

Preliminary study on properties of small diameter wild *Leucaena leucocephala* species as potential biomass energy sources

Abstract

The heavy reliance on non-renewable energy sources from fossil fuel such as petroleum, natural gas and coal has led to the scarcity of these sources and occurrence of global warming. This phenomenon raises the public concerns to diversify the energy sources to sustain energy availability. To address these predicaments, biomass is among the prominent alternative energy sources since it is renewable and possesses minimal harms to the environment. *Leucaena leucocephala*, or locally known as 'Petai Belalang' is one of the potential energy crops. In this study, 3 portions of *Leucaena leucocephala* stem which are bottom, middle and top have been divided and 2 different particle sizes which are 0.5 and 1.5 mm were used to determine their influences on the properties of the samples. Proximate analysis (moisture content, volatile matter, ash content and fixed carbon), physical analysis (specific gravity and bulk density) plus calorific value of *Leucaena leucocephala* were conducted as the parameters to determine the properties of the samples. Among the proximate parameters, portions differ significantly ($p < 0.01$) in moisture content, volatile matter and ash content except for fixed carbon. Whereas, particle sizes shown significant differences ($p < 0.01$) in moisture content, ash content and fixed carbon while differing ($p < 0.05$) in volatile matters. Both independent factors differ significantly ($p < 0.01$) in the physical parameters, including specific gravity and bulk density. The highest calorific value was observed in the bottom portion with particle size 0.5 mm which is 18.56 MJ/kg, whereas calorific values are significantly differing ($p < 0.01$) for both independent factors. In conclusion, *Leucaena leucocephala* species show a good result to be as potential biomass energy sources.