Lipid detection in microalgae grown under different light intensities

Pinto, R.F. [1, 2], **Sant´Anna, C.** [1], **Martins, J.L.** [1], **Azevedo, S.M.F.O.** [2], **Bessa, L. B.** [2], **Miranda, C.T.** [2], **Vinícius, D.** [2], **De Souza, W.** [1, 2]

[1] **Laboratório de Biologia, Diretoria de Programas, Instituto Nacional de Metrologia, Normalização e Qualidade Industrial, Rio de Janeiro, Brazil**
[2] **Instituto de Biofísica Carlos Chagas Filho, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil**

The global impact of fossil fuels and the increasing necessity for renewable energy have stimulated researchers to investigate biodiesel production from microalgae. These microorganisms have a fast growing rate, high photosynthetic efficiency and they are able to accumulate lipids. Recently, studies are focused on microalgae field analyzing the presence of triacylglicerol, a neutral lipid important for biodiesel production. The aim of our work was to compare the lipid production in three microalgae genera (*Ankistrodesmus sp.*, *Scenedesmus sp.* and *Chlorella sp.*) under different light intensities. Microorganisms were isolated from fresh water and were grown in ASM-1 medium pH 8.0 at 24°C, with an artificial illumination photoperiod of 12 h with intensities of 200, 500 and 1000 ìmol photons $m^2.s^{-1}$. The triacylglycerol detection was done with Nile Red (NR), a lipophilic fluorescent dye, used as a rapid screening method for lipid production in oleaginous microorganisms. Quantitative measurement of lipid content was evaluated by fluorimetric assays in conjugation with confocal microscopy. NR showed affinity for the lipid content in microalgae tested, indicating the presence of neutral lipids. Fluorimetric analysis showed that *Ankistrodemus sp*, exhibit the highest lipid content when compared to *Scenedesmus sp* and *Chlorella sp*. The lipid production in *Ankistrodesmus sp* was confirmed by confocal microscopy of NR stained cells, where the highest amount of lipid droplets was observed disperse in the cytoplasm. When algae were submitted to variable light intensities, results showed that 500 ìmol photons $m^2.s^{-1}$ was the most effective intensity to increase the lipid content in *Ankistrodesmus sp*. This analysis could be an standard method to evaluate microalgae lipid production and it could be applied in studies focused on biodiesel production.

Key words: Lipid; Microalgae; Nile Red.

Supported by: *FAPERJ, INMETRO, CNPq.*