



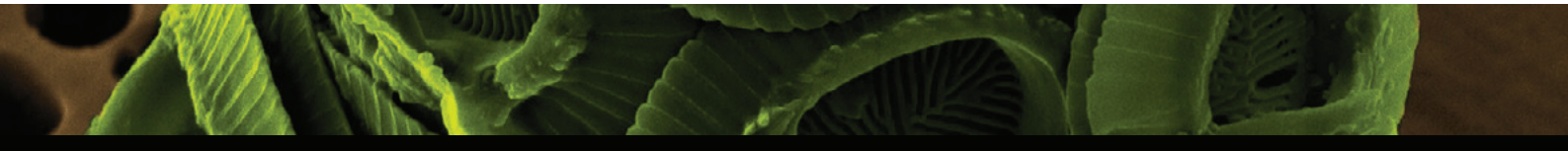
# **V Congreso Latinoamericano de Biotecnología Algal (CLABA)**

**25-29 de Octubre de 2015**

**Viña del Mar, Chile**

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## CARBON DIOXIDE BIOFIXATION AND LIPID ACCUMULATION BY THREE GREEN MICROALGAE SPECIES AT DIFFERENT CO<sub>2</sub> CONCENTRATIONS.

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The increasing of CO<sub>2</sub> in the atmosphere is considered one of the main causes of the global warming effect. Since most microalgae are photosynthetic microorganisms, they can contribute to the mitigation of CO<sub>2</sub> together with the production of valuable biomass useful for e.g. biodiesel production. In this study, *Scenedesmus obliquus*, *Chlorella vulgaris* and *Chlorella protothecoides*, were cultivated with bubbling air (0.035% CO<sub>2</sub>) and air enriched with 5% and 10% v/v CO<sub>2</sub>. For *S. obliquus* 2.5%, 7.5% and 15% v/v CO<sub>2</sub> were also tested. Growth kinetic parameters, productivities, theoretical CO<sub>2</sub> biofixation, lipid content and fatty acid profile were evaluated. In general, adding CO<sub>2</sub> resulted in improved growth rates, biomass and lipid productivities. *S. obliquus* showed great tolerance to high CO<sub>2</sub> levels (up to 15%) and presented higher growth rate, productivities and lipid accumulation than the *Chlorella* strains, except for *C. protothecoides* at 10% CO<sub>2</sub>. In fact, the highest value of maximum dry weight was observed for *C. protothecoides* (10% CO<sub>2</sub>) -5.79 gL<sup>-1</sup>- concomitant with the best result in maximum productivity: 1.05 gL<sup>-1</sup>d<sup>-1</sup> and CO<sub>2</sub> biofixation rate: 1.98 gL<sup>-1</sup>d<sup>-1</sup>. *S. obliquus* attained the best maximum specific growth rate ( $\mu_{max}$ ): 0.99 d<sup>-1</sup> (7.5% CO<sub>2</sub>) and the best average productivity: 0.36 gL<sup>-1</sup>d<sup>-1</sup> (10% CO<sub>2</sub>). Regarding lipid content, *S. obliquus* showed the highest results namely for the 2.5 and 15% CO<sub>2</sub> enriched-air, with 26.4 and 25.3% w/w, respectively. The main fatty acid composition of the three examined microalgae were within C16–C18 among the different tested CO<sub>2</sub> levels. The present results suggested *C. protothecoides* as a good candidate to mitigate CO<sub>2</sub>, only *S. obliquus* revealed a high lipid accumulation and an adequate profile composition for biodiesel production according to EN14214.