Synopsis — Research on Fuel Production from Algae

Title: Production of Biofuel from Algae

Hypothesis

If algae is cultivated and its oil content is extracted and converted into biodiesel, then it can serve as an eco-friendly alternative to fossil fuels, reducing pollution and dependency on non-renewable energy sources.

Procedure

1. **Collection & Cultivation:** Collect algae samples from a pond or prepare algae culture in nutrient-rich water under sunlight.
2. **Harvesting:** Allow algae to grow until a thick biomass forms, then filter or centrifuge to separate algae from water.
3. **Drying:** Spread the algae biomass to dry completely.

4. **Oil Extraction:** Use a simple pressing method (or solvents like ethanol, if available) to extract oil from the dried algae.
5. **Conversion to Biodiesel:** Mix the algae oil with alcohol (methanol/ethanol) and a catalyst (like NaOH/KOH) to produce biodiesel through *transesterification*.
6. **Testing:** Burn the produced fuel in a small lamp or burner to compare flame quality and smoke emission with normal fuel.

Risk and Safety

- Wear gloves and goggles while handling chemicals like alcohol or catalysts.
- Conduct experiments in a ventilated area or under teacher supervision.
- Avoid direct contact with algae samples from polluted water (may contain harmful microbes).
- Dispose of chemical waste properly after the experiment.

Data Analysis

- Record the quantity of algae biomass collected and dried.
- Note the amount of oil extracted from the biomass.
- Measure the amount of biodiesel produced from the oil.
- Compare fuel efficiency by observing flame brightness, smoke, and duration compared to kerosene or diesel.
- Represent findings in bar charts (e.g., biomass vs. oil yield, biodiesel vs. burning time).

Conclusion

The research is expected to prove that algae can produce significant quantities of oil, which can be converted into biodiesel. This renewable energy source is eco-friendly and can help reduce pollution and dependence on fossil fuels in the future.

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Bibliography

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