

***Callophyllum Inophyllum* as Biodiesel Feedstock in Malaysia: Potential and Challenges**

V.Sharmini^{1,a)}, Tan Ee Sann^{2,b)}, P.Kumaran^{1,c)}

¹UNITEN R & D Sdn Bhd (URND), Universiti Tenaga Nasional, Jalan IKRAM-UNITEN, 43000 Kajang, Selangor, Malaysia

²College of Engineering, Universiti Tenaga Nasional, Jalan IKRAM-UNITEN, 43000 Kajang, Selangor, Malaysia

^{a)} Corresponding author: vj.sharmini@gmail.com

^{b)}: EeSann@uniten.edu.my

^{c)}: kumaran@uniten.edu.my

Abstract. Higher global energy demand has led to significant concerns regarding energy sustainability, food security, global warming, pollution as well as fossil fuel depletion. Currently, biodiesel appears to be the key to clean energy that can be utilized immediately as biodiesel has potential to replace conventional diesel. Biodiesel has ability to penetrate transportation and energy generation market. However, 95% of world biodiesel production depends on first generation biodiesel feedstock which are edible feedstock such as palm, rapeseed, soybean and sunflower which are costly as well affect the food market equilibrium. In order to overcome issues with first generation edible feedstock, second generation non-edible feedstocks such as *Callophyllum Inophyllum* (CI) are introduced as new biodiesel feedstock. CI has high oil yield, high heating value and it also meets US American Society for Testing and Materials standard (ASTM) D6751 and European standards (EN) EN14214 biodiesel standard. Furthermore, CI has ability to produce high yield in barren land with low cost. Such feedstock can be used in transportation industry as well as energy generation. This study explores the potential and challenges of biodiesel from CI in Malaysia.

INTRODUCTION

Acute increment of global energy demand has led to significant concerns regarding energy sustainability, food security, global warming, pollution as well as fossil fuel depletion. There is critical need to identify viable alternative renewable and clean energy. According to studies, carbon dioxide (CO₂) emission is expected to increase 1.7% for every year till 2030. Globally, 11 billion tons of fossil fuel are used up annually accounting to 82.67% of total energy consumed [1].

Currently, biodiesel appears to be the key to clean energy that can be utilized immediately as it has potential to replace conventional diesel due to its ability to be used widely in the transportation sector because biodiesel can be used in diesel engine without modification whilst being environmentally friendly [2]. Besides, biodiesel has great physiochemical properties that can be explored to be utilized in energy generation sector which is constantly increasing in demand as seen in figure 1. It is certain that biodiesel is beginning to grasp the world economy. In this respect, countries with highest gross domestic product (GDP) per capita like China has already owned more than 2000 biodiesel production factories on the year 2007 and U.S has set target of 36 billion gallons of biofuels to be produced by 2022 [3]. In Malaysia, there are around 16 registered biodiesel companies with production capacity accumulating up to 2,130,000 tones/year[4]. According to statistics 96.63% of energy demand in Malaysia is from fossil fuel that is higher than United States consumption of fossil fuel which is 80%. It is important to note that US is the largest user of biodiesel, with consumption of biodiesel need of fossil fuel will be reduced and this aid in carbon footprint reduction [5].