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## Study heterotrophic growth of *Chlorella* sp under different carbon-to-nitrogen and carbon-to-phosphorous ratios

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Microalgae have caused interest in recent years because of their particular way of accumulating lipids. These microorganisms can be cultivated in autotrophic, mixotrophic, and/or heterotrophic way. Heterotrophic cultures decrease growth time, increase biomass concentration, and total lipid yields. Appropriate composition of the culture medium will favor the growth of the cells, for this reason commercial culture media have been modified to establish the effect of increasing or decreasing the concentration of some nutrients when producing biomass and lipids. However, to achieve good lipid yields, it is necessary to ensure a high concentration of biomass at an initial stage of cultivation. Lipids, being primary metabolites, can be induced by subjecting the microalgae to stress conditions depending on both the species and the abiotic factors. This work evaluated the heterotrophic growth of the native microalga *Chlorella* sp using glucose as carbon source and varying relations carbon/nitrogen and carbon/phosphorus to favor the production of biomass. In addition, the change of fatty acid composition changes with biomass production. Maximum biomass obtained was 9.25 g/L and 8.67 g/L for C/N of 25:1 and C/P of 200:1 during 7 days of cultivation, their productivities were 0.93 g/L\*d and 0.99 g/L\*d. Total fatty acid production was favored with C/N 50:1 and C/P 400:1 reaching 25.7% and 22% of total fatty acids in dry biomass, also higher fatty acid productivities in biomass of 41.16 mg/L\*d and 24.32mg/L\*d with C/N 10:1 and C/P 200:1. Low C/N and C/P ratios stimulated biomass production, biomass lipid productivity, and decreased total fatty acid production. High C/N and C/P ratios improved the production of total fatty acids. In this way, the maximum production of biomass must be reached for further achieving the stage of nutritional exhaustion due to the deficiency of N and P in the culture medium. This causes the elongation of polyunsaturated fatty acid chains.

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