

Determining and Evaluating the Pyrolysis of Candlenut Shell as an Alternative Energy Sources

Sulhatun, Muhammad, Suryati, Meriatna and Lukman Hakim

Department of Chemical Engineering

Faculty of Engineering

Universitas Malikussaleh

Muara Batu, Aceh Utara, Aceh, Indonesia

sulhatun@unimal.ac.id, mhdtk@unimal.ac.id, suryati@unimal.ac.id, meriatna@unimal.ac.id,
lukman.hakim@unimal.ac.id

Abstract

Candle Nut (*Aleurites moluccana*) is classified as one of Indonesia's substantial available natural resources, is considered a wide prospect marketing commodity either domestic or overseas. The purpose of the study was to find out and evaluate the temperature against the percentage yield and characteristics of pyrolysis products produced for the application of the product as an alternative fuel. The research consists of the initial stage of raw material preparation, pyrolysis process stage and analysis stage of Bio-oil, Gas, Char products. Pyrolysis uses a fixed Batch Reactor equipped with a dual condenser system (SKG) at temperatures varied at 350, 450, 550 °C and pressure 1 (one) atmosphere and sampling time of 30, 60, 90, up to 420 minutes. The use of cooling water temperature in condensers ranges from 25 -35 °C. A Bio-Oil level analysis measured the amount of bio-oil volume produced in the measuring glass during pyrolysis time intervals performed at each temperature used. Product identification carried with GCMS (Gas Chromatography and mass spectrometry). Also, it measures tar products, solid products and gases from pyrolysis processes utilized for alternative fuels. The results showed that at optimum temperatures produced liquid smoke yield products of 8.6%, charcoal 81.6 %, tar 3.7 % and 6.1 %. Identification results using GC Mass Spectrometry (GCMS) at optimum temperature conditions of 450 °C and pyrolysis time of 210 minutes show a smaller number of components that are 7 (seven) components, namely: Cyclopentanone, 2 Cyclopenten-1-one, 2 cyclopentene-1-one, Acetic acid, 2 Furancarboxildehyde, 2 methoxyphenyl and 2 Methoxy-4-methyl enols.

Keywords

Pyrolysis, Natural Resources, Candlenut shell, Alternative Energy

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