

## **Abstract**

The feasibility of using various culture systems incorporating heterotrophic metabolism for biodiesel oil production was compared. Heterotrophic culture can be used to achieve high cell concentration, and depending on the strain and organic carbon source employed, the introduction of light (mixotrophic culture) can enhance cell growth and oil accumulation. However, mixotrophic cultures also face the problem of light limitation and, depending on the relative concentrations of the organic carbon source and light intensity, the interaction between the heterotrophic and photoautotrophic metabolic activities can have negative effects on cell growth and oil accumulation. Systems that separate the two metabolic activities in time or space, such as cyclic photoautotrophic-heterotrophic cultures, sequential heterotrophic-photoautotrophic cultures, and sequential photoautotrophic-mixotrophic cultures can all be used to improve oil productivity. However, the effectiveness of each system depends on the strain of microalgae and other culture conditions.

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