# Determining the Optimal Growing Conditions for Nannochloropsis Algae for Economically Feasible Biofuel Production

Good, Samuel

For decades scientists have used an array of organic materials to produce environmentally friendly biofuel. But only recently has algae been introduced as a possible candidate for biofuel production. The purpose of this study was to determine the best environment for the Nannochloropsis strand of algae in regards to maximum biomass growth. An experiment was created consisting of four photobioreactor treatments: a nitrogen-based environment, a weak phosphorus-based environment (3%), a strong phosphorus-based environment (6%), and a control (no nutrients added). Each 1L sample was inoculated with 8.4 ounces of algae and monitored for seven days while carefully controlling aeration, light exposure, and temperature. After one week, 1 milliliter samples were taken from each treatment and the algae biomass was separated and measured. It was found that a 6% phosphorus-based nutrient concentration produced the greatest biomass yield at 7.3 grams per liter. The control and the 3% phosphorus-base followed closely behind while the nitrogen ended up killing the entire algae culture. Using the phosphorus-based solution as a commercial standard, Nannochloropsis could effectively produce biomass at a greater rate than it could in the natural environment, leading to a greater oil yield.

**Awards Won:**