The Effect of the Algal Harvesting Method on the Amount of Algal Mass Recovered for Economically Feasible Biofuel Production

Loop, McKenna

Loop, Kaitlyn

With depleting fossil fuels, a new source of energy has to be found. Algae, nature's oldest, fastest growing plant, is a viable solution. The purpose of this project was to determine which harvesting method affected the economic feasibility of algae biofuel production Total algal yield, time, and cost of filtration, dissolved air flotation, centrifuging, and flocculation were experimented with to find a solution. The total cost is currently $7.50 per gallon of algae oil, with harvesting and growth being the most expensive steps in the process $1.30 and $1.50. The cheapest method with the highest algal yield was flocculation with Iron (II) Sulfate and the air pump utilizing dissolved air flotation. This method yielded an average of 58.4% algae recovery and the lowest cost of $5.11 per gallon for harvesting. This method increased the total yield and cut the cost of growth step and harvesting step by 42% based on the current centrifuge method. The growth step cost was reduced based on the yield of the Iron (II) sulfate and air pump, making the amount of algae required at growth less. While the cost of the centrifuge in the data collected is $14.28, much higher than the original $1.90, it can be concluded that the Iron (II) sulfate with the air pump will reduce the growth cost by 42% based on the ratio of the cost of centrifuging and Iron (II) sulfate with the air pump, calculated in the project. However, more research can be done on the type of flocculent used, specifically electrodes and the chemicals used in the anode and cathode. The project adds to the research on decreasing the total cost of the algae biofuel, and has paved the way to improve the cost to an even greater extent making algae biofuels competitive with fossil fuels.

Awards Won: