

Converting Flue Gas CO₂ to Microalgal Biomass for Biofuels and Bio-based Chemicals

Production

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The future resources for food, fuels, and chemicals will potentially come from ocean. One of the major marine resources is microalgae, which have the ability to fix carbon dioxide at a much faster rate than that of terrestrial plants. The fixed carbon dioxide is converted to microalgal biomass, which has potential applications in producing biofuels, animal feed, health food, pharmaceuticals, and other high-value products. Therefore, using microalgae to mitigate CO₂ emissions is a promising strategy for CO₂ storage and re-utilization. We have identified various indigenous microalgae strains that utilize flue gas of a steel-making factory for growth with excellent CO₂ biofixation ability. We are able to adjust the composition of resulting microalgal biomass (lipid, carbohydrates, proteins, pigments, etc.) by using different cultivation strategies to meet the needs of downstream applications. To make the concept of microalgae industry a reality, new technologies and engineering approaches should be developed; for instance, outdoor large-scale cultivation, biomass harvesting, product conversion technology, and so on. Some key technologies required for realizing commercialization of microalgae-based CO₂ emission mitigation and biorefinery are introduced in this presentation.

Keywords: Microalgae; mitigation of CO₂ emissions; lipid; carbohydrate, protein; biofuels; flue gas; biorefinery



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