Esterification of *Chlorella Sorokiniana* to biodiesel

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Introduction

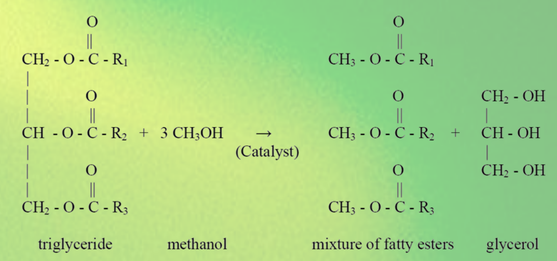
- Fossil fuels are a major contributor to the excess of carbon dioxide in the atmosphere, which is a significant contributor to global climate change.
- Finding alternatives to fossil fuels is essential. One such alternative is algae-based biodiesel. Algae contain lipids, which can be extracted and used as a resource for biodiesel production through a process called esterification with methanol.

- In this project, we investigated the growth of *Chlorella Sorokiniana* and the synthesis of the algae into biodiesel as a potential solution to the problem of fossil fuel dependence and excess carbon dioxide emissions.

Materials and methods

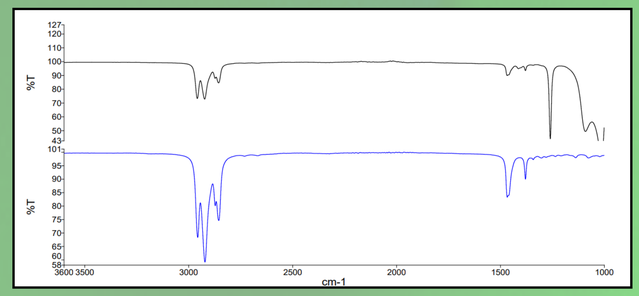
- In order to determine the growth of the algae, we employed two methods: a cell count using a Bürker counting chamber and a photometric determination

- To convert the algae oil into biodiesel, we conducted an esterification reaction using methanol and potassium hydroxide as a catalyst. The outcome of the esterification was analyzed using infrared spectroscopy."



Results and discussion

- Clear increase in the number of cells over time. Over a period of 1 week, the number of cells per ml increased on average by a factor of 1.75.



- A typical spectrum of heptane (blue) was observed, compared to the spectrum of the obtained end product (black).

Conclusion

- Despite the rapid growth of the algae, only a small volume of the biomass was produced.
- The resulting liquid displayed morphological characteristics similar to those of bio-diesel, but infrared spectroscopy could not detect the presence of oil.
- It is possible that a more favorable outcome could have been achieved with a longer cultivation period.
- The findings of this study indicate that there is still significant potential for further investigation in this area.

Promotor research: Laurent Jacoby