Enhanced lipid production by homogeniser approach from microalgae Chlorella vulgaris in biodiesel production

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Enhanced lipid production by homogeniser approach from microalgae *Chlorella vulgaris* in biodiesel production

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Abstract: The Earth's temperature is surging, and oligotrophication is already becoming visible. Algae use carbon and nutrients to form important biomolecules such as lipids in this challenging environment. Microalgae is a sustainable and renewable biomass with a high percentage of lipids, that can be used to produce third generation microalgae-based biofuels, and this is regarded as the potential alternative biofuel, replacing non-renewable fossil fuels. Cell disruption is a significant pre-treatment for the effective lipid recovery from microalgae before they are processed in biofuel production, but increased energy requirements are viewed as a concern for low-valued biodiesel. However, the relationship among lipid generation and environmental change remains unexplored. Therefore, this study investigated lipid extraction from microalgae *Chlorella vulgaris* using high speed homogeniser technique for pre-treatment along with deep eutectic solvents like methanol and hexane for extraction. The results found that, enhanced lipid yield of 18.65% was obtained from *Chlorella vulgaris* and this study tried to suggest that the cell wall was disrupted, allowing the solvents for diffusion and extraction of lipids. Gas chromatography analysis found the major components of the characterization of biodiesel, and this could be used as a feedstock in producing biodiesel.

Keywords: Renewable energy; Pre-treatment; high speed homogeniser; Lipid; Biodiesel; Temperature increase.