

The effect of maturity stages on calorific values of Malayan yellow dwarf

ABSTRACT

Coconut plantation has the potential to contribute for biomass energy from its waste such as coconut husks and shells. This research aimed to determine the calorific value of coconut shells and husks at different maturity stages and its relationship with moisture content as the first step in determining their acceptability as alternative fuel sources. A bomb calorimetry procedure was performed to measure gross calorific values (GCV) which was used to indicate the potential of the samples to produce biofuels. It was found that the coconut shell had the highest calorific value of 22.36MJ/kg at maturity stage 4 (eleven to twelve months of age) followed by inner husk at 18.96MJ/kg and outer husk at 17.65MJ/kg. The relationship between the average GCV and maturity stages of the whole samples yielded the regression of $R^2=0.971$. This result shows that the average GCV increased as the maturity stages increased. While the mean calorific value obtained from the shells was 16.38MJ/kg which was comparable to certain wood species. The coconut shells, which are generally not fully utilized, abandoned, and discarded, have the potential to be used as energy sources, whilst the husks have a lesser calorific value but could be used as fuel for less energy intensive uses.