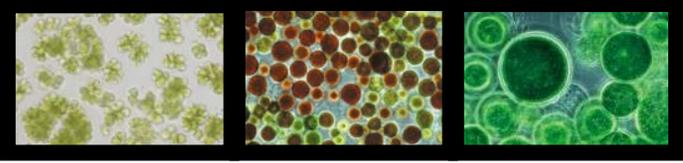




Microalgae Mediated Biodiesel Production Using Poultry Litter



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The Background

Biodiesel is a promising alternative to the petroleum-based energy production. There are two steps that would need to be taken for producing biodiesel on a large scale:

- Growing sufficient amount of the feedstock.
- Processing it into biodiesel.

The main issue that is often contested is whether or not we would be able to grow enough crops to provide the vegetable oil feedstock for producing a substantial portion to displace our diesel needs.

The Need

Georgia is the largest producer of poultry in the country, which generates an enormous amount of poultry litter waste that holds great potential for energy production. Apart from biogas production, anaerobic digestion of poultry litter helps in providing CO₂ and other nutrients for microalgae cultivation that offers benefits of biodiesel production and concomitant bioremediation of poultry farm wastes.

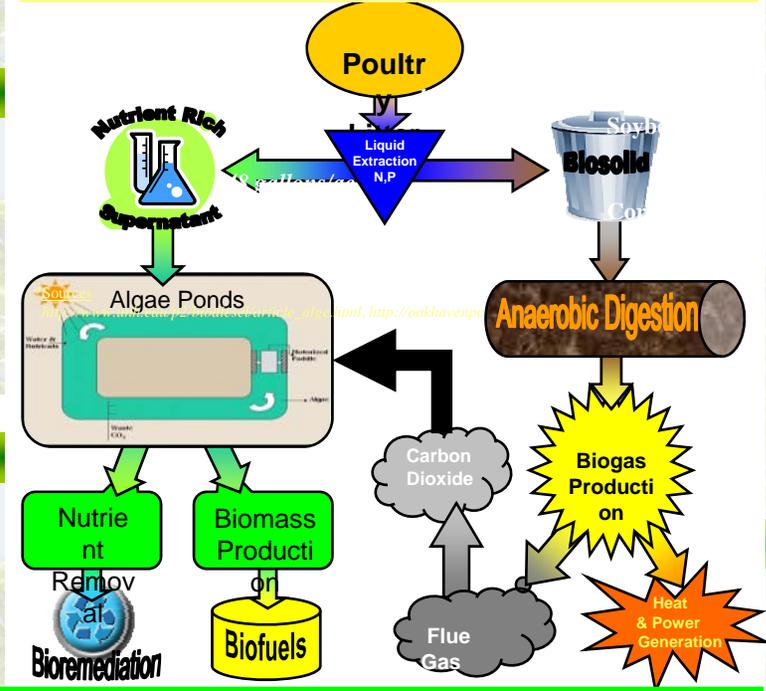
The Benefits

- Significant increase in renewable biomass feedstock productivity on a per acre basis.
- Integration of algae-based biofuel production with wastewater and waste flue gas treatment will recycle waste nutrients, thereby reducing production cost and improving water conservation and the environment.
- Utilizes land and water (saline/brackish/wastewater) otherwise not usable for conventional agriculture; thereby not interfering with food production.

Why Algae Biodiesel?

Oil Yield per acre per year of algae compared to popular oilseed crops:

Algae	5,000-15,000 gallons/acre*
Oil Palm	635 gallons/acre
Rapeseed/Canola	127



The Goal & Objectives

Propose a combined cost effective biotechnological scheme for processing and treatment of poultry litter for renewable energy production

- Determine optimal strategies for extracting nutrients from poultry litter for microalgae cultivation
- Assess biomethanation potential of poultry litter after nutrients extraction and microalgae biomass for biogas production through anaerobic digestion
- Evaluate microalgae mediated nutrient removal from poultry litter extracts
- Optimize the growth and hydrocarbon production of microalgae using poultry litter extracts and flue gas emissions from biogas units
- Characterize and compare costs and benefits of microalgae treatment systems with existing biological treatment processes and poultry litter management practices

The Outcome

On-farm demonstration of an integrated biosystems approach for waste management in poultry farms which comprises of the following:

- Biogas production using poultry litter and microalgae biomass, for power generation
- Microalgae cultivation for biofuel production using poultry litter extracts and flue gases