

## II

**Research Title:** Enhanced lipid production of *Botryococcus braunii* KMITL2 and *Scenedesmus dimorphus* KMITL by using carbon dioxide in algal cultivation for biodiesel production

**Researcher:** Assoc. Prof. Dr. Suneerat Ruangsomboon

**Faculty:** Faculty of Agricultural Technology **Department:** Department of Fisheries Science

### ABSTRACT

The effect of 1-20% CO<sub>2</sub> on *B. braunii* KMITL2 and *S. dimorphus* KMITL were studied. The results showed that the highest specific growth rate of *B. braunii* ( $0.30 \pm 0.14$  /d) was showed in cultivation with 5% CO<sub>2</sub>. The maximum biomass of  $1.48 \pm 0.03$  g/l was showed in 10% CO<sub>2</sub>. The maximum carbohydrate of  $25.2 \pm 6.8$  % was showed in 15% CO<sub>2</sub>. The maximum lipid content, protein, lipid yield and lipid productivity were  $57.41 \pm 3.59\%$ ,  $94.7 \pm 4.9$  %,  $0.40 \pm 0.02$  g/l and  $72.66 \pm 2.56$  mg/l/d, respectively. The highest carbon content of 46.5% was showed in 5% CO<sub>2</sub>.

The highest specific growth rate ( $0.31 \pm 0.06$  /d), biomass ( $0.89 \pm 0.04$  g/l), lipid yield ( $0.34 \pm 0.02$  g/l) and lipid productivity ( $90.57 \pm 16.99$  mg/l/d) of *S. dimorphus* were showed in cultivation with 20% CO<sub>2</sub>. The highest lipid content of  $45.52 \pm 0.92$  % was showed in 5% CO<sub>2</sub>. The maximum carbohydrate of  $23.0 \pm 3.5$  % was showed in 15% CO<sub>2</sub>. The maximum protein of  $88.8 \pm 8.2$  % was showed in 1% CO<sub>2</sub>. The highest carbon content of 33.62 % was showed in 10% CO<sub>2</sub>.

Green microalga, *S. dimorphus* display higher resistance to CO<sub>2</sub>, and grow well under high CO<sub>2</sub> concentration. Thus the results of this study indicated that *S. dimorphus* was suitable for use as the living biosorbent for accumulation of industrial flue gas.

**Key words:** carbondioxide, *Botryococcus braunii*, *Scenedesmus dimorphus*, lipid, fatty acid, biodiesel