Palm Journal

paspi
Palm oil Agribusiness Strategic Policy Institute

Analysis of Palm Oil Strategic Issues Vol. I, No. 21/08/2020

THE URGENCY OF CHANGING THE STATUS OF SPENT BLEACHING EARTH (SBE)

By
Research Team PASPI

RESUME

The refining process of crude palm oil (CPO/CPKO), In addition to producing the main product in the form of RBD Palm Oil (RBDPO), that process also produce by products are Palm Fatty Acid Distillate (PFAD) and solid waste namely Spent Bleacing Earth (SBE). The presence of metal and oil residues, refers to Government Regulations 101/2014 which categorizes SBE as hazardous and toxic materials waste Category 2 waste from a Special Specific Source with code B413. Even though it is categorized as hazardous and toxic materials, SBE processing can produce intermediate input (R-Oil and De-Obe), that can be used to produce construction materials to biodiesel.

However, the large economic potential and business prospects of SBE processing have not been optimally developed. One of the crucial obstacles related to the development of the SBE processing industry in Indonesia is the status of SBE as hazardous and toxic materials. The status is not attractive (disincentive) to investors, because it implies strict procedures and requirements that must be met to manage hazardous and toxic materials waste. In addition, that status also has the potential to affect the image of the product and industry both in the national palm oil industry. When compared to other countries such as Malaysia, India and the European Union, SBE is not categorized as hazardous and toxic materials. This will have further implications, namely the weakening of the competitiveness of Indonesian oil and palm oil derivative products in the global market.

Based on this, it can be seen that the urgency or importance of changing the status of SBE from hazardous and toxic materials to non-hazardous waste should even be categorized as an intermediate input (feedstock) that can be safely utilized by the industry. Government Regulations 101/2014 opens the opportunity to change the category of a hazardous and toxic materials. (Article 7 paragraph 7) with waste characteristic test. Ministry of Industry of the Republic of Indonesia in 2015 through the Letter of the Minister of Industry of the Republic of Indonesia No. 447/M-IND/9/2015 addressed to the Minister of Environment and Forestry of the Republic of Indonesia, proposing recommendations for changing the status of SBE to non-hazardous. However, up to six years after Government Regulations 101/2014 was issued there were no new regulations as feedback from the Minister of Industry's letter.

Good news comes from Regulation of the Minister of Environment and Forestry 10/2020, stated that SBE waste is included in waste category which is shortened procedure for submitting an exception from the category of hazardous and toxic materials waste so that its status can be changed to non-hazardous waste or by-products. Although the Regulation of the Minister of Environment and Forestry does not mention that SBE is removed from the hazardous and material toxic waste category, but this regulation becomes a step that can make it easier for companies or palm oil stakeholders to prove that SBE is not classified as hazardous and material toxic.

With government regulations/policies, it is clear that SBE status as a production input (not hazardous and toxic materials) it is hoped that it will become an incentive for investors in the development of the SBE processing industry in palm oil centers. It is also hoped that the development of the SBE waste processing industry can create large economic benefits such as increased value added, employment and increased income. Another impact of the development of the SBE processing industry is the opportunity for the palm oil industry (refinery to downstream industries) to become a green industry that has successfully implemented the principle of zero waste in its production process..

PRELIMINARY

Previous journal articles discussed the status of Spent Bleaching Earth (SBE) which is categorized as hazardous and toxic materials waste. In addition, we also know the potential for using SBE waste to become a product with high economic value added. The huge potential for utilizing this waste is a pity if it is not developed optimally, especially in the current global trends and preferences that consumers wants eco-friendly products.

