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Algae and Biofuel

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The intensification of greenhouse effect due to fossil fuel combustion has prompted scientists to research on the feasibility of switching to alternative energy sources, one of which is algal biofuel, which might help mitigate the adverse impacts due to the excessive use of fossil fuels.

Chlorella pyrenoidosa and *Spirulina platensis* have been selected as research objects as they are easily accessible and cheap. Moreover, culturing algae requires minimal land, a characteristic which makes the extraction of algal biofuel an ideal solution to Hong Kong's growing fuel consumption and deficient land resources.

Various conditions for optimal algal growth were investigated. Optical densities of algal samples were measured with a colorimeter. A higher optical density would mean a higher algal growth rate. 200 mL Kuhl solution was introduced into two conical flasks, each with a different Fe^{2+} concentration (0.07 g or 0.21 g). It was discovered that *Chlorella pyrenoidosa* would generally grow better than *Spirulina platensis*. Moreover, a higher iron(II) ion concentration favoured algal growth. To investigate the effect of light intensity on algao growth, table lamps were placed at different distances (20 cm, 35 cm and 50 cm) in different set-ups, using Basal medium and Kuhl solution as culture media. A stronger light intensity would facilitate the growth of algae. Algae would grow faster in Kuhl solution than in Basal medium. Algal cultures were placed in water baths of 21°C, 27°C and 37°C and it was found that algae generally demonstrated a higher growth rate at 37°C.

Oil contents from sunflower seed, orange peel and coffee powder were compared using methyl acetate, ethanol and hexane as extraction solvents. Hexane was found to be a better solvent since more oil could be extracted than using other solvents. Sunflower seed and peanut also showed higher oil yield. *Spirulina platensis*, peanut and sunflower seed were used to test for their lipid contents, using hexane as solvent. *Spirulina platensis* had similar lipid content as sunflower seed, a common material for oil production.