JOURNAL OF DEGRADED AND MINING LANDS MANAGEMENT
ISSN: 2339-076X, Volume 1, Number 4 (July 2014): 197-200
DOI:10.15243/jdmlm.2014.014.197

Research Article

Weeds optimally grow in peat swamp after burning

P.D. Susanti[1*], A. Ardhana[2], R.S. Wahyuningtyas[2]

[1] Research Institute of Forestry Watershed Management Technology, Jl. A. Yani - Pabelan , Kartasuro Surakarta PO BOX 295 57 102
[2] Banjarbaru Forestry Research Institute, Jl. A Yani Km 28.7 Basis Ulin Banjarbaru South Kalimantan

*corresponding author: pranatasari_santi@yahoo.com

Abstract : After clearing land by burning the peat, then the weeds and undergrowth will flourish. Even sometimes, the weeds are eventually burned again. Weed is known as a destroyer plant that has to be controlled. Through proper treatment, the existing weeds in peatlands can be potentiallly exploited. The purpose of this study was to determine the calorific value of briquettes as one of peatland weeds utilization. The results showed that the calorific value ranged from 2,492 cal/g to 5,230 cal/g. The lowest calorific value was on 'teki kecil' grass (*Scirpus grossus* Lf), while the highest calorific value was observed for 'bantalaki grass' (*Hymenachne amplexicaulis* Nees). The high calorific value of the peat weeds are potential for biomass briquettes raw materials. The utilization and use of peat weed briquettes as a raw materials expected can reduce land degradation due to peat swamp burning.

Keywords: *briquettes ,peat swamp , weeds utilization*

Introduction

Fire is a frequent event in peat swamps. This event will increase in intensity during the dry season arrives. According to Akbar (2011), there are six factors that generate fire, i.e. (1) the damage of forest canopy structure that causes the forest susceptibility to heating, (2) the forest is open to the public resources and capabilities in the field of forestry officials to secure the forest is minimal so that everyone can take the forest without concerned with sustainability, (3) fire control system that has not been to involve forest communities, (4) forest fire caused by negligence increased the use of fire for farming, (5) fire control technology is not popular in the community, and (6) lack of proper silvicultural systems.

Community tend to choose burning activities to clear land, either for agriculture, farming, and plantation, were deemed to be more efficient and effective for the community. As a result of the combustion of very diverse acts, including the emergence of weeds or undergrowth. According Bastoni and Sianturi (2000), the fire has led to an anchorage burning peat layer tree roots, so plants thrive under. As stated by Najiyati et al. (2005), due to the burning of land, then the land will be in the open condition so that the presence of lower plants such as grasses, ferns and shrubs and herbaceous pioneer more. Weeds growing on peat swamp with lush real potential to be managed. Appropriate measures and profitable should be a major concern that weeds are very abundant in number in peat swamps can be used as an alternative management of peat swamp itself (Susanti and Wahyuningtyas, 2011). Wahyuningtyas et al. (2012) said that some types of weeds and undergrowth are often found in peat swamps include : rumput paitan (*Axonopus compresssus* (Swartz) P. Beauv), 'rumput gajah' *(Pennisetum purpureum* Schumach.), 'kelakai' (*Stenochlaena palustris* Bedd. FERN), 'gulma bunga kuning' (*Jussieua erecta* Linn.), 'pakis-pakisan' (*Blechnum indicum* Burm.f.), 'alang-alang' (*Imperata cylindrica* (L.) Raeuschel), 'purun tikus' (*Eleocharis ochrostachys* Steud., 'karamunting kodok' (*Melastoma malabathricum* L.), 'anggrek tanah bunga kuning' (*Philydrum lanuginosum* Banks ex Gaertn.), eupatorium (*Chromolaena odorata* King & H. E Robins.), kalopogonium (*Calopogonium mucunoides* Desv.), 'keladingan' (*Scleria purpurascens* Steud.), 'anggrek tanah' (*Xyris indica* L.), 'rumput bundung (*Leersia hexandra* Sw.), 'rumput bantalaki' (*Hymenachne amplexicaulis* Nees.), krokot merah (*Ludwigia* sp.), 'teki kecil' (*Scirpus grossus* L.f.), 'rumput' bantak (*Polygonum minus* Huds ssp.*depressum* Dans., 'rumput kumpai' (*Hymenachne acutigluma* (Steudel) Gilliland.), 'kumpai batu' (Cynodon dactylon (L.) Pers., 'bakungan banyu' (*Hymenocallis litthoralis* (Jacq.) Salibs), and 'bulu bab'i (*Leptaspis urceolata*).