However, until now, the development of the SBE waste processing industry in Indonesia has not been widely found in Indonesia. GIMNI (2019) reports that in the last 5 years there were only 3 units and only 2 units operating processing SBE waste using Solvent Extraction technology. In fact, with the large volume of SBE waste produced every year, it takes at least 20 units of SBE waste processing to be placed throughout the Indonesian. In line with GIMNI, KLHK (2020) presents data that currently there are only 11 companies that have permits to manage SBE with a total capacity of 116 thousand tons per year, while the volume of SBE waste continues to increase every year. The implication is the accumulation of SBE waste in open and illegal areas, as happened in Marunda Jakarta (Kompas Daily, 2019).

The low interest from investors and industry to develop an SBE waste treatment unit is thought to be related to the status of SBE waste as hazardous and toxic materials. Referring to Government Regulations 101/2014 regarding the procedures, requirements and permits for processing waste that classified as hazardous and toxic materials is relatively strict. In addition, there is no clarity about the legal status of processed products from SBE whether they are classified as hazardous and toxic materials or not.

Therefore, this paper aims to show the urgency of changing the status of SBE as hazardous and toxic materials, so that it can be used as one of the insights as part of policy recommendations regarding the status and processing/utilization of SBE policies aimed to palm oil stakeholders, especially the Indonesian government and related technical ministries.

OVERVIEW OF THE STATUS AND POTENTIAL USE OF SBE

In addition to producing the main product in the form of RBD Palm Oil (RBDPO), the refining process of crude palm oil (CPO/CPKO) that occurs at the refinery will also produce by products are Palm Fatty Acid Distillate (PFAD) and solid waste namely Spent Bleacing Earth (SBE). The presence of metal and oil residues, refers to Government Regulations 101/2014 which categorizes SBE as Hazardous and Toxic Materials waste Category 2 waste from a Special Specific Source with code B413.

The classification of SBE's waste status as hazardous and toxic materials in Indonesia is than other countries such as Malaysia, India and the European Union. SBE waste produced by the Malaysian refinery industry is not classified as hazardous and toxic materials but is still categorized as solid waste from refinery which the processing is regulated in the Solid Waste Regulation (SWR) so that the waste can be reused into high economic value products.

In contrast to other countries, so far the SBE waste produced by the refinery industry in Indonesia has not been utilized optimally so that it is only an economic cost burden which has further implications on the high production costs of palm oil-based downstream products and declining product's competitiveness. So it is expected that the development of SBE processing technology will be able to produce new resources that are more useful as well as the cost effectiveness of the industry.

One of the SBE waste management technologies is Solvent Extraction (SE). SE technology is also used by the SBE waste processing industry in Malaysia. Through this technology, components in SBE consisting of oil residue (20-30 percent) and solid waste (such as sand) can be separated so that they can produce two products with two different phases, the liquid phase namely Recovered Oil (R-Oil) and the solid phase namely De-oiled Bleaching Earth (De-Obe) with an oil content of less than 3 percent (Figure 1).

