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Takhrij and Syarah Hadith of Chemistry: The Perspective of Hadith in Protecting the Environment and Processing Hazardous and Toxic Waste (B3)

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Abstract

The purpose of this research is to discuss the hadith of the Prophet, rarding sustainable of environment and treating poisoned hazardous waste. This research method is qualitative through the takhrij and sharah hadith approaches with chemical analysis. The discussion result of researchis that keeping environment and recycling B3 waste is important, because it prevents the occurrence of fading in live and the environment. The conclusion of this research are takhrij and syarah hadiths of the Prophet. about the harm with chemical analysis proves that environment sustainable and B3 waste recycle is important for human.

Keywords: Chemistry, Disadvantage, Environment, Hadith, Waste

Introduction

The more industrial development in the world during the industrial revolution 4.0 era, the waste produced has increased. Waste is something useless, which is generated from a process either by industry or domestically (Widjajanti Endang, 2009). If it is mistreated, industrial and domestic waste, especially B3 waste, will endanger human health and natural ecosystems (Widyasari, 2008). In human health, it can cause nerve damage, respiratory system damage, skin damage, cardio vascular damage, and death. Meanwhile, natural ecosystems will pollute soil, water, air and biota (Putra et al., 2019). But behind this impact, there are still people who are not aware of the importance of protecting the environment from waste, especially B3 waste (Setiyono, 2001).

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Therefore, it is necessary to have research on waste treatment with qualitative research methods from the hadith perspective. Research carried out to encourage and make people aware of the importance of treating good waste from the hadith perspective for the sake of maintaining a good environment. As in the hadith of the Prophet. with regard to the prohibition of doing harm and causing harm to the Musnad Ibnu Majah number 2331:

حَدَّثَنَا عَبْدُ رَبِّهِ بْنُ خَالِدٍ النُّمَيْرِيُّ أَبُو الْمُغَلِّسِ حَدَّثَنَا فُضَيْلُ بْنُ سُلَيْمَانَ حَدَّثَنَا مُوسَى بْنُ عُقْبَةَ حَدَّثَنَا إِسْحَقُ بْنُ يَحْيَى بْنِ الْوَلِيدِ عَنْ عُبَادَةَ بْنِ الصَّامِتِ أَنَّ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ قَضَى أَنْ لَا ضَرَرَ وَلَا ضِرَارَ

Has narrated to us Abdu Rabbih bin Khalid An Numairi Abu Al Mughallis spoke, has narrated to us Fudlail bin Sulaiman spoke, has narrated to us Musa bin Uqbah speaking, has narrated to us Ishaq bin Yahya bin Al Walid from Ubadah bin Ash Shamith spoke, "Rasulullah ﷺ decided that it is not permissible to do harm and things that cause harm."

Based on the above description, the research formula was prepared, namely the problem formulation, research questions, and research objectives (Darmalaksana, 2020a). The summary of this problem is that there is a hadith of the Prophet ﷺ about the prohibition of the use of harm and the problem of harm. The question of this study is how the hadith of the Prophet ﷺ about caring for the environment and processing the waste of hazardous and toxic materials. The purpose of this research is to discuss the hadith of the Prophet ﷺ about caring for the environment and processing waste of hazardous and toxic substances.

Research Methods

This research method is qualitative through literature and field studies (Darmalaksana, 2020b). Meanwhile, the approach applied is takhrij and syarah hadith (Soetari, 2015). The interpretation in this study used an approach with chemical analysis (Kardono, 2016).

In general, there are two stages of research on hadith, namely takhrij and syarah. Takhrij is the process of extracting a hadith from a hadith book to examine its validity, while syarah is an explanation of the hadith text with a certain analysis (Soetari, 2015). The field of chemistry itself, as a means of interpretation in this research, is the science that studies the structure of matter, composition of matter, properties, and changes in matter that occur when a chemical substance interacts with others, as well as an orderly and directed treatment of B3 waste (Ichtiakhiri & Sudarmaji, 2015).

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Results and Discussion

Initially, the search was carried out through the hadith application about keywords "disadvantage" until the hadith was found in the book Musnad Ibnu Majah Number 2331, as previously disclosed.

