

WWW.SUNGRANT.OKSTATE.EDU



U.S. Department  
of Transportation



**Title: Production of Lipids for Biofuels through Mixotrophic Growth of a Mixed Microalgae-Cyanobacteria Culture**

**Dr. Maria Teresa Gutierrez-Wing**

#### Project Goal

The overall goal of this project was to determine the suitability of mixotrophic culture to produce biomass and lipids from a mixed culture of microalgae and cyanobacteria. The specific objectives were to: a) determine the suitability of a mixed culture composed of a species of *Chlorella* sp. and a cyanobacteria to grow in mixotrophic conditions; and b) determine the effect of different carbon sources on lipid production to explore the possibility of using agricultural waste streams rich in carbohydrates in the production of microalgal biofuels.

#### Project Outcomes

- Mixotrophic mixed culture of the microalgae *Chlorella vulgaris* and cyanobacteria *Leptolyngbia* sp. can grow and produce lipids with the addition of organic carbon.
- Biomass and lipid productivity of the co-cultures was higher in mixotrophic, compared with phototrophic cultures.
- Sodium acetate in the chemical media and sugar mill wastewater effluents resulted in the highest biomass and lipid productivity.
- Final dry mass concentration was higher in the cultures with higher proportion of sugar mill wastewater effluent, compared with those with higher proportion of evaporator effluent.
- Cultures maintained in 100% wastewater showed higher productivity and growth rate than the control.
- Total pigment content was higher in the treatment with 100% sugar mill wastewater effluent.
- Neutral lipids extracted from the biomass in all samples was composed mainly by C16 and C18 fatty acids.



**PI: Dr. M. Teresa Gutierrez-Wing**  
Louisiana State University  
*Civil & Envir. Engineering*

#### Co-PIs:

**Dr. Joan King**  
LSU AgCenter  
*Food Science*

**Dr. Kelly Rusch**  
(formerly connected with LSU)  
*Engineering*

**Funded:** \$75,000

**Start Date:** 07/01/11

**End Date:** 06/30/13

#### Other Sources of Funding:

Louisiana State University covered the cost sharing portion of this award.