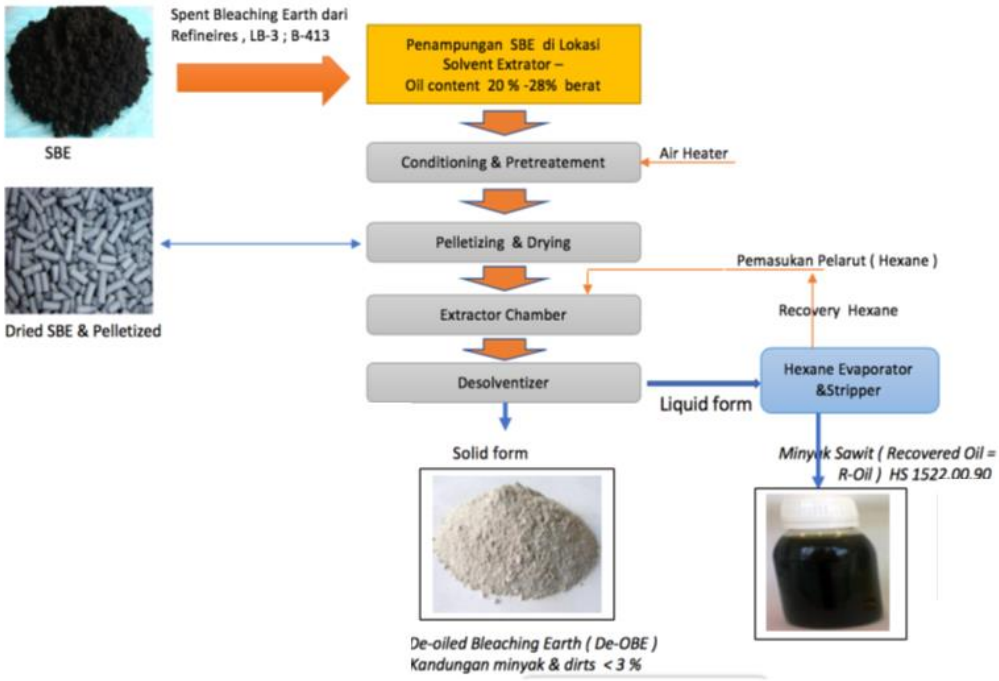

Figure 1. Solvent Extrct Technology for Processing Spent Bleaching Earth Waste (Source: GIMNI, 2019)

Both of these SBE waste treatment products can be used as raw materials to produce various high economic value products. R-Oil (HS 1522.00.90) or Industrial Vegetable Oil can be reused as feedstock for biodiesel (Kheang et al, 2007; Adadetuyi et al, 2014; Suryani et al, 2017) and lubricants/biolubrikan (Abdulbari et al. al, 2011; Widyawati & Ufidian, 2017).

Meanwhile, the SBE-processed solid phase, namely De-OBE, can be directly used for landfill in the process of field or road compaction. The silica and alumina dust content in De-OBE is also suitable for substitution of fine aggregate (natural sand) to produce various construction/building materials such as concrete (Rokiah et al, 2013; Sumarno et al, 2017; Ashari et al, 2017), cement (Tee, 2010) and brick (Abrar & Nuryasin, 2019). Nutrient content of N, P, K, C: N ratio, balanced pH in SBE and De-OBE has the potential to be used as raw material for bio-organic fertilizer (Cheong et al, 2013; Loh et al, 2015). In addition to organic fertilizer, higher level of silica content in De-OBE can also be used as raw material for NPK fertilizer (Purba et al, 2018; Anugrah et al, 2020).

De-OBE which still contains palm oil can also be directly mixed with soybean meal and other ingredients to produce nutritious animal feed (Chang et al, 2006; Justia, 2016). De-OBE products can also produce Bleaching Earth/RBE Reactivation as a form of BE recycle that can be reused in the CPO refining process (Damayanti, 2019).

The various empirical studies above show the large potential for the use of SBE as raw material to produce high economic value products. SBE waste is also more appropriately categorized as an intermediate product (feedstock) that can be used as a production input, not waste especially hazardous and toxic waste.

THE URGENCY OF CHANGING THE STATUS OF SBE AS HAZARDOUS WASTE BECOME PRODUCTION INPUT (FEEDSTOCK)

Along with the increase in palm oil refenery activity, it will increase the volume of SBE waste produced. The Ministry of Environment and Forestry (2020) explained that SBE waste volume data continues to

increase, from 184 thousand tons in 2017 to 637.5 thousand tons in 2018 and continues to increase to 778.8 thousand tons in 2019. Meanwhile, the SBE management industry in Indonesia is still relatively low, with only 11 companies has a license to manage SBE with a total capacity of 116 thousand tons per year.

These gap has implications for outflow congestion as indicated by the accumulation of SBE waste in open and illegal areas. The SBE stockpile also has the potential to create legal risks both for the refinery industry and waste management service providers, if the waste is only left on open land. The case occurred in Marunda, Jakarta in January 2019 with a maximum of three years' imprisonment and a three billion fine (Harian Kompas, 2019).

