

## Algae Program

### Description

Diesel and jet fuels are critical to our nation's economy and defense, which require large quantities of the fuels. The United States consumes more than 40 billion gallons of diesel annually, and the U.S. Air Force (USAF) alone consumes about 3 billion gallons of aviation fuel a year. Also, 20 percent of fuels for military use must come from renewable sources by 2020. A clean, renewable, domestic source of fuel would have tremendous strategic and economic value. Microalgae can produce significantly more biofuel per acre than any other source. Although, under ideal conditions, microalgae theoretically can produce 15,000 gallons of oil per acre per year in raceway (open) systems, a more realistic production goal would be 5,000 gallons per acre.

Texas AgriLife Research has developed a comprehensive algal fuels development program with General Atomics and with other components of the Texas A&M University System (Texas A&M University, Texas A&M Galveston, and Texas A&M Corpus Christi). The program has received significant, long-term funding from the Texas Governor's Emerging Technology Fund, and the U.S. Department of Defense to develop technologies that can lead to rapid economical commercialization.

Recently AgriLife Research joined the National Alliance for Advanced Biofuels and Bioproducts as a consortium member with the Los Alamos National Laboratory and the Donald Danforth Plant Science Center.

### Research and Results

The AgriLife/General Atomics team has identified eight technology challenges that must be resolved for algae to become economically viable on a large, commercial scale:

- Algae growth efficiency
- Cellular oil concentration
- Nutrient utilization
- Thermal/Environmental controls
- Carbon dioxide injection/utilization
- Production practices and facilities
- Oil extraction
- Separation technology
- Coproduct development for feed/food

Texas AgriLife Research with technical support from General Atomics has constructed an algae production test facility at Pecos, Texas, that includes laboratories, open raceways, and processing components.



Overview of open raceways construction in Pecos, Texas



Algae in raceway with paddlewheel



On-site algae laboratory

For more information, contact

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