

## Mixotrophic Fed-batch Culture of Green Microalga

### *Haematococcus pluvialis*

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The green alga *Haematococcus pluvialis* is capable of accumulating a superior amount of astaxanthin ((3S-3'S)-dihydroxy-b, b-carotene-4,4'-dione) compared to other sources. However, the mass production of *Haematococcus pluvialis* is hindered by the slow growth of this organism. While the astaxanthin content determines the product quality, the algal growth rate is closely related its productivity. Despite extensive research on the physiology and conditions of astaxanthin induction, research for enhancing the productivity of this alga has been relatively rare. Several studies have recently been conducted to increase the growth rate of *H. pluvialis*, and have reported that this alga can grow mixotrophically as well as photoautotrophically, and that for the mixotrophic culture, acetate has been shown as a good organic carbon source. Although the heterotrophic culture of this alga is also possible, its growth rate was too slow for its culture to be applied to commercial production, and astaxanthin was negligibly synthesized under the dark condition<sup>1)</sup>. Therefore, the best way to promote the growth might be under mixotrophic conditions, with acetate-supplemented medium. This work was aimed at evaluating the combined effects of light intensity and acetate concentration on the cell growth rate under different culture conditions. In addition, a system<sup>2)</sup> to accurately measure the photosynthetic activity of mixotrophic culture was used to monitor the light dependence according to the change of cell stage. Based on information from above studies, acetate was supplied in a fed-batch mode, resulting in enhanced growth rate and improved cell density.

### References

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2. Y.-S. Yun, J.M. Park, Attenuation of monochromatic and polychromatic lights in *Chlorella vulgaris* suspensions(2001), Appl. Microbiol. Biotechnol., 55, 756-770.