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Identifying Nipah Fruit Extract with Cycle Variations Using a Methanol Solvent

D. Ariyani*, Y. Yuniarti, E. Megawati, B. Sulaiman, B. Kresna and I. Iwan

Oil and gas processing techniques Sekolah Tinggi teknologi minyak dan gas bumi Balikpapan, Balikpapan, Indonesia

ORCID ID
D.Ariyani : https://orcid.org/0000-0002-9308-9555
Y.Yuniarti : https://orcid.org/0000-0003-0259-6496
E.Megawati : https://orcid.org/0000-0001-6450-5831

Abstract.
Indonesia has many sources of vegetable oil that can be used as a renewable energy source. One of these sources that has great potential to be developed is palm fruit (*Nypa Fruticans Wurmb*). Nipah fruit is one of the raw materials used in this study, using the extraction method and methanol as the solvent. The research was conducted with various cycles variations of 5, 6, 7, 8 and 9. The extracted oil had a fragrant odor, a clear yellow color and was volatile. Tests were then carried out, including percentage yield, pH, free fatty acid (FFA), iodine number and density. From the test results, it was found that the average yield of palm fruit oil was nine cycles reaching 1.2%, where the highest percentage yield was found in the 35-gram sample, the pH number for five samples showed the number six, percentage FFA of palm fruit oil on average was 0.6%, the iodine number of fruit oil Nipah was an average of 0.18 and the specific gravity of Nipah fruit oil on average was 0.76 gram/ml.

Keywords: nipah fruit, vegetable oil, extraction

Corresponding Author: D. Ariyani; email: debora.ariyani@sttmigAS. ac.id

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1. INTRODUCTION

Along with the increasing population, the need for energy will increase. Meanwhile, the supply of energy, especially non-renewable energy, is decreasing in quantity. Petroleum fuels are one of the main energy Source that are widely used today. The need for this fuel will always increase along with its use in industry and transportation [1]. Based on data from the Directorate General of new, renewable Energy and energy conservation of the ministry of energy and mineral resources in CNN Indonesia, the growth in energy consumption in Indonesia reaches 7 % per year, and this figure is above the growth in energy consumption in the world, namely 2.6 % per year. Therefore, alternative energy is needed to support the existing fuels. One of the materials that can be renewed and found in nature is derived

from plants or that is often referred to as biofuel derived from biomass such biodiesel [2].

One of the plants that has the potential as biodiesel fuel is nipah Plants (Nypa fruticans Wurmb). Apart from being processed as a food ingredient, nipah plants are a source of oil that can be used as renewable energy. One of the Alternative uses of the palm plants is as a raw material of making bioethanol. Nipah sap contains sucrose as much as 13 – 17 %, this as material that has the potential to be processed into bioethanol [3].

Apart from nipah sap, part of the nipah that is very potential to be utilized is the fruit. Extraction of nipah fruit oil can be done by extraction. Extraction is a process of taking the substances used in a solid phase through contact with a solvent. The solvent used in this extraction is methanol because it is a light, volatile, colorless, flammable, and poisonous liquid with a characteristic odor (milder odor than ethanol). So that it becomes a good solvent to test the characteristics of the nipah fruit [4].

2. MATERIALS AND METHODS

2.1. Material

In the first stage, the collection of raw materials is carried out where the raw material is nipah fruit, the location for collecting raw materials is located in Handil II Village, Muara Jawa District, Kutai Kartanegara Regency, East Kalimantan. After the raw materials are collected, the next process is the separation of the nipah shell and fruit, the purpose of separation is to take a sample, namely the nipah fruit. The weight of the nipah fruit obtained after separation from the shell is 6.2 kg. After the sample is separated, the next step is the drying process of the sample. The purpose of drying is to remove the moisture content in the sample, after the drying process for 5 days or until the sample is dry, the sample weight is reduced to 3.2 kg.

2.2. Methods

The next process is to reduce the particle size; the sample is in the crusher so that the sample becomes smooth. After crushing, the sample is then screened using a sieve with a size of 70 mesh in order to obtain a finer powder. In this stage, the first thing to do is determine the mass of the sample, namely the first sample of 30 grams, with the number of cycles of each extraction process that varies, namely 5 cycles, 6 cycles,

7 cycles, 8 cycles, and 9 cycles. then the sample is inserted into filter paper that has been shaped like a tube with a soft cotton support under it.

After the sample is put into filter paper, the next is the extraction process where this extraction is a process of separating one or more soluble substances from a collection or its unit that cannot dissolve with the help of solvents. In this research, the solvent used is CH3OH (Methanol). The amount of methanol used is 500 ml in each sample, during the extraction process the temperature ranges from ± 65 ° C-70 ° C and the temperature must not exceed 70 ° C so that the solvent (methanol) does not evaporate. Extraction process can be seen on Figure 1.

Figure 1: Extraction Process.

