

Astaxanthin production in primarily treated wastewater by *Haematococcus pluvialis*

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Microalgae systems are able to efficiently eliminate nitrogen and phosphorous compounds responsible for eutrophication. Microalgal culture system for bioremoval shows several advantages, such as utilization of cheap and abundant sources (light and CO₂), production of biomass for animal feed, and production of valuable bioactive substances. A green microalga *Haematococcus pluvialis* produces a keto-carotenoid astaxanthin with a high antioxidant activity during induction of green vegetative cells to red cyst cells. In this study, the *H. pluvialis* NIES-144 was cultivated photoautotrophically on primarily treated sewage (PTS) and piggery wastewater (PTP) under synchronized illumination, followed by strong photoautotrophic induction for astaxanthin production. The *Haematococcus* cells grew well in PTS and 4 times diluted PTP, resulted in removal of ammonium, nitrate, and phosphate. Astaxanthin concentration in the induced cells was 40 and 84 mg/l, respectively. Fed-batch operation of *H. pluvialis* using undiluted PTS has been established for high cell density culture.