of Belt Press Filtrate (BPF) wastewater. BPF wastewater is water removed from treated wastewater sludge to better manage sludge disposal. BPF wastewater is enriched with nutrients such as ammonium (NH_4 ~ 500 to 1000 mg/L), phosphorus (PO_4^{2-} ~172 mg/L) and potassium (K ~136 mg/L). To meet water quality regulations, the concentration of ammonium in BPF wastewater needs to be significantly reduced to less than 10 mg/L (parts per million) before it can be discharged into the Rio Grande. Treatment of BPF ammonium is a major cost in wastewater treatment. Reducing the ammonium concentration and quantity of BPF water can significantly reduce the cost of wastewater treatment. This study explores methods and the technical feasibility of recovering nutrients from BPF and storing them in a compost medium for use as an organic fertilizer.

Belt Press Filtrate Wastewater

OBJECTIVES

- Develop and evaluate chemical methods to optimize conditions for more efficient recovery of nutrients from belt press filtrate.
- Analyze the efficiency of fixing nutrients present in belt press filtrate in compost by bio-physico-chemical processes.
- Evaluate BPF nutrient retention in amended compost under the high temperature and dry conditions of El Paso, TX and similar arid regions.

Ammonium being removed (precipitate at the bottom of the beaker) from BPF

RESULTS

- Laboratory studies of new removal methods indicate that the ammonium concentration in the BPF can be reduced by 94%.
- Factors such as molar ratios (relative concentrations of different reactants), pH and initial concentration of ammonium were found to be key conditions influencing/or affecting ammonium removal.
- Excess initial ammonium favored precipitation of ammonium as Magnesium Ammonium Phosphate or Struvite
- Initial magnesium ion concentration in the BPF is one of the primary limiting factors.
- A pH of >8.5 is required for effective removal of ammonium.

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USDA United States Department of Agriculture National Institute of Food and Agriculture