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*Enhancing Algae Biofuels: The Effects of Nitrogen Limitation and CO₂ Infusion on the Oil Yields of *Nannochloropsis oculata**

Despite gaining attention as a prospective oil source for biodiesel, due to its potential to meet modern energy needs without dependence on fossil fuels or arable land, algae's oil yields still must be optimized for algae biofuels to become widely feasible. Therefore, this study evaluates nitrogen limitation and carbon dioxide infusion as possible factors to increase biomass and cellular lipid content, and thus oil yields, of the microalgae *Nannochloropsis oculata*. It was hypothesized that carbon dioxide infusion would increase both biomass and cellular lipid content, yielding the most oil, while nitrogen limitation would decrease biomass but increase cellular lipid content, resulting in next highest oil yields, with control cultures yielding least overall lipids. Gravimetric and fluorometric analyses were employed for lipid and biomass quantification. *N. oculata* was cultivated in a homemade photo bioreactor under carbon-dioxide-infused, nitrogen-limited, and control conditions. For gravimetric biomass evaluation, cells were collected with centrifugation and filtering, and dried in an oven. For gravimetric lipid evaluation, lipids were solvent-extracted from dry weight with methanol/chloroform and hexane/isopropanol, and dried on a hot plate. For fluorometric lipid evaluation, samples were stained with Nile Red dye and analyzed through spectrofluorometry. As hypothesized, nitrogen-limited cultures showed less biomass and more lipid content than control; however, carbon-dioxide-infused cultures died due to acidity in growth media. Results indicate that carbon dioxide infusion cannot augment algae oil yields without precise pH regulation (though further research is pending), but that nitrogen limitation does in fact hold this potential to increase the viability of algae biofuels.