REVIEW ON THE SYNERGISTIC EFFECT OF BIOFUEL PRODUCTION FROM BIOMASS AND PLASTIC

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ABSTRACT

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Conventional fuels like oil and coal release greenhouse gases and cause other problems to the environment. So, there is a need to find a replacement to make things better. Biofuel could be used as an alternative fuel to meet the need for energy as it can reduce greenhouse gas emissions, provide fuel, and ensure a steady supply of energy. Biofuel derived from biomass and plastic have the potential to replace a portion of the need for fossil fuels. Aside from helping to resolve environmental problems, biofuels derived from biomass and plastic also have high availability and low cost in production. Oil palm biomass and algae biomass has been seen to be good biomass source as biofuel feedstock as it is the most-grown type of plant, have more lipids per cell, more lipids per area, and have the potential to be grown on a large scale than other terrestrial and marine biomass species. Then, plastics such as polyethylene terephthalate (PET), polyvinyl chloride (PVC), polypropylene (PP), polystyrene (PS), low-density polyethylene (LDPE), and high-density polyethylene (HDPE) can be used to make biofuel as it has properties like the calorific value that are almost the same as petroleum fuel. Besides, to increase the quality of oil yield and improve the properties of bio-oil yield, the combination of biomasses and plastics is needed to create a synergistic effect. This present study attempts to review on the potential of biomass and plastic as biofuel. Besides, this study compares the synergistic effect between mixed biomass and biomass, plastic and plastic, and biomass and plastic using the different thermochemical methods to produce biofuel.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

The overuse of fossil fuels and the rising need for energy is getting more attention because of the development of clean, renewable fuels (Dimitriadis & Bezergianni, 2017). Due to its accessibility, affordability, and environmental benefits, biomass has attracted a lot of interest as a renewable energy source over the past 30 years. When biomass is burned to create energy, the CO_2 that is emitted is allowed to grow again through photosynthesis, which can assist to slow down global warming. Biomass is also cheap and easy to get. By 2030, more than 1,200 MW of clean, renewable energy will come from biomass (Ozturk et al., 2017). Malaysia makes at least 168 million tons of biomass waste every year (MPOB, 2019).

Biomass has been shown to be a carbon-neutral fuel for heat and power generation in recent decades (Lee et al., 2022). Various thermochemical processes can convert biomass to gaseous, liquid, and solid products. Waste biomass is an important type of biomass that has a lot of energy potential. Waste biomass is the biomass that is left over after food crops, fodder crops,