A REVIEW ON THE PRODUCTION OF LIQUID FUEL FROM CO-PYROLYSIS OF SOLID WASTES

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Final Year Project Report Submitted in

Partial Fulfilment of the Requirements for the

Degree of Bachelor Of Science (Hons.) Applied Chemistry

Faculty Of Applied Sciences

Universiti Teknologi MARA

AUGUST 2022

ACKNOWLEDGEMENT

Throughout the writing of this dissertation I received a tremendous deal of help and encouragement. My greatest gratitude goes to my supervisor, En. Mohd Fauzi b. Abdullah, despite his duties as a lecturer, had committed all of his focus, time, and devotion to this field of research. I am eternally thankful to him for his great counsel, unwavering support, and patience during my studies. His vast knowledge and great experience have inspired me throughout my academic research and daily life.

Many people, especially my close friends have made valuable comments, suggestions on this thesis which gave me inspiration to improve my writings. I would like to thank them for helping hands, full support and motivation throughout completing this dissertation from the very beginning until very end of the project. Last but not least, I would like to express my gratitude to my family, especially my parents, for their wise counsel, sympathetic ear, love and support. I would also like to thank my sisters, whom without this would have not been possible. Without their tremendous understanding and encouragement in the past few years, it would be impossible for me to complete my study.

Lastly, I want to dedicate the gratitude to myself for being strong and patient throughout this whole roller-coaster ride of emotion and journey in completing this thesis. Through all the mental breakdown and stressful situation, thanks for surviving this journey.

Nur Qistina Sofia Binti Zakaria

ABSTRACT

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Economists predict an increasing energy demand from worldwide over next two decades by means the usage of fossil fuel is at maximum consumption. Remarkably, the over consumption of fossil fuel is associated with environmental problems and reduction of fossil fuel source. Hence, the application of biofuel to recover energy from waste in the form of biofuel has attracted global interest as a means of ensuring environmental and energy security via pyrolysis. Pyrolysis have environmental and socio-economic benefits. The present study focuses on the liquid fuel production through co-pyrolysis of solid-based waste in varying composition and characterization of the liquid products. Waste plastics and waste tyres were selected as primary feedstock due to its wide availability and low cost. One of the purposes of this review is to review the pyrolytic product from composition of solid-based waste, to gives insight into the co-pyrolysis and their reaction process and to look at the synergistic impacts of co-pyrolysis on the quality of liquid fuel. Based on this review, mixtures of palm shell and polystyrene waste were pyrolyzed to obtain a high-grade pyrolytic liquid that could be used as a fuel. An externally heated co-pyrolysis reactor converted solid tyre waste and rice husk into biofuels and chemicals. Co-pyrolysis was also investigated for its potential to transform used frying oil and polyolefin-based plastic waste. Meanwhile, co-fed solid waste with palm shells, used frying oil and rice husk improves compounds of biofuel to satisfy the requirement of conventional fuel.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

In recent years, improved lifestyles, rising energy demands, high fossil energy consumption, and rapid industrial growth have contributed to the advancement of renewable energy sources. Therefore, some research needs to improve existing operations is crucial to achieving a power generation benefit while causing the most negligible impacts of environmental damage. Pyrolysis is the most common thermochemical conversion process, in which chemical properties are changed, and organic molecules are thermally degraded in an oxygen-free environment. Pyrolysis is defined as fast, slow, or flash-based on operating variables such as heating rate, temperature, and residence duration. As a result, product distribution can be regulated (Ong et al., 2019).

Moreover, due to the general advantages of using multiple feedstocks, adjusting settings, achieving higher efficiency, and being ecologically friendly, it is an inexpensive and practical approach to manufacturing biofuels and beneficial