

Calorific value analysis of *azadirachta excelsa* and *endospermum malaccense* as potential solid fuels feedstock

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Abstrak

Thermal conversion of woody biomass to fuel has been intensified in recent decades due to the depletion of fossil fuels, greenhouse effect and high energy demand worldwide. Screening the potential feedstock is being considered as one of the alternatives to identifying the most suitable biomass resources prior to being converted into renewable energy in the form of solid fuels, such as charcoal and briquettes. Generally, high calorific value (CV) indicates high potential of feedstock for briquettes, torrefied wood and coal generation. In this study, CV was characterized using a bomb calorimeter that was based on 3 different ranges of moisture content (MC) that are $\pm 25\%$, $20\% \pm 25\%$ and $\pm 20\%$ for two tropical tree species, namely *Azadirachta excelsa* (Sentang) and *Endospermum malaccense* (Sesenduk), respectively. This standard method for the characterization process was considered to determine the CV. Average CV for both samples ranged between 16 ± 17 MJ/kg. The highest CV was 17.3490 MJ/kg and 17.1273 MJ/kg for Sesenduk and Sentang, respectively and calorific values were obtained at MC less than 20%. The experimental study demonstrated that the decreasing value of MC has increased the CV because of the high value of oxygen-to-carbon (O/C) ratio in the wood; additionally, the energy density of the wood sample was also improved when CV increased. Both of these species were proved to contain the potential of being feedstock as wood fuel resources, since they carry standard CVs, obtain fast growth with suitable conditions in Malaysia and are grown at very low cost of production for plantations, fertilizer, pesticides, labor, transportation and handling.