



## **Technology Commercialization Opportunity**

### **Animal Waste derived Organic Plankton Booster as Low-cost Renewable Nutrient Source for Algaeculture to Produce Biofuels**

UGARF Case: 1455

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Intellectual Property Status: Patent Pending

#### **Introduction**

The cost of production of algae is a major handicap in its commercialization for the purpose of biofuel production. It is estimated to be ~\$2.2/lb and need to be brought down to the order of ~10-15 cents/lb. Algal production requires supplementation of nutrients especially nitrogen and phosphorus. These two nutrients are also the major requirement of our food crops. Cost of nitrogenous fertilizers almost doubled and that of phosphorus showed a threefold increase between Jan 2007 and Jan 2008. Therefore it is essential to find alternative sources of nutrients for large-scale cultivation of algae to produce biofuels and other added value products. Poultry litter is a cheap source of nutrients that contains *ca.* 3.3% nitrogen and 2.6% phosphorus. The state of Georgia in USA alone produces 1.5 million tons of poultry litter that is equivalent to 108 t of urea and 85 t of DAP. Current cost of production algae biofuels is *ca.* \$500-\$800/bbl. In order to reduce the cost below \$50/bbl, various cost reduction strategies are to be employed for algae mass cultivation. Fertilizers are one of the major cost components in the production of crops or algae biomass. Reduction in fertilizer cost will significantly reduce the cost of production of algal biomass as well as algal biofuels.

#### **Technology Summary**

Inspired by their previous work on water effluents contaminated by animal and industrial wastes, UGA scientists developed a process that allows for the utilization of animal litter extracts as viable sources of nutrients to promote algal growth. The invention also comprises the selection of algal species that benefit most from said extracts, displaying an increase of 660% in the level of chlorophyll a and of 180% to 200% in the amount of biomass produced, as compared with normal growth conditions, when using poultry litter as nutrient source. Productivity of biomass at levels of 80mg/L/day was observed.

#### **Advantages**

- Inexpensive means to promote rapid growth of algal biomass
- Replaces considerable amounts of synthetic nutrients. For each ton of algal biomass production, poultry litter extract saves 478 lb of urea and 48 lb of DOP
- Reduces carbon-foot print, by reducing the need for synthetic nutrients
- Works with a variety of algae, although mixotrophic algae seems to be better suited for this system
- Exceeds the growth observed when the standard BG-11 growth medium is used.

#### **Potential Applications**

- Economical production of algal biomass with concomitant reduction

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