Effects of CO_2 Concentration and Inoculum Stage on *Chlorella sorokiniana*

Erico Mattos

Crop and Soil Sciences Seminar
Wednesday February 16, 2011 at 3:35 PM
Room 2401 Miller Plant sciences Building

Recently, there has been renewed interest in microalgal biofixation of CO_2 as a viable CO_2 sequestration technology (Ono and Cuello 2006) in which CO_2 emitted by an industrial process is used as a source of inorganic carbon to stimulate microalgal growth. This process is being investigated by scientists funded by the U.S. Department of Energy (Huesemann *et al.*, 2003). Microalgae are not a well-studied group from a biotechnological point of view. Of the tens of thousands of microalgal species believed to exist, only a few thousand strains are kept in collections around the world, and only a few have been cultivated in industrial quantities (Olaizola 2003). We initiated a project with the overall objective of identifying microalgae species tolerant to high CO_2 concentrations. As a first step, we grew *Chlorella sorokiniana* for 30 days to identify the best time to collect inoculums from three growth phases: lag, exponential, and stationary. In a following experiment, two variables affecting the overall biomass production were investigated, including CO_2 concentration (0.03%, 5% or 10% CO_2 by volume) and inoculum phase (lag, exponential and stationary). Results showed that the 5% CO_2 concentration with inoculum from the lag phase yielded the greatest biomass production. Future work will use lag phase inoculum to screen microalgae species for tolerance to high CO_2 concentration.

References

Huesemann, M., Bartha, R., Hausmann, T., and Benemann, J. (2003) *An innovative approach for screening marine microalgae for maximum flue gas CO2 biofixation potential*, in *Second annual conference on carbon sequestration*. Alexandria, VA - US. p. 11.

Olaizola, M. (2003) *Commercial development of microalgal biotechnology: from the test tube to the marketplace*. Biomol Eng. 20(4-6), 459-466.

Ono, E. and Cuello, J. L. (2006) *Feasibility assessment of microalgal carbon dioxide sequestration technology with photobioreactor and solar collector*. Biosystems Eng. 95(4), 597-606.