While some weeds and undergrowth that often appear on peat swamps are degraded by Akbar and Priyanto (2008), among others : rumput kumpai *(Leersia hexandra*), pakis-pakisan (*Neprolepis exaltata* dan *Stenochlaena palustris*), rumput babi (*Leptaspis urceolata*), alang-alang (*Imperata cylindrica*), karamunting (*Melastoma malabatricum*), and teki grass (*Cyperus rotundus).*

The many Of weeds and undergrowth scattered peat, very little use by the society, even almost nothing. Weeds have only allowed and will be burned if the planting season has arrive. Peat weed is easy to burn, potentially as a briquettes raw material. In addition to proper weed management, the manufacture of briquettes from peat weeds is expected to be a source of renewable energy. Because this time, the availability of fossil fuels has begun drained. According to the Executive Agency for Upstream Oil and Gas (BP Migas, 2011), status on January 1,2011, proven and potential reserves of gas in Indonesia reached 153.72 trillion cubic feet of proven reserves and petroleum potential of 7.41 billion barrels. If the existing backup produced with current production levels, then Indonesia's oil reserves will be depleted over the next 12 years, while Indonesia's natural gas reserves is still able to hold the next 46 years to meet the needs.

This condition will cause the energy crisis in Indonesia, even according to Setiawan (2006) Indonesia would become a net oil importer (Net Oil Importing Country) within 10 to 20 years into the future. The availability of highly abundant weeds in peat swamps, both before and after burn, will be easier for people to get briquettes raw material. How easy weeds and undergrowth is burned, it is interesting to note calorific value when used in the briquettes form. Seginhha, the purpose of this study was to determine the calorific value of briquettes made from peat weed.

Materials and Methods

The research method was an experimental on briquettes making. The briquettes were made from peat weeds. The materials used are weeds originating from peat and sawdust in the ratio 1 : 1. Coupled with adhesive material derived from starch. Weeds that have been dried, then charred, and mixed with sawdust and glue. Once mixed , put in a briquette mold, and dried in an oven with a temperature of 60 ° C for 24 hours. Parameters observed in this study is the calorific value of briquettes, which performed at the Laboratory of Industrial Research and Standardization Banjarbaru.

Results and Discussion

Based on the results of laboratory analysis of the experiments that have been conducted, the calorific value of peat weeds briquettes, can be seen in Figure 1.

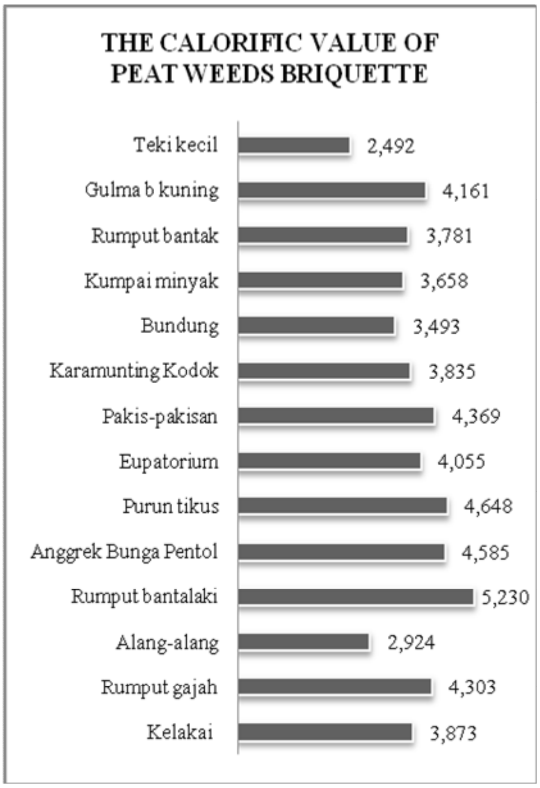

Figure 1. Calorific Value of Peat Swamp Weeds Briquettes in (cal/gr)

Based on the images shows that the calorific value ranging from 2,492 cal /gr - 5,230 cal /gr. The lowest calorific value is Teki Kecil grass (*Scirpus grossus* Lf), while the highest calorific value is bantalaki grass (*Hymenachne amplexicaulis* Nees). The high calorific value have so potential to be used as briquettes raw material.The calorific value of briquettes from this peat weed also qualified for quality of raw coal briquettes without carbonation, by decree of the Director General of Public Works 1993 (Budiman et al. 2010) which requires more briquettes calorific value of 4,000 cal/gram and qualified for charcoal timber briquettes standard quality SNI 01-6235-2000 which requires heating value should be more than 5000 cal/g (Sriharti et al. 2010). The calorific value generated by briquettes from organic material can be seen in Table 1 below:

Table 1. The calorific value of various biomass briquettes

No	Raw material	Calorific value
1	Saw dust	4.600 cal/g
2	Rice Husk	3.700 cal/g
3	Cashew skin	6.148 cal/g
4	Corncob	5.752 cal/g
5	Water Hyacinth	3.332,65 cal/g

Source: Sinurat (2011), Maninder et al. (2012) and Utomo and Primastuti (2013)

The calorific value is very important to know, because it determines the ability of briquettes burning. The higher heating value, the higher the combustion capability. The heating value is the amount of heat obtained from the combustion of a fuel within a certain amount (Utomo and Primastuti, 2013). Jamilatun (2011) convey, is a measure of thermal or heat energy generated and measured as gross calorific value or net calorific value. So far, people are more familiar with coal briquettes as a potential raw material. But weed biomass and coal as a solid fuel which has different characteristics, because coal has a carbon content and high calorific value, ash content, and the content of volatile compounds were lower, while, biomass has a high volatile matter content but a low carbon content (Jamilatun, 2008). However, when seeing an average calorific value generated by peat weeds briquettes, these weeds briquettes have a potentially and dare to contend with briquettes from other raw materials. If the weeds that are growing in peat swamps can be used optimally, then the land degradation caused as a result of peat swamps burning activities during land clearing can be avoided.

