



Available online at <http://journal.walisongo.ac.id/index.php/jnsmr>

Production of Brikueda (Briquettes from Teak Sawdusts and Durian Rind/*Durio zibethinus*) as Renewable Fuels

Wihdatus Syarifah¹, Sulhadi¹, Teguh Darsono¹

¹Postgraduate Program of Physics Education, Universitas Semarang, Indonesia

Abstracts

Corresponding author:
Wihda_Assyarifah@yahoo.com
Received : 21 February 2019,
Revised : 27 May 2019,
Accepted : 25 June 2019.

Jepara is a carving city. The result of carving produces sawdust waste which is usually used to be sold and burned. In addition, durian fruit is available that has a distinctive taste and made an icon of one village in Jepara. The fruit is the belle of the whole community to be eaten by meat and made food. But the skin has the traits and characters that are difficult to decompose. Then the two wastes will be combined with tapioca flour into briquettes as an alternative fuel. This research take four stage: combustion, filtering, printing, and drying. Obtained two treatment, the first treatment is using ratio wood sawdust and durian rind; 50 gr: 50 gr; 25 gr: 50 gr; 50 gr: 25 gr. The results shown it does not ignite up and very hard. The second treatment is using same ratio but added 25 gram starch, the results shown it ignite. This is due to the starch content is used, it ignite the longest with a concentration ratio of 50 gr: 50 gr because its combination increases the calories value. In durian rind there are 3786 cal/g and teak wood consists mainly of cellulose (40-50%), hemicellulose (20-30%), lignin (20-30%), and the calories value of sawdust briquettes is 4714-5519 kcal/kg.
©2019 JNSMR UIN Walisongo. All rights reserved.

Key words: Briquettes; Durian rind; Teak Sawdust; Renewable energy

1. Introduction

The increase of population has led to an increase in human lifestyles and gain the industrial development so that demand for energy requirement increase. While the energy availability continues to run low every years, this has an impact on increasing the selling price of fuel oil and causing scarcity of fuel oil. Therefore we need an alternative material that is cheap and friendly for the environment. One of them can use waste or recycle waste. Waste

causes the emergence of several problems including the emergence of disease and can reduce the city's aesthetics.

Jepara is a small city that has a thousand original Indonesian art producers which is worldwide. The most famous is wood carving, the majority of the population in Jepara is the wood furniture industry. So every day a lot of carving waste be produced by it. Based on the results of interviews with two entrepreneurs of the wooden furniture industry, wood furniture

waste is sold to pottery entrepreneurs who are only sold very economically according to the type of wood, the most expensive is teak wood (1 Sack of Rice = Rp. 2000,-), otherwise thrown it into the river or just burned it.

Sawn timber production in Indonesia reaches 1.4 million m³/year [1]. Furthermore there are durian rind, durian rind has structures and characteristics that are difficult to decompose, creating new problems. Because all this time durian only were consumed fruit flesh and seeds or made to processed snacks. Along with the increase in the area of surian harvest, from 24,031 ha in 1991 to 53,770 ha in 2003, an increase in durian production in Indonesia from 194,359 tons in 1999 to 741,841 tons in 2002 [2]. So that durian rind will only cause air pollution and reduce the aesthetics of the city.

Due to the lack of sensitivity of society to the environment around the use of waste, the authors make a study of the waste material to be useful and have high economic value. So that alternative fuels are made as Briquettes. Briquettes will increase the economic value and reduce environmental pollution. Charcoal briquettes are solid fuels of organic material that contain carbon, have high calorific value, and can burn for a long time [3]. Therefore in this study, it will examine the production of BRIKUEDA as an alternative fuel, it is briquettes from teak Sawdust and durian rind.

2. Experiments Procedure

Production of BRIKUEDA take four stages: combustion, filtering, printing and drying. At the stage of burning durian rind was previously dried in the sun, then it burning as well as sawdust. After that, at the filtering stage, all sawdust and durian rind ash are filtered to produce a small and smooth materials. Next is the printing stage, the first step is weighed materials to compare the ratio levels. It mixed with an adhesive materials which is starch, then printed using mold. After the drying step, it is dried under the hot sun for two days.

