**Biohydrogen Production from Food Industry Wastewater: Economies of Scale Study**

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**Abstract.** The use of fossil fuels is responsible for approximately 70% of global greenhouse gas emissions. Hydrogen has been discovered to be a clean and environmentally friendly source, and it is gaining attention as replacement for fossil fuels.

Biohydrogen production via dark fermentation is one of the interesting approaches employing biomass as a feedstock. In this study, wastewater from the food industry was used as a substrate assisted by treated sludge to enhance the production of biohydrogen energy. The laboratory-scale experiment proved effective in producing biohydrogen from wastewater.

However, the process's viability is still being questioned. Therefore, the aim of this paper is to evaluate the economic performance of this process based on the plant capacity of this process. The conceptual process model was simulated using SuperPro Designer V9.0 to estimate the capital cost and utility requirement for the overall process. Economies of scale methods were used to evaluate the feasibility of this process. From the results, an ROI value of 10% as expressed by the optimum plant capacity of 3.5x104 L/batch is considered viable for economic performance in biohydrogen production from food industry wastewater.

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