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Bio-electrochemically formed *Geobacter sulfurreducens* gas metabolites as phototroph feedstocks

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The finite nature of fossil fuels presents an unsustainable long-term model for energy sourcing compounded by climate change. Sustainable, alternative methods for producing energy-rich fuel are needed. Deriving biodiesel from algae is one option. However, the low concentration of carbon dioxide in air (0.04%) poses a challenge for maximizing the anabolic potential of algae. Strategically sourcing cheap CO2 to reduce input costs could give momentum to the nascent algal bio-product industry. Developments in bio-electrochemically catalyzed anaerobic digestion technology have enabled accelerated gaseous metabolite production from waste. Utilizing biogas for its high carbon dioxide content (up to 40%) can facilitate growth of algae, while cutting operational costs. This study evaluated whether algae can be grown on gas metabolites bio-electrochemically [BEC] generated by pure culture *Geobacter sulfurreducens*. We examined the effect of [BEC] biogas on the growth rate of Chlorella sp. grown for 21 days with 12:12 daily light dark cycles in BG-11 media. Growth rate on BEC-derived biogas was significantly greater than on air alone and comparable to growth of Chlorella sp. on 5% carbon dioxide. These results support further exploration into the use of bio-electrochemically formed gas metabolites for cultivation of phototrophs.

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