Table 1. List of Rawi Sanad

No.	Rawi Sanad	Birth/Death		Country	Kuniyah	Ulama's Comments		Circle
		B	D			-	+	
1	Ubadah bin Ash-Shamit bin Qais		34 H.	Madinah	Abu Al-Wlid		Shahabat	Shahabat
2	Disconnected							Tabi'ut Tabi'in Old people
3	Ishaq bin Yahya bin Al-Walid		131 H.	Madinah		Majhulul hal		Tabi'in ordinary people
4	Musa bin 'Uqbah bin Abi 'Ayyasy		141 H.	Madinah	Abu Muhammad		- Tsiqah - Tsiqah - Tsiqah - Tsiqah - Tsiqah - Tsiqah, faqih - Tsiqah mufti	Tabi'in
5	Fudloil bin Sulaiman		185 H.	Bashrah	Abu Sulaiman	- Laisa bi tsiqah - Laisa bi qowi - Laisa bi qowi - Shaduuq is wrong a lot - Layyin		Tabi'ut Tabi'in Among the middle
6	Abdu Rabbih bin Khalid bin 'Abdul Malik		242 H.	Bashrah	Abu Al-Mughallis		- It is mentioned in 'ats tsiqaat - Maqbul - Shaduuq	Tabi'ul Atba 'Old people
7	Muhammad bin Yazid	207 H.	273 H.	Qazwin	- Abu Abdullah		- Imam fi Al-hadis	Mudawin

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No.	Rawi Sanad	Birth/Death		Country	Kuniyah	Ulama's Comments		Circle
		B	D			-	+	
					- Imam Ibnu Majah			

Table 1 is a list of the hadith narrators and sanad under study. Rawi is the narrator of hadith while sanad is the chain of narrators from companionship to mudawin, namely scholars who record hadiths in the hadith book (Soetari, 1994). According to the science of hadith, the requirement for a sahih hadith is that the rawi must be positive according to the comments of the scholars. If there is a commentary from a scholar who gives a negative assessment to one of the narrators in the sanad lane, then the hadith is a hadith dhaif (Darmalaksana, 2020d). Sahih hadith is a strong hadith while dhaif hadith is a weak hadith (Soetari, 1994). Requirements for sahih hadith must also be continued. If the hadith sanad is broken, then the hadith is a dhaif hadith. The proof of continuity is meeting between teacher and student. If there is no objective evidence, the encounter between teacher and pupil can be seen from birth and death. If there is no data on births and deaths, it is predicted that the average age of scholars is around 70-90 years. The meeting of teachers and students can also be seen from the narrator's life journey. If the teacher and student are in the same place, it is predicted that the teacher and student will meet (Darmalaksana, 2020d).

The quality of this hadith is hasan. Because, from the side of the narrator, there were comments from scholars who gave negative assessments. Also from the sanad side there is a disconnect between Ubadah bin Ash-Shamit and Ishaq bin Yahya. However, this hadith does not reach the level of dhaif for several reasons, namely Ibn Majah always includes syahid and mutabi in the hadiths he narrates, the text of the hadith does not contradict the Al-Qur'an and also does not contradict common sense, and the content of this hadith is an appeal to kind. Basically the science of hadith has another parameter in providing reinforcement to hadith. Among other things, hadith are called mutawatir in a very popular sense if the hadiths are being examined in several hadith books (Soetari, 2015). The distribution of this hadith acts as syahid and mutabi. Syahid is another hadith of a kind whereas mutabi is another sanad (Darmalaksana, 2020d). The rest, as far as hadith is the virtue of Islamic practice, it can be argued even though its status is dhaif (Darmalaksana et al., 2017).

The scholars have given syarah, namely an explanation of the content and meaning of the hadith (Darmalaksana, 2020c). According to the views of the scholars, this hadith explains the prohibition of doing harm and

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things that cause harm. According to Ibn Taymiyyah, mudharat is anything that can harm oneself or others if it is done (Jetta, 2010). This hadith can also be related to the chemical sector concerning B3 waste treatment. Hazardous waste is included in dangerous objects. According to Menahan (1994), a dangerous object is a material that can cause something dangerous to the organism's life, material, environment, or building due to explosion, fire, corrosion, or poisoning to organisms. Meanwhile, according to PP. 18 of 1999 the definition of waste is the remainder of a business or activity. So B3 waste is the residue of a business or activity that contains hazardous and toxic materials due to its nature, concentration, or quantity, either directly or indirectly which can endanger the environment, health and living things (Riyanto, n.d.).

The hazardous waste produced by the industry is inseparable from chemicals that make it dangerous. Chemical substances are dangerous due to chemical reactivity, fire hazard, poisoning hazard, and so on. There are various kinds of dangerous substances in between:

