

Algae Biofuel: Opportunities and Challenges

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Abstract

The world's biofuel demand is rising from day to day due to the urgency to tackle fuel crisis, greenhouse gases (GHG) emissions and climatic changes in the near future. This alternative energy will minimize the dependency on fossil fuels while guarantees a continuous energy supply and upholds the ecosystem sustainability. As a developing countries are still finding a suitable green energy source to support the national daily energy consumption without affecting the political stability and socio-economic background. The realistic effort made by applying microalgal biotechnology for biofuel production and concurrently mitigating CO₂ and other flue gases in the presence of tertiary wastewater. Microalgae produce high amount of biomass feedstock in a short time with less amount of land capacity by using wastewater as the medium to grow. A developing country such as Malaysia and Thailand are producing variable wastes from both agro-industrial and industrial sectors that can be recycled as a nutrient supply for microalgae.

Algae are very photosensitive and well known for their changes of direction in different light conditions. The light energy is detected by apex of the cell. Algae needs light energy to manufacture food and increase the cell density of itself. The highest dry cell weight resulted using the highest light intensity as well, the strength of light energy is believed to influence the growth of microalgae, chlorophyll a, microalgal biomass and its lipid content for biofuel production purposes. Wastewater that is available in Malaysia and Thailand comprises high nutrient value compounds that have high amount of nitrogen and phosphorus. The current trend in Malaysia and Thailand in the biofuel industry as well as the application of microalgae as a superlative feedstock to replace conventional methods and boost future biofuel industries. This is the opportunities and challenges of Malaysia in cultivating microalgae with stronger technical feasibility and higher turnout in the economy by using the high rate algal pond (HRAP). Apart from that, an interesting route in the process of converting waste from a number of different sources in biofuel production by using microalgae as the intermediate tool is proposed.