

CO₂ Reduction from Exhaust Gas of Thermal Power Plants by microalgae

Hyun-Shik Yun*, Min-Kyu Ji*, Sang-Hyun Park*, Young-Tae Park*, Seong-Joo Yoon*,
Je Seong Yeol**, Jaeyoung Choi*

*Korea Institute of Science Technology, Gangneung Institute
**KOSPEP Yeongdong Thermal Power

The main objective of the present research work was to determine in field feasibility of microalgae for sequestering CO₂ from flue gas. It also aimed to study the effect of CO₂ concentration induced by flue gas on fatty acid production as a biodiesel feedstock. Microalgae (*Nephroselmis* sp., *Micractinium reisseri*, and *Autodesmus obliquus*) was isolated from water of acid mine drainage (AMD) site at South Korea. The batch experiments were conducted using 160 mL aluminum crimp-sealed serum bottles containing 100 mL sterilized BBM, inoculated with 2% ($V_{\text{inoculum}}/V_{\text{BBM}}$) and supplemented with air, 14% synthesis and 14.1% flue gas CO₂. The typical composition of the flue gas was CO₂, 14.1%; CO, 300 ppm; NO_x, 207 ppm; and SO_x, 53 ppm. Total inorganic carbon (TIC) concentration was determined using a Shimadzu TOC-V_{CPH} analyzer (Tokyo, Japan). Highest TIC was removed (96%) for *Autodesmus obliquus* with optimal algal growth rate compared to *Nephroselmis* sp., *Micractinium reisseri*. Utilization of *A. obliquus* for the CO₂ reduction with simultaneous production of biofuel feedstock can be a cost-effective and environmentally sustainable strategy.

- ※ Keyword: CO₂ reduction, Flue gas, Microalgae, Biomass
- ※ Funding Institution & Project title: KIST, Development of Eco-Green technology based microalgae; KOSPEP, Microalgae cultivation for carbon dioxide reduction in the exhaust gas of thermal power plants
- ※ Oral Presentation Poster Presentation