3. Result and Discussion

Based on the results of research data production of BRIKUEDA in using a ratio of three mass variations with the binding material is 40 gr which is dried under the hot sun for two days, the results shown the very hard briquettes and not ignite. This is because too much starch as an adhesive material in durian rind and wood sawdust ash. Adhesive materials be required is 25 grams for BRIKUEDA to ignite. Reference [4] experiment which states that the higher starch content, the higher the water content, this is due to the adhesive starch and charcoal properties that are not resistant to moisture, so it is easy to absorb water and air.

Table 1. Result of the Treatment

No	Treatment	Ratio wood sawdust: durian rind ash (gr)	Result of ignite
1	Added 40 grams of starch and dried under the hot sun (2 days)	50 : 50	No ignite
		25 : 50	
		50 : 25	
2	Added 25 grams of starch and dried under the hot sun (2 days)	50 : 50	10 minute
		25 : 50	8 minute
		50 : 25	5 minute

The content of water in briquettes is very influential in the calories value and ignition process of the briquette. Moisture content affects the quality of the briquettes produced. The lower of water content, the higher the calories value. Otherwise, the higher the water content, will decrease the calories value [5]. This is because the water content in durian rind and teak sawdust evaporates during the carbonization process. Reference [6] declare the longer carbonization process, the smaller the water content. The burning time of briquettes is occupied at durian rind and sawdust ash content with ratio 50 gr: 50 gr due to the combination of the calories value also increases. Reference [7] teak wood consists

mainly of cellulose (40-50%), hemicellulose (20-30%), lignin (20-30%), and the calories value of sawdust briquettes 4714–5519 kcal/kg. Reference [8] in the durian rind there are 3786 cal/g, also consists of high cellulose (50-60%), low lignin (5%) and starch content (5%).

4. Conclusion

BRIKUEDA can be used as an alternative fuel, in addition it can utilize waste that is difficult to decompose. There are things to consider in making BRIKUEDA is what percentage of the adhesive used, which is 4.5% because if starch too much, it not ignite. This is because the higher of starch content, the water content also increase, it is caused by the adhesive properties of starch and charcoal that not resistant to moisture so it is easy to absorb water. The content of water in briquettes is very influential in the calories value and ignition process of the briquette. The lower water content, the higher the calories value. Otherwise, the higher the water content, will decrease calories value. Besides that, in durian rind there are 3786 cal/g, and teak sawdust consists mainly of cellulose (40-50%), hemicellulose (20-30%), lignin (20-30%), and the calories value of sawdust briquettes is 4714–5519 kcal /kg.

Acknowledgment

This research was carried out thanks to Allah that always provides convenience in every step of His servant, besides, thanks to families who always provide motivation and unceasing prayer and to Mr. Sulhadi, M.Sc and Mr. Teguh Darsono, S.Pd., M.Si for your guidance and suggestions for this research. Also do not forget to class 1 physical education friends who always provide constructive motivation and advice for this research.

References

- [1] Direktorat Jenderal Bina Produksi Kehutanan, 2005.
- [2] Agung Setiawan, “Pengaruh Komposisi Pembuatan Biobriket Dari Campuran Kulit Kacang Dan Serbuk Gergaji Kayu Jati Terhadap Nilai Pembakaran”, *Jurnal Teknik Kimia*, vol 18, no. 2, 2012.
- [3] Pari Gustan, “Teknologi Alternatif Pemanfaatan Limbah Industri Pengolahan Kayu”, Bogor: Institut Pertanian Bogor, 2002.
- [4] Y. Hermawan, “Pemanfaatan Limbah Sekam Padi Sebagai Bahan Bakar Dalam Bentuk Briket”, Jurusan Teknik Mesin, Fakultas Teknik Universitas Jember, 2006.
- [5] Ahmad Syafiq, “Uji Kualitas Fisik Dan Kinetika Briket Kayu Kalimantan Dengan Dan Tanpa Pengikat”, vol. 2, pp. 214–217, 2009.
- [6] Silalahi, “Penelitian Pembuatan Briket Kayu dengan Serbuk gergajian Kayu”, Bogor: Hasil Penelitian Industri DEPERINDAG, 2000.
- [7] Agus Sugiyono, “Penggunaan Energi di Industri Pulp dan Kertas: Aspek Teknologi dan lingkungan”, Jakarta: Badan Pengkajian dan Penerapan Teknologi, 2009.
- [8] Rossi Prabowo, “Pemanfaatan Limbah Kulit Durian Sebagai Produk Briket di Wilayah Gunung Pati Kabupaten Semarang”, *Mediagro*, vol. 5, no. 1, 2009.