

Thesis Title	Suitable Conditions for Liquid Fuel Production from Cashew Nut Shell Using Hydrothermal Process
Author	Mr. Nitthinan Borirak
Degree	Master of Engineering (Mechanical Engineering)
Advisor	Asst. Prof. Dr. Chatchawan Chaichana

ABSTRACT

This research studied about the investigated parameters for liquid fuel production from Cashew Nut Shell (CNS) using Hydrothermal Process (HTP) without catalyst. HTP experiments were performed at 10% solid concentrations and heating rate at 4 degree/min. Parameters investigated are with and without 5 wt.% Na_2CO_3 catalyst, temperature (200, 250 and 300 °C) and retention time (0, 60, 120 and 180 min). Output from the experiments were tested for yields of products, high heating values (HHV), energy efficiency, proximate and ultimate analysis.

It was found that HTP conversion at temperature 200 °C, without catalyst and the shortest retention time produced the highest amount of liquid fuel. Output ratio of liquid fuel, solid fuel and gas and organics soluble is 32.33, 37.43 and 30.24 wt.% respectively. The energy recovery is 57.53%. The composition of the liquid fuel by proximate analysis are Volatile matter, Fixed carbon, Moisture and Ash is 91.36 7.40 0.95 and 0.29 respectively and ultimate analysis are C, H, O and N is 78.22 9.79 9.80 and 0.31 respectively. The liquid fuel empirical formula and pH is $\text{CH}_{1.909}\text{O}_{0.120}\text{N}_{0.004}$ and 3.30 ± 0.06 respectively. The liquid fuel obtained from the HTP has similar HHV to that of fuel oils and diesel oil with HHV of 40.90 MJ/kg compared to 42.10 MJ/kg and 42-46 MJ/kg respectively.