After the extraction process is complete the sample is then distilled to separate the solvent from the oil produced from the palm fruit. As with the extraction process, the temperature during the distillation process is ± 65 ° C-70 ° C because if it goes beyond 70 ° C there is no possibility that the oil will evaporate. During the distillation process it is necessary to pay attention to the solvent not dripping anymore, when the solvent does not drip again it means that the oil and the solvent have separated. After the extraction and distillation processes are complete, the palm fruit oil obtained from the distillation results is then identified for its characteristics. In identifying the characteristics of the nipah fruit, testing the pH, % Yield, % FFA, iodine number, and density test was carried out.

3. RESULTS AND DISCUSSION

Extraction of nipah showed in table 1.

TABLE 1: Result of Nipah Fruit Extraction Process.

Sample	cycle	Methanol volume	Extraction Time	Yield volume	Temperature
35 gr	5	500 ml	2 hour 44 minute	415 ml	33 ^{o}C
35 gr	6	500 ml	2 hour 52 minute	422 ml	33 ^{o}C
35 gr	7	500 ml	2 hour 52 minute	430 ml	33 ^{o}C
35 gr	8	500 ml	3 hour 27 minute	425 ml	33 ^{o}C
35 gr	9	500 ml	2 hour 15 minute	432 ml	33 ^{o}C

Nipah fruit oil obtained after the distillation process or after the solvent and oil separate is a sample of 5 cycles of

3.2 ml, a sample of 6 cycles of 1 ml, a sample of 7 cycles of 4.1 ml, a sample of 8 cycles of 4.4 ml and a sample 9 cycles of 1 ml. Results of identification characteristics of nipah fruit showed in table 2.

TABLE 2: Results of Identification Characteristics of Nipah Fruit.

Sample	cycle	% Yield	pH	% FFA	Density	Iodine number
35 gr	5	17,8	6	0,6	0,88 gr/ml	0,036
35 gr	6	13,34	6	0,6	0,67 gr/ml	0,041
35 gr	7	18,13	6	0,8	0,86 gr/ml	0
35 gr	8	18,22	6	0,8	0,91 gr/ml	0,010
35 gr	9	21,31	6	1,2	0,71 gr/ml	0,018

Of the 5 identified samples, the test results for the pH number for the 5 samples showed the number 6; The color of the palm fruit oil is pale yellow and smells good after being distilled. Then the% yield of nipah fruit oil was 18.76 on average, % FFA of nipah fruit oil was 0.8, the iodine number of nipah fruit was 0.021 and the density of the palm fruit oil was 0.806 gram / ml.

4. % Yield

See Figure 2 bellow.

At the time of the extraction process the more cycles in the process, the greater the% yield value.

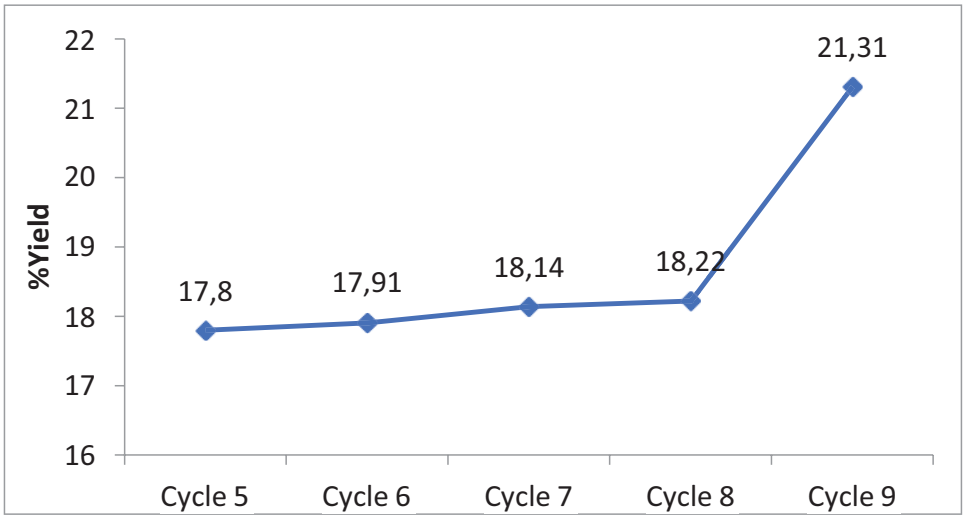

Figure 2: Cycle vs % Yield.

