

CONFERENCE PROGRAMME PAPERS ABSTRACTS



6th International Conference on
Sustainable Agriculture, Food
and Energy.
October 19 - 21, 2018 in MANILA,
Philippines.

Inclusive Agri-food Energy Production for Community Empowerment in a Changing Climate

**6th International Conference
Sustainable Agriculture, Food, and Energy
SAFE2018**

October 19-21, 2018
I'M Hotel, Makati. MANILA, PHILIPPINES

**“Inclusive Agri-food Energy Production for
Community Empowerment in a Changing
Climate”**

ENERGY-01

CHARACTERISTICS OF BAMBOO BIOMASS IN THREE TYPES OF ELEVATIONS IN WEST SUMATERA

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Abstract— Bamboo plants in West Sumatra spread from the lowlands to the highlands with the varieties that are very diverse and their usefulness to the community is also very diverse. Some varieties of bamboo plants in the highlands of West Sumatra are currently used by the community as a source of energy (fuel) in the agricultural processing industry. The type of bamboo that is often used as fuel is *betung* and *buluh*. There are differences in the characteristics of biomass in the three types of bamboo plants that are important to be considered as a source of biomass. Type of *Betung* which is grown in the highlands has an average stem height of 15 meters with the number of stems per ha approximately between 60,968 - 76,800 stems.

Keywords— Bamboo, Biomass, energy

ENERGY-02

PERFORMANCE TEST AND CHARACTERISTICS OF METHYL ESTER FROM PYROLYSIS PROCESS OF RICE HUSK

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Abstract— Methyl Esters, in this research, were obtained from the process of making liquid smoke from rice husks. Previous research conducted by Novita, SA et al (2011) the results of the analysis of testing with GC / MS showed that the liquid smoke from rice husks containing Methyl Esters was relatively high, in range \pm 58-70%. The purpose of this study was to modify the pyrolysis device to produce methyl esters, determine the content of methyl esters with GC/MS analysis and test the performance of biodiesel using a diesel engine. From the research carried out the pyrolysis tube wall has been modified by changing the thickness of the stainless steel material to 1.5 mm, to facilitate the combustion process and heat transfer and reduce the equipment weight. While the tube base still uses 3 mm stainless steel to prevent leakage during the process because of high temperature (300 - 400°C). Wood and coconut shell was used to accelerate the incomplete combustion process and have higher methyl ester compared to using a gas stove. The amount of liquid smoke produced is quite high at 35.88% while using a gas stove is around 30%. From the GC / MS results, it was found that the content of methyl ester and ethanol obtained was 60.12% and 1.13%, respectively. The methyl ester obtained was separated from the tar using a rotary evaporator based on the boiling point difference. Methyl ester from this husk can turn on the diesel engine with B10 - B50.

Keywords— Rice husk, pyrolysis, methyl ester, liquid smoke

ENERGY-03

POTENCY OF NYAMPLUNG SEED OIL (*CALOPHYLLUM INOPHYLLUM* LINN) AS ALTERNATIVE ENERGY IN NORTH MALUKU

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Abstract— The Nyamplung (*Calophyllum inophyllum* Linn) plant has the opportunity to produce vegetable oil through its seeds, and is a non-food plant. In Indonesia nyamplung plants spread throughout the territory of Indonesia. The advantage of nyamplung as an alternative energy (biofuel) is that the seeds have high oil yields (more than 50%) and in their utilization they do not compete with food interests. North Maluku is one of the areas that has a lot of nyamplung plants because of the geographical conditions that strongly support the growth of nyamplung. This research will be conducted in Ternate-North Maluku for ten months in two stages. In the first stage, the collection of nyamplung seeds is carried out as a raw material for Biofuel. In the second stage, purification of nyamplung oil was carried out with degumming using water. The application of nyamplung oil biofuel as fuel is done by boiling 500 ml of water on a special stove. The results of the refining of nyamplung oil with degumming at the ratio of nyamplung oil and water 1: 3 (v / v) and temperature 28.5°C provide better physical and chemical properties than other treatments (0.932 gr specific gravity / ml, viscosity 52,545 cSt, flash point 219.5 ° C, ash content 0.012% (wt), water content 0.047% (wt), heating value 9484.234 calories / g, sulfur 0.14 ppm, phosphorus 13 ppm, and total sediment 0.05% (wt)). The use of biokerosin oil nyamplung results of research as biokerosin on the stove would be better when substituted with kerosene 50%.

Keywords— Nyamplung, *Calophyllum inophyllum*, alternative energy, vegetable oil, biofuel