

ABSTRACT

Extraction of natural dye from plants like flower and leave has a great deal of potential to replace fossil fuels such as petroleum as the most affordable renewable energy source. They differ from fossil fuels primarily in their variety, quantity, and possibility for usage anywhere on Earth, but most importantly in that they do not emit any greenhouse gases that contribute to climate change or other harmful emissions. The desire for cleaner, more sustainable, and renewable energy is being driven by rising energy consumption and increasing awareness of environmental issues. The IEA predicts that by 2040, global electricity demand would have grown by 70%, accounting for 24% of energy demand. In this study, extraction of natural dye undergo photodegradation were prepared using hibiscus dye extracted from *Hibiscus rosa-sinensis* flowers. One type of metal oxide, which is calcium oxide, was used for as a catalyst for the solution. The main purpose to analyze the future usage of organic dyes as a source of renewable energy and to investigate the chemical and physical characteristics of dye extraction. So, after three weeks of exposure to the sunlight, the natural dye solution colours began to degrade. The colour of solution change from darker to lighter. Additionally, the functional group by FTIR of the hibiscus are also reported.

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CHAPTER ONE

BACKGROUND

1.1 Introduction



The hunt for cleaner, sustainable, and renewable energy is fuelled by rising energy needs and a heightened awareness of environmental problems. Solar energy has a great potential to become the next energy source to compete with fossil fuels because it is the most plentiful clean source of electricity. To be practical, this procedure must have a low cost, a long lifespan, and a respectable efficiency. Most of the the world's population—roughly 6 billion people—live in nations that are net importers of fossil fuels, making them susceptible to geopolitical shocks and crises. These nations account for nearly 80% of the world's population. In contrast, renewable energy sources are accessible worldwide and have not yet reached their full potential. By 2050, according to the International Renewable Energy Agency (IRENA), 90 percent of the world's electricity can and ought to come from renewable sources. (Nations, 2020)

With the help of renewable energy sources, nations may diversify their economies, shield themselves from the erratic price fluctuations of fossil fuels, and promote inclusive economic growth, job creation, and the reduction of poverty. Anthocyanins are natural dyes that give rise to a variety of colours, and different plants have distinct sensitising properties. Research teams from all around the world

have made numerous attempts to use natural dyes derived from various plant components as sensitizers for solar cells. High amounts of anthocyanins found in the red flowers of *Hibiscus rosa-sinensis* could be used as organic solar cell dyes. (Wong 2009)

So photodegradation is a process needed when the solution expose to the sunlight. The degradation of materials caused by light is known as photodegradation. The term is frequently used in an unclear manner to describe the combined effects of sunshine and air, which result in oxidation and hydrolysis. Since photodegradation destroys artwork and other artefacts, it is frequently avoided on purpose. However, it has a purposeful role in some disinfection systems and contributes to the remineralization of biomass. Photodegradation includes degeneration in all UV light wavebands but excludes ageing or degradation caused by infrared light or heat.