

UNIVERSITI TEKNOLOGI MARA

**PHYSICAL CHARACTERISTIC
STUDY OF ROOTS (WOOD) AS
FUEL APPLICATION**

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ABSTRACT

The depleting of fossil fuel has increased due to increasing demand of its usage. Forestry biomass is currently seen as the potential source of energy as it is being used to produce biofuel as one of the substitute for fossil fuels. The physical characterization study of forestry biomass is essential in order to identify its efficiency as fossil fuel substitute. This study presents the physical characterization of the chosen forestry biomass, root (woods) as fuel application by undergoing several analyses such as proximate analysis, Thermogravimetric Analysis (TGA), Fourier Transform Infrared (FTIR) analysis and heating value. The proximate analysis results indicated that roots (wood) contains 4.79% moisture, 51.92% volatile matter, 4.72% ash and 38.57% fixed carbon; respectively. The study on the thermogravimetric behaviour of the roots (wood) indicates that the thermal decomposition of biomass sample decomposed at temperature above 250°C. The presence of functional group of aliphatic, aldehyde, aromatic and alkane represented for FTIR analysis. Hence, roots (wood) is potential biomass feedstock as fuel source as energy of proposed study was achieved efficiently.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Fossil fuels have been the main source of energy globally in which more than 81% of the world's primary energy depends on it (Sathre & Gustavsson, 2011). Fossil fuel was among the resources that plays a significant role in this world. However, the production of fossil fuels gave a great impact on the environment globally.

Climate change which has been a global issue is one of the impacts of fossil fuel production. The burning of fossil fuel increases the carbon dioxide level in our atmosphere (Ghani et al., 2013). According to Ghani et al., (2013), the amount of carbon dioxide (CO₂) released to the atmosphere has risen more than 3% per annum since year 2000. This rise in emission of carbon dioxide (CO₂) has driven the search for alternative sources which can replace fossil fuels, renewable and reduced the impact on the environment (Ho et al., 2014).

Alternative sources such as forestry and agricultural wastes were the potential of the most important replacement for fossil fuels in developing countries (Olanders & Steenari, 1995). First generation of feedstock for the production biofuels were food crops such as sugarcane and corn, while the second generation of feedstock includes agricultural, forestry and municipal waste. Production of biofuels has moved towards second generation feedstocks because the feedstocks were abundantly available locally in most countries (Ho et al., 2014).

Referring to Ghani et al., (2013) and Olanders & Steenari, (1995), the research study on the physical characterization of wood and straw by using rubber-wood-sawdust and ashes was conducted which has led us to evaluate the roots(wood) physical characteristics.