On the other hand, there are many empirical studies that show the great potential of using SBE as raw material to produce high economic value products. The market opportunity for processed products from SBE waste is also expected to be bright in the future, along with the development of market preferences that require the availability of eco-friendly and sustainable products. This should be an incentive for industry to invest in SBE waste management. However, the development of the waste processing industry, especially SBE waste and industries that use SBE as production input in Indonesia are still very low, even though the economic value and market prospects of SBE processed products are quite high.

One of the crucial obstacles related to the development of the SBE processing industry in Indonesia is the status of SBE waste as hazardous and toxic materials. That categorize is not attractive to investors (disincentive), because it implies strict procedures and requirements that must be fulfill to manage B3 waste as stated in the Government Regulations 101/2014. The regulation also does not explain clearly about the status of processed SBE products, especially De-OBE, whether they are classified as B3 waste or not. This uncertainty in status has also lowered investors's interest in developing the SBE processing industry.

In addition hampering the SBE processing industry, the status of hazardous and toxic materials that is labeled on SBE waste in Indonesia also has the potential to affect the image of the palm oil-based food industry such as the national palm cooking oil industry. Consumers can interpret and accuse that the production process at the MGS factory and other palm-based food products has been contaminated by hazardous and toxic components that produce waste categorized as hazardous and toxic materials. So that it considers palm cooking oil and other palm oil-based food products to contain hazardous components or contaminated with it which is can endangers health. The allegations will harm both producers of palm oil-based food industry. The implication will further reduce the competitiveness of Indonesian oil and palm oil derivative products in the global market.

Based on the implications of the status of SBE waste which is categorized as hazardous and toxic materials on the development of the SBE waste processing industry and the image of the oil palm-based food industry, it is necessary to reassess the status of SBE waste. Government Regulations 101/2014 opens the opportunity to change the category of a hazardous and toxic materials. (Article 7 paragraph 7). A waste can change from the status of hazardous and toxic materials to non-hazardous waste, if it passes the Toxicity Characteristic Leaching Procedure (TCLP) test and the toxicology test (Article 5 paragraph 4). So that based on this test, it can be ascertained whether the SBE waste produced by refinery factories and the downstream palm oil industry in Indonesia can be converted into non-hazardous waste, such as regulations in Malaysia or even categorized as feedstock.

Ministry of Industry of the Republic of Indonesia in 2015 through the Letter of the Minister of Industry of the Republic of Indonesia No. 447/M-IND/9/2015 addressed to the Minister of Environment and Forestry of the Republic of Indonesia, proposing recommendations for changing the status of SBE to non-hazardous. This aims to guarantee legal certainty as well as open up business opportunities for the use

of SBE, improve the image of the palm oil industry, and increase the competitiveness of the palm oil industry and the national palm oil-based downstream industry. However, up to six years after Government Regulations 101/2014 was issued there were no new regulations as feedback from the Minister of Industry's letter.

In 2020, there is the latest news update from the Ministry of Environment and Forestry of the Republic of Indonesia, which issued Regulation of the Minister of Environment and Forestry No. 10 of 2020 (Permen LHK 10/2020) concerning Procedures for Characteristics Testing and Determination of the Status of Hazardous and Toxic Waste. SBE waste is included in the four hazardous and toxic materials waste which are included in the waste category which is shortened procedure for submitting an exception from the category of Hazardous and Toxic Materials waste so that its status can be changed to non-hazardous waste or by-products.

Although the Regulation of the Minister of Environment and Forestry does not mention that SBE is removed/eliminated from the hazardous and toxic materials category, this regulation becomes a step that can make it easier for companies or palm oil stakeholders to reasses so that it can prove that SBE is not classified as hazardous and toxic materials. The guaranteed status of SBE as not as hazardous and toxic materials also have implications for legal certainty regarding the status of processed SBE products, especially De-OBE, which are not classified as hazardous and toxic and safe to be used as industrial raw materials. Apart from certainty of status, regulations are also needed to guide the management of SBE into new resources that can be utilized (R-Oil and De-OBE).

