Conversion of Algae Extract into Bio-Fuel

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Abstract The global carbon dioxide emission due solely to the combustion of fossil fuels reached thirty-six billion tons, an increase of sixty-one percent since the 1990s. Therefore, in order to reduce human contribution to the CO2 emission rate, our best approach is to convert to carbon neutral energy generation and utilization systems. Such systems require thoughtful and strategic planning in order to balance energy manufacturing and consumption. This research explored a possible method for extracting lipid components from Chlorella algae using the solvent, isopropyl alcohol. The research was divided into two main phases: the manufacturing phase and the testing phase. The algae bio-fuel was manufactured through a solvent-mediated lipid extraction process. Algae extract and alcohol were then mixed and tested using a calorimetry lamp device to determine the optimal caloric output ratio. The optimal algae extract to alcohol ratio was found to be 0.5:9.5 grams. This ratio maximized the miscibility and the caloric output of the bio-fuel. Observations evidenced that higher algae extract ratios lowered the caloric output, and created difficulties for combustion. This research project presents the possibility of using alcoholic extracts from algae as a component to an effective bio-fuel. Future research will be dedicated to substituting cleaner solvents such as Ethanol, which can be synthesized from corn, refining the procedure in order to optimize yield, and exploring methods for carbon neutral manufacturing of Ethanol.

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