METABOLIC FLUXES ANALYSIS OF *Chlamydomonas reinhardtii* FOR BIOFUELS PRODUCTION

Jhorman Alexis Niño Gómez, Edgar Salgado Manjarrez, Instituto Politécnico Nacional, Unidad Interdisciplinaria de Biotecnología, México D.F, C.P. 06400, E-mail of Jhorman Niño: jhorman15@gmail.com

Key words: Chlamydomonas reinhardtii, metabolic flux analysis, lipid production.

Introduction. Metabolic flux analysis (MFA) allows us to observe the effect of environmental or genetic modifications that a microorganism can undergo in a metabolic level in a biological process (1). This work intends to perform the metabolic fluxes analysis of *C. reinhardtii* under mixotrophy conditions, in order to glimpse the strain potential under specific culture conditions, in terms of important metabolites accumulation for biofuels production.

Methods. Metabolic models building was performed under autotrophy, heterotrophy and mixotrophy conditions.
We determined the growth rate depending on the light intensity in 4 ranks, 3000, 8000, 20000 and 30000 lux (2) to find the best growth condition on mixotrophy and autotrophy.

Results. In a closed system is observed that there is a period of growth in the absence of carbon consumption, this is possibly due to the change in metabolism from photosynthesis to photorespiration. The evaluation of the light intensities yielded the following results

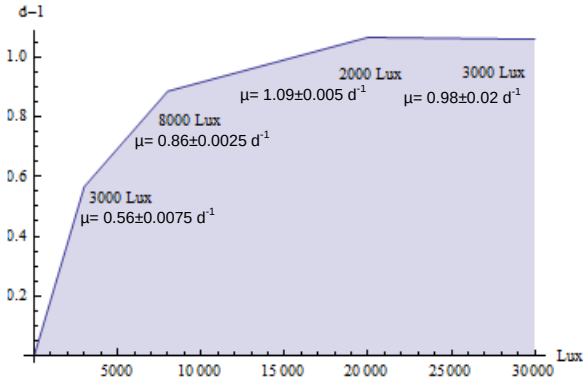

Figure 1. Graph of growth rate of *Chlamydomonas reinhardtii* and light intensity

In the construction of metabolic models, we obtained the following:

Table 1. Characteristic of Metabolic models

Model	Reaction	Metabolites
Full	425	422
Determined	421	421
Reduced	110	226
Artificial	69	163

The following figure shows the network formed in the full model under mixotrophic system.

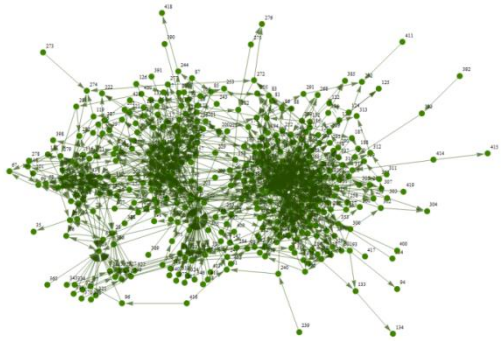

Figure 1.Metabolic network of full mixotrophic model.

Conclusions. It requires an experiment measuring CO_2 and O_2 to evaluate the growth of *C. reinhardtii* and the possible mixed metabolism (photorespiration).
The growth rate is influenced in a near zone to the 15000-20000 lux, after this, the increase in growth rate is very low.

Acknowledgements. To CONACYT for its financial support.

Bibliography

1. Manish S, V. (2007). *I.J.HP. 32:*, 3820-3830 "Metabolic flux analysis of biological hydrogen production by Escherichia coli".
2. Ioannis, A., Kiriakos K., Konstadia, L. (2012) Journ of theo biology.300, 254-264. Modeling the dynamic modulation of light energy in photosynthetic algae.