5. % FFA

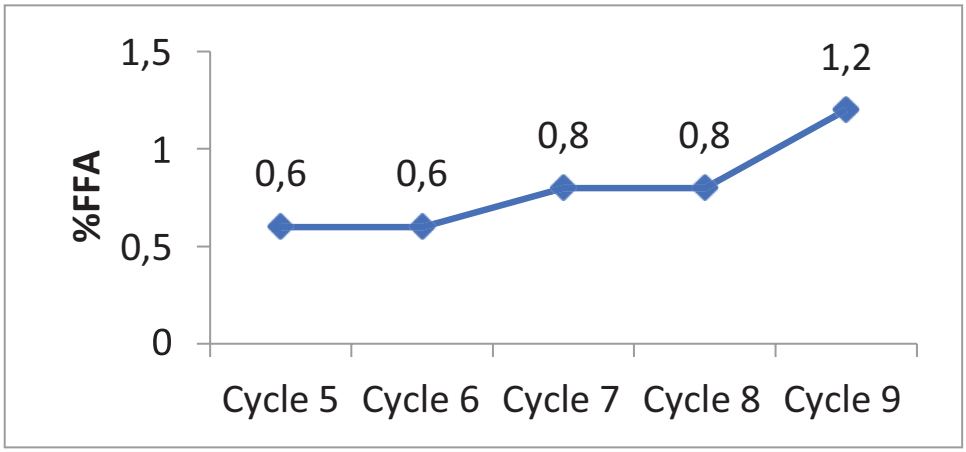

Figure 3: % FFA.

Fatty acid determination can be used to measure and determine the amount of free fatty acids in a material or sample. The greater the acid number, it means that the free fatty acid content in the sample is higher, the amount of free fatty acids contained in the sample can be a result of the hydrolysis process or due to poor processing. The results are as follows on Figure 3:

5.1. Iodine Number

See Figure 4 bellow.

Calculation of the Iod number obtained by the iod number in the sample cycle 5 0.36, cycle 6 0.22, cycle 7 0, cycle 8 0.10, and 0.18.

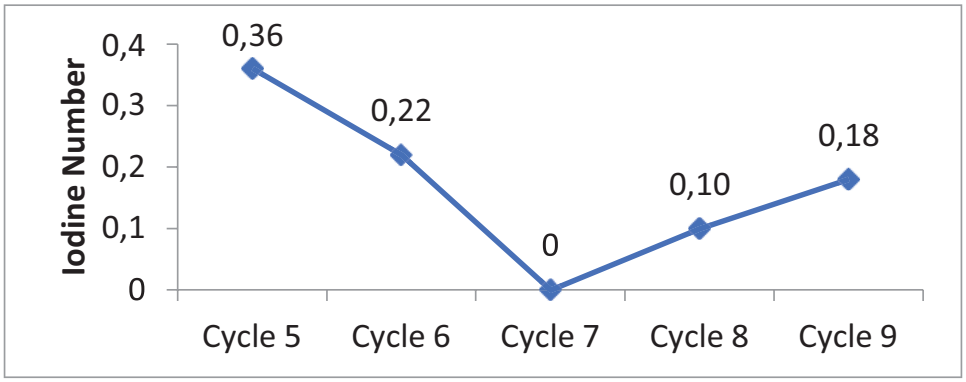

Figure 4: Iodine Number.

5.2. Density

Finding the density using a pycnometer filled with the entire sample after the distillation process. The results are as follows on Figure 5:

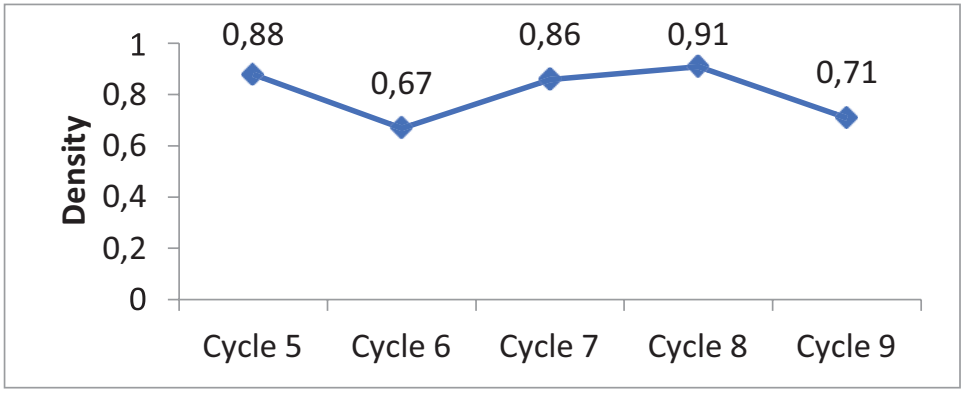

Figure 5: Density.

5.3. pH

pH testing is carried out by entering the paper into the oil that has been separated with a solvent, then matching the pH color. The oil resulting from the palm fruit has a pH of 6 in the sense that the oil is acidic.

6. CONCLUSION

From the research conducted, the results obtained were: pH after extraction, from the 5 samples showed the number

6. And the best% FFA quality occurred in the sample 35 gram cycles 5 and 6 which reached 0.6% because the standard of biodiesel was 0.5, and the worst occurred in a

sample of 35 grams with 9 cycles reaching 1.2%. In the 5th cycle, the Iod number was 0.36, the 6th cycle was 0.22, the 7th cycle was 0, the 8th cycle was 0.10, and the 9th cycle was

0.18. The highest density was found in the sample 35 gram 8 cycles, reaching 0.91 gram / ml with a mass of 4.1 ml and the lowest density was found in the sample 35 gram 6 cycles, reaching 0.67 gram / ml with a mass of 0.76.

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