AGRITECH INNOVATION CHALLENGE I 2016

INNOVATION CHALLENGE

Nutrient Recovery

Introduction

- Over the last 25 years, the number of farms in the Fraser Valley has decreased, yet the average number of livestock per farm has increased
- Nutrient sinks in the region have become smaller due to conversion from grass and corn to berries
- All livestock in the Fraser Valley require 1,100 kilotons of feed per year (≈ weight of 157,000 elephants)
- Majority of poultry and swine feed isn't grown "on-farm" which results in a nutrient surplus
- Soil Test Phosphorus (STP) levels measured very high (>100 ppm) in 94% of the fields in 2012
- Fraser Valley sits on sensitive aquifers, over-application of nutrients can lead to nitrate pollution of groundwater

Current Practices

- Transport manure off-farm
- Manure composting
- Solid/liquid separation
- Anaerobic digestion

Innovation Challenge

- Trucking is too expensive for manures with high moisture content
- Composting doesn't solve all the nutrient management issues
- Solid/liquid separation technologies allow for better management of nutrients on farm, but still excess nutrients
- Anaerobic digesters allow for value added processing, do not address nutrient imbalance on agricultural operations

Scenario #1 – Nutrient Recovery

- Nutrient recovery technologies separate the solid and liquid portion of the manure
- Aim to alter Nitrogen to Phosphorus ratio (N:P)
    - Allows for optimized nutrient application
- Altering N:P opens up opportunities to produce fertilizers with greater concentration of N or P.
- More efficient commercial technologies to alter N:P are needed
- **Possible Innovations**
    - Struvite Crystallization
    - Dissolved air flotation with bio-available polymers
    - Ammonia-N stripping in conjunction with solids separation
    - Nitrification/de-nitrification with polymer clarification and sludge settling
    - Centrifugation

Scenario #2 – Value Added Products

- Producers are incurring costs for by-product disposal, they could gain revenue streams from excess nutrients
    - Innovations are sought to maximize the use potential of excess nutrients
    - Once nutrients are separated, a value added processing step needs to be introduced to develop a commercially marketable product
- **Product Characteristics**
    - Need to be attractive to markets while being easy to package and transport
    - Possibilities include: Organic fertilizer, Green Bedding, Fibre 'Cow Pots / paper products', Glucose production via Acid Hydrolysis

Growing Forward 2 – A federal-provincial-territorial initiative
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