

### Enhancement of astaxanthin synthesis in *Haematococcus pluvialis* using strong photoautotrophic induction

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Astaxanthin (3,3'-dihydroxy- $\beta,\beta$ -carotene-4,4'-dione) is a red keto-carotenoid that has a higher antioxidant activity and a more polar configuration than other carotenoids. The green microalga *Haematococcus pluvialis* is one of the best microbial sources of astaxanthin, which is accumulated during induction of green vegetative cells to red cyst cells under unfavorable environments. In this study, photoautotrophic induction was substituted for heterotrophic induction using acetate, both to prevent contamination by heterotrophs due to addition of organic carbon and to enhance carbon assimilation in the induced cells. Strong photoautotrophic induction was performed by N-deprivation of photoautotrophically grown *Haematococcus* cells followed by supplementation with bicarbonate or CO<sub>2</sub>. Bicarbonate-induced cells contained more astaxanthin than acetate-induced cells, and even further enhancement of astaxanthin accumulation was achieved by continuous CO<sub>2</sub> supply. It was also investigated that optimum carbon concentration and light intensity on cell density during photoautotrophic induction.