With government regulations/policies, it is clear that SBE status as a production input (not hazardous and toxic materials) it is hoped that it will become an incentive for investors in the development of the SBE processing industry in palm oil centers. It is also hoped that the development of the SBE waste processing industry can create large economic benefits such as increased value added, employment and increased income. Another impact of the development of the SBE processing industry is the opportunity for the palm oil industry (refinery to downstream industries) to become a green industry that has successfully implemented the principle of zero waste in its production process.

CONCLUSION

In the process of refining crude palm oil (CPO/CPKO) it will produce main product and by product, the process will also produce Spent Bleacing Earth (SBE) waste. Refers to Government Regulations 101/2014 which categorizes SBE as hazardous and toxic materials. Even though it is categorized as hazardous and toxic materials, however SBE has a large potential economic value to be used as an input (feedstock) that can produce construction materials to biodiesel.

However, the large economic potential and business prospects of SBE processing have not been optimally developed. One of the crucial obstacles related to the development of the SBE processing industry in Indonesia is the status of SBE as hazardous and toxic materials. The categorization of SBE as hazardous and toxic materials is not attractive (disincentive) to investors, because it implies strict procedures and requirements that must be met to manage Hazardous and Toxic Materials waste. In addition, the status of hazardous and toxic materials in Indonesia also has the potential to affect the image of the product and industry both in the national palm oil industry. When compared to other countries such as Malaysia, India and the European Union, SBE is not categorized as hazardous and toxic materials. This will have further implications, namely the weakening of the competitiveness of Indonesian oil and palm oil derivative products in the global market.

Based on this, it can be seen that the urgency or importance of changing the status of SBE from hazardous and toxic materials to non-hazardous waste should even be categorized as an intermediate input (feedstock) that can be safely utilized by the industry. Good news comes from Regulation of the Minister of Environment and Forestry 10/2020, although the Regulation of the

Minister of Environment and Forestry does not mention that SBE is removed from the hazardous and material toxic waste category, but this regulation becomes a step that can make it easier for companies or palm oil stakeholders to prove that SBE is not classified as hazardous and material toxic. Thus, it can be an incentive for investors to develop the SBE processing industry which can produce a large multiplier effect for the regional economy as well as an opportunity for the palm oil industry to become a green industry.

REFERENCES

Abdulbari HA, Rosli MY, Abdurrahman HN, Nizam MK. 2011. Lubricating Grease from Spent Bleaching Earth and Waste Cooking Oil: Tribology Properties. *International Journal of the Physical Sciences*. 6(20): 4695-4699.

Abrar A, Nuryasin A. 2019. Studi Eksperimen Pemanfaatan Limbah Spent Bleaching Earth (SBE) Sebagai Bahan Pembuat Bata. *Siklus: Jurnal Teknik Sipil*. 5(2): 70-78.

Aladetuyi A, Olatunji GA, Ogunniyi DS, Odetoye TE, Oguntoye SO. 2014. Production and Characterization of Biodiesel using Palm Kernel Oil; Fresh and Recovered from Spent Bleaching Earth. *Biofuel Research Journal*. 4: 134-138.

Anugrah C, Indradewa D, Putra ETS. 2020. Biochemical Response of Hybrid Maize (Zea mays L.) to NPK Fertilization Based on Spent Bleaching Earth in Field Scale. *E3S Web of Conferences*. 142: 1-9.

Ashari ML, Dermawan D, Sunarya RB. 2017. Pemanfaatan Limbah Padat Spent Bleaching Earth pada PT. SMART Tbk. Surabaya Sebagai Pengganti Agregat Halus pada Campuran Beton. *Jurnal Presipitasi: Media Komunikasi dan Pengembangan Teknik Lingkungan*. 15(1): 7-10.

Chang JI, Tai HS, Huang TH. 2006. *Regeneration of Spent Bleaching Earth by Lye-Extraction. Environmental Progress & Sustainable Energy*. AICHE The Global Home of Chemical Engineers. New York (NY).

