Alternative and Emerging Species for Aquaculture Workshop

PRINCE EDWARD AQUA FARMS INC.

Alternative product development utilising Mussel Processing by Products

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Prince Edward Aqua Farms

- One of three Mussel Processing Plants on PEI
- Active and aggressive in the area of Research and Development since its inception in 1989
- Conducted research projects in the areas of:
    - mussel process waste,
    - mussel shell products
    - mussel holding and oxygenation systems
    - added value investigations for undersized and broken processed meats

Mussel Shell

A major initiative to have Mussel shell added to *Schedule IV* of the **Feeds Act**

- This initiative involved an extensive and expensive research project to meet the requirements of Canada Food Inspection Agency (CFIA)
  - required more than three years to complete
  - Designed to generate a source of calcium for the laying hen industry
- Research was conducted by J,L. MacIsaac *et al* NSAC
  - identified that mussel shell contained 39 % Ca similar to Oyster shell that has been used by this industry for decades
    - Project conducted for the PEI Sea food Processors Assoc.
- Mussel shell had to be included on Schedule IV before it could be used in commercial feeds

Mussel Shell

A major initiative to have Mussel shell added to *Schedule IV* of the **Feeds Act**

- Excellent source of calcium and liming effect over long period when applied to crop lands
- Mussel shell sourced from solid waste or shell source blended with a carbon source and composted sold locally in Garden Centers
- East Coast Composting of Maine market the product as grub and slug deterrent . Sold throughout the north east down to Georgia and west to Michigan.
- No known science to support the claim but effectively marketed

Mussel Waste Liquid Fraction

- Prince Edward Aqua Farms product entry has the capacity to isolate the wash water from the holding area discharge. this water is directed to waste treatment facility that was designed to reduce the risk of spread of invasive species particularly at the larval stage
  - The extracted semi solids are 11 to 14 % dry matter
  - NPK average 1.28 0.14 and 0.26 % pH 7.2 with C:N Ratio of 8.3
  - 39 % of plant available N in first year
  - Using a GE Palmer as a Flocculent (does not meet organic standards)can enhance settlement
  - Waste less the flocculent meets Organic standards
  - Researched Electro Flocculation technologies NSAC G. Price *et al*
- Market Research suggests the material ranks 12 to 14 th in a list of 30 similar products available on the market in North America

Mussel Waste Liquid Fraction

- Issues: low dry matter , distance from the market , small quantities of material from single source, cost to enhance dry matter very high
- Research conducted by our Funding Partners and Soil Scientists indicate value as a nutrient source for several crop studied, grapes, cole crops, potatoes some cereal crops and grass lands
- Research Partners NRC, NSAC , Trent University Dr Mehdi Sharifi, Dr. Gordon Price , Agriculture Canada Kentville, Harrington Research Station , Kevin Sanderson, Basil Dixon, Aaron Mills. wonderful work done by all
- Results positive but large volumes of material needed . Grapes research showed good results
- Local farmers have used the material all report significant impacts on crop growth.

  - **Note** This facility was designed similar to the Summerside Waste Treatment Plant and allows for recovery of the sediments . These sediment consist of organic wastes in the form of pseudofeces and feces found in the mussel sock as well as bio fouling that may be attached to the rearing sock at harvest.

Solid Waste Fraction

- PE Aqua continues to research and partner with soil and plant scientists to find ways to add value to this portion of the waste stream. PE Aqua enjoys the partnership with a large local farmer who collects the material on year round basis. We are very greatfull to this farm interest .
- Some research has been conducted and reported on this fraction over several years much conducted by Agriculture PEI and Agriculture Canada
  - J. A. Macleod *et al* has conducted some considerable work along with Roger Henry and a Masters Student Thomas Gallant have evaluated this material as a source of nutrient for several crops. With good results.
- Product very unstable , intensive odor in warmer months , constant leaching into ground and to water table causing water quality issues .
  - Communities do not want this material stored or spread adjacent to houses
  - This material composted can stabilize and manage the odor to some degree
- Composted NPK depending on Carbon source is approximately .83 .24 and .23 g/ kg
  - Raw material can have up to 10 fold increase in value NPK 26.6, 2.5, 2.9 *(unstable foul odor) over composted material depending carbon source

Issues

- **Wastes generated year round**
- **Individual plants do not generate enough solid and liquid wastes to meet the needs for solid business plan**
- **All Plants in the mussel processing industry must work together to research to possibility of adding value to their waste resource.**
- **Research needed in Market opportunities, transportation, Packaging etc.**
- **Are there other industrial interests that might be prepared to create Partnerships that could enhance a Business Plan**
- **Are there opportunities to partner with Organic Producers on PEI**
- **Need to stabilize most waste products and store nutrient sources until they are needed by garden and industry consumers ; May - June each year.**
- **New product development Pet Food for example**