

Optimizing Cultivation Strategies and Photobioreactor Design for Enhanced Photofermentative Hydrogen Production by Rhodobacter Sphaeroides

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Abstract:

The project focuses on enhancing Photo fermentative hydrogen production from Rhodobacter sphaeroides using a designed photobioreactor to improve hydrogen yield. By selecting optimal bacterial strains and methodologies for growth and production, the aim is to promote clean energy solutions. This multifaceted approach includes optimizing growth conditions, improving hydrogen output, and assessing lab-scale feasibility. Sustainability assessments and life cycle analyses will evaluate the environmental and economic viability, while comprehensive safety protocols will guarantee the responsible handling of both the bacteria and hydrogen. The primary objective remains the advancement of renewable energy production utilizing Rhodobacter sphaeroides. This purple, non-sulfur bacterium has shown significant promise in the realm of biohydrogen production, leveraging its unique metabolic pathways. By harnessing its capabilities, we aim to not only pioneer technological innovations but also navigate the economic challenges associated with commercialization. Our approach focuses on creating scalable solutions that can effectively contribute to a sustainable future, ensuring that the benefits of this research translate into practical and viable applications in the energy sector.