Conclusion

Efforts to manufacture briquettes from peat weed is it can be used as an alternative energy source, and can help people to reduce the amount of peat weed burning. High calorific value of peat weeds briquettes showed the weeds potentiality as a biomass briquettes raw material. Weed management peat swamp appropriate because the amount and abundant availability will greatly help the community to improve the well-being and optimal environmental sustainability by reducing land degradation as a result of the act of burning the peat swamp.

References

Akbar, A. 2011. Studi kearifan lokal penggunaan api persiapan lahan: studi kasus di hutan Mawas, Kalimantan Tengah. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan* 8 (3): 211 - 230

Akbar, A. dan Priyanto, E. 2008. Dampak pembakaran terkendali pada ladang terhadap produktifitas lahan di rawa gambut. Prosiding Seminar Optimasi Tata Kelola Kehutanan untuk Mendukung Rehabilitasi Hutan Rawa Gambut. Balai Penelitian Kehutanan Banjarbaru, Palangkaraya, 30 Oktober 2008: 131-150.

Bastoni dan Sianturi, A. 2000. Dampak kebakaran hutan rawa gambut terhadap tanah dan tegakan hutan serta implikasinya dalam rehabilitasi areal hutan bekas tebangan (Studi kasus di daerah Air Sugihan, Sumatera Selatan). Prosiding Seminar Pengelolaan Hutan Rawa Gambut dan Ekspose Hasil Penelitian di Hutan Lahan Basah, Banjarmasin, 9 Maret 2000. Balai Teknologi Rebosisasi Banjarbaru: 44-45

BP Migas. 2011. Dari Minyak Terbitlah Gas. Buletin BP Migas No. 73 Agustus 2011. BP Migas. Jakarta.

Budiman, S., Sukrido, dan Harliana, A. 2010. Pembuatan biobriket dari campuran bungkil biji jarak pagar *(jatropha curcas* l.*)* dengan sekam sebagai bahan bakar alternatif. Seminar Rekayasa Kimia dan Proses. 20 Mei 2010. Semarang.

Jamilatun, S. 2008. Sifat-Sifat penyalaan dan pembakaran briket biomassa, briket batubara dan arang kayu. *Jurnal Rekayasa Proses* 2 (2): 37-40.

Jamilatun, S. 2011. Kualitas sifat-sifat penyalaan dari pembakaran briket tempurung kelapa, briket serbuk gergaji kayu jati, briket sekam padi dan briket batubara. Prosiding Seminar Nasional Teknik Kimia “Kejuangan 22 Februari 2011. Yogyakarta.

Maninder, G., Kathuria, R.S. and Grover. S. 2012. Using Agriculture Residues as a Biomass Briquetting : An Altenative Source of Enegy. *Journal of Electrical and Electronics Engineering* 1 (5): 11-15.

Najiyati, S., Asmana, I.N. and Suryadiputra, N. 2005. Pemberdayaan Masyarakat di Lahan Gambut. Proyek Climate Change, Forest and Peatlands in Indonesia. Wetlands International - Indonesia Programme and Wildlife Habitat Canada. Bogor, Indonesia

Setyawan, I. 2006. Briket Arang dari Limbah Organik Perkotaan. Fakultas Kehutanan. IPB.

Sinurat, R. 2011. Studi Pemanfaatan Briket Kulit Jambu Mete Dan Tongkol Jagung Sebagai Bahan Bakar Alternatif. Universitas Hasanudin. Makasar.

Sriharti, Salim, T. dan Sitompul, R. F. 2010. Studi pedahuluan pemanfaatan limbah jarak pagar (*Jatropha curcas lin*n) sebagai bahan bakar alteratif. Seminar Nasional Kluster Riset Teknik Mesin 2009. 13-14 Oktober. Surakarta.

Susanti, P.D. ,and Wahyunigtyas, R.S. 2011. Penambahan BFA dan Zeolit untuk meningkatkan kualitas unsur hara kompos gulma lahan gambut dalam pengelolaan lahan di Kalimantan Tengah. Prosiding Seminar dan Kongres Nasional X Himpunan Ilmu Tanah Indonesia (HITI). Surakarta, 6-8 Desember 2011

Utomo, A. F, dan Primastuti, N,. 2013. Pemanfaatan limbah furniture enceng gondok (*Eichornia crassipes)* sebagai bahan dasar pembuatan briket bioarang. Jurnal teknologi Kimia dan Industri Vol 2 No 2 Tahun 2013 : 220-225.

Wahyuningtyas. R. S., Susanti. P. D., and Ardhana. A. 2012. Briket Dari Gulma Lahan Gambut Sebagai Sumber Energi Alternatif yang Ramah Lingkungan. Laporan Akhir. Balai Penelitian Kehutanan Banjarbaru