

Novel strategy for Outdoor cultivation of *Haematococcus pluvialis* in Photobioreactor using flue gas

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The microalgae have a photosynthetic apparatus that can conduct photosynthesis produce various by-products by metabolic pathway and expect reduction of Carbon dioxide concentration. Therefore, the studies about CCU(Carbon Capture and Utilization) for reducing Carbon dioxide by microalgae and increasing the production of useful by-products have been actively conducted. Among microalgae species, *Haematococcus pluvialis* is a microalgae species that produces High-Value products called Astaxanthin. In this research, a polymer film type photobioreactor was used to cultivate *H. pluvialis* in indoor and outdoor conditions and to increase productivity at the limit of small scale. The cultivation condition was 20~25°C, with the light intensity of 0~300 $\mu\text{mol photon/m}^2\text{s}$ and 25L polymer film type photobioreactor was used. At these conditions, *H. pluvialis* accumulated 130 mg/L of Astaxanthin in 76 days and this result shows us that 25L polymer film type photobioreactor is better than small scale indoor condition and we can expect to be able to apply industrial photobioreactor to the cultivation of *Haematococcus pluvialis*.