Cheong KY, Loh SK, Salimon J. Effect of Spent Bleaching Earth based Bio Organic Fertilizer on Growth, Yield and Quality of Eggplants under Field Condition. *AIP Conference Proceedings.* 1571: 744-748.

Damayanti C. 2019. *Pengaruh Jenis dan Konsentrasi Asam Terhadap Proses Reaktivasi Spent Bleaching Earth (SBE) Hasil Samping Produksi Biosolar* [Skripsi]. Bandar Lampung (ID): Universitas Lampung.

GIMNI. 2019. *Menuju Green IHK-Sawit*. Dipresentasikan pada : FGD Pembahasan & Diskusi Pengolahan Limbah B3. Jakarta (ID), 22 April 2019.

Justia. 2016. *Use of Edible-Oil-Processing Spent Bleaching Earth in Formulating Poultry and Livestock Feed Products*. Dimuat di www.patents.justia.com pada tanggal 4 Maret 2016.

Ministry of Environment and Forestry. 2020. *Peraturan Menteri LHK Nomor 10 Tahun 2020*, *Alternatif Solusi KLHK untuk Pengelolaan Limbah B3 Spent Bleaching Earth* [internet]. Tersedia pada: http://ppid.menlhk.go.id/siaran_pers/browse/2535

Kheang LS, May CY, Ngan MA. 2007. *Residual Oil from Spent Bleaching Earth (SBE) for Biodiesel and Biolubricant Applications.* MPOB Information Series No. 367.

Loh SK, Chong KY, Choo YM, Salimon J. 2015. Formulation and Optimisation of Spent Bleaching Earth-Based Bio Organic Fertiliser. *Journal of Oil Palm Research*. 27(1): 57-66.

Majid RA, Mat CRC. 2018. Application of Regenerated Spent Bleaching Earth as Adsorbent for Treatment of Palm Oil Mill Effluent. *Palm Oil Enginerring Bulletin*. 127: 38-44

PASPI [Palm Oil Agribusiness Startegic Policy Institute]. 2020. Spent Bleaching Earth (SBE), The Hidden Treasure From Waste of The Palm Oil Refinery Plant. Jurnal Monitor. 20 (1): 131-136

Purba RS, Irwan SNR, Putra ETS. 2020. The Effect of Spent Bleaching Earth Filler-Based NPK Fertilization on Proline,

Growth and Yield of Maize. *Caraka Tani: Journal of Sustainable Agriculture.* 35(1): 44-53.

Rokiah O, Khirunnisa M, Youventharan D, Arif SM. 2019. Effect of Processed Spent Bleaching Earth Content on the Compressive Strength of Foamed Concrete. *IOP Conf. Series: Earth and Environmental Science.* 244: 1-10.

Sumarno A, Widodo E, Nugroho A, Triastuti, Suryanegara L. 2017. Pemanfaatan Limbah Spent Bleaching Earth (SBE) dari Industri Pengolahan Minyak Kelapa Sawit pada Aplikasi Bata Beton. *Prosiding Seminar Lignoselulosa. Pusat Penelitian Biomaterial, Lembaga Ilmu Pengetahuan Indonesia (LIPI).* Bogor (ID).

Suryani A, Mubarok Z, Suprihatin, Romli M, Yunira EN. 2017. Process Design of in situ Esterification-Transesterification for Biodiesel Production from Residual Oil of Spent Bleaching Earth (SBE). *IOP Conf. Series: Earth and Environmental Science 65.*

Tee CK. 2010. *Performance of Spent Bleaching Earth as Cement Replacement in Concrete*. Malaysia (MY): University Malaysia Pahang.

Widyawati Y, Ufidian D. 2017. Pengaruh Penambahan Spent Bleaching Earth pada Minyak Nyamplung untuk Gemuk Lumas. *Konversi*. 6(1): 1-6.