The Optimization of Macronutrient For Hydrogen Production by *Chlamydomonas reinhardtti* in Sulfur-Deprived Circumstance

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Abstract

The photobiological hydrogen production by *Chlamydomonas reinhardtti* during deprivation of sulfur has been investigated. Under sulfur deprivation, the photosystem II (PS II) activity in chloroplast is inhibited and subsequently the activity of photosynthetic H_2O oxidation and O_2 evolution decreases. However, such a nutrient stress does not affect the rate of mitochondrial respiration. When the level of O_2 evolved by photosynthesis decreases to that of O_2 assimilated by respiration, a sealed culture quickly becomes anaerobic in the light and the cells induce a reversible hydrogenase.[1)] It is known that in vitro hydrogenase activity under sulfur deprivation is two times higher than anaerobic adaptation.[2)] The objective of this research is to search the fundamental mechanisms of H_2 production by *C. reinhardtti* under sulfur deprivation. The optimization of several factors for H_2 production such as strain type, nutrient composition, temperature, pH, and light intensity is required to maximize the amount of H_2. This experiment focuses on the effect of the macronutrient such as sulfur, phosphorus, and nitrogen in the TAP medium on the growth of microalgae and the H_2 production to evaluate optimum S/N/P ratio of the medium.

References

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