1. Toxic
   Toxic are ingredients and formulations marked with a hazard notation that they can cause chronic health damage if they enter the body or come into direct contact with the body. The precautions to avoid are not to swallow, do not inhale and avoid direct skin contact. Examples include chromium, arsenic and carbon monoxide (Subamia et al., 2019).
2. Very Toxic
   Very Toxic is a material that is very toxic and very dangerous to health. In addition, it can cause chronic pain and death. The action that must be taken is to avoid direct contact with the body and respiratory system. For example potassium cyanide, hyrogen sulfide, nitrobenzene, and atripine (Subamia et al., 2019).
3. Irritant
   Irritants are substances that can cause irritation, itching, and cause burns to the skin. Actions to be taken avoid direct contact with the body. Example: $NaOH$, C_6H_5OH, and Cl_2 (Subamia et al., 2019).
4. Harmful
   Harmful is a dangerous substance that can damage the health of the body if it comes in direct contact with the body through inhalation. The precautions to take are do not inhale, do not swallow, and avoid direct contact with skin. Examples include ethylene, glycol, and dichloromethane (Subamia et al., 2019).
5. Corrosive Subtances
   Corrosive Subtances are hazardous substances that are corrosive, can irritate the skin, and make the skin peel. Examples include sulfuric acid, acid chloride, nitric acid, and hydrocarbons (Subamia et al., 2019).

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6. Flammable
   Flammable is a hazardous material that has a low flash point so it is easily flammable when exposed to a bunsen fire, hot metal surface, or sparks. The action that must be done is to keep it away from objects that have the potential to emit fire. For example, the oil has stopped (Subamia et al., 2019).
7. Very Flammable
   Very Flammable is a material that is flammable under atmospheric conditions or has a low flash point (below 21°C) so it burns easily under humidity. The action that must be taken is to avoid institutional influence, avoid sparks, open flames, and sources of ignition. For example acetone and sodium metal (Subamia et al., 2019).
8. Extrem Flammable
   Extrem Flammable is a very dangerous and highly flammable material. Substance in the form of gas and air which forms explosive mixtures under normal conditions. The action to do is keep away from the mixture of air and sources of ignition. For example diethyl ether and propane (gas) (Subamia et al., 2019).
9. Explosif
   Explosive is a chemical that is explosive in the presence of heat or sparks, friction or impact. The action that must be taken is to avoid blows / collisions, friction, heating, fire and other sources of ignition even without atmospheric oxygen. For example $KCLO_3$, NH_4NO, and TNT (Subamia et al., 2019).
10. Oxidizing
    Oxidizing is a chemical that has oxidizing properties, it can cause fires by generating heat on contact with organic materials. The action that must be done is to keep it away from heat and reducing agents, for example, benzyl peroxide (Subamia et al., 2019).
11. Dengerous for the environment
    Dengerous for the environment is a material that can cause rapid ecosystem disruption. The action that must be taken is to avoid contact or mixing with the environment. An example of tributyl tin chloride (Subamia et al., 2019).

The types of materials that have been mentioned are some of the materials that are harmful to both health and the environment. In the process of sewage treatment should refer to a well-organized system, through which a proper pathway to destruction or disposal that maintains human health and natural ecosystem. Therefore based on PP. 18 of 1999 concerning the treatment of hazardous and toxic waste. B3 waste processing is the process of changing the characteristics, amount and type of B3 waste

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to be harmless or non-toxic, so that it can be reused (recycled). The process of treating B3 waste includes reduction, storage, collection, transportation, utilization, processing and/or landfilling (Kementrian LHK, 2020). If simplified, B3 waste processing can be carried out by means of physical and chemical processing, stabilization or solidification, and inceneration.

Physical and chemical processing aims to reduce the toxicity of B3 waste and/or eliminate its characteristics from being dangerous to being harmless. The process of stabilization or solidification is a process that aims to update the physical and chemical properties of B3 waste by adding a B3 binder, so that the movement of B3 compounds is inhibited so that it forms a monolithic mass with a dense structure (Riyanto, n.d.). Meanwhile, the incineration process is a process that aims to destroy the B3 compounds contained therein into compounds that do not contain B3 substances (Riyanto, n.d.).

The physical and chemical processing processes contained in Kep-Men 13/1995 or stipulated by Bapedal are strengthened and clarified in the Indonesian government regulation No. 101 of 2014 concerning B3 waste treatment (Pemerintah Pusat, 2014). Chemical processing can be carried out by means of reduction and oxidation, electrolysis, neutralization, precipitation, solidification, absorption, ion exchange, and/or pyrolysis. In addition, there is a physical processing process that can be carried out by means of electrostatic precipitators, particle filtering, wet scrubbing, and adsorption with activated carbon. In sewage treatment it is also necessary to separate liquids and solids which can be done by means of centrifugation, clarification, coagulation, filtration, flotation, sedimentation, or thickening. In addition, to be more specific, it is necessary to remove components by means of adsorption, crystallization, dialization, electrodialysis, evaporation, leaching, reverse osmosis, solvent extrtion, or stripping (Riyanto, n.d.).

The next process is to use a stabilization or solidification system, a B3 waste treatment stage to reduce the toxicity and B3 waste content by limiting the solubility of movement dan its toxicity (immobilization of toxic elements) so as to form a monolithic mass bond with a stocky structure before the B3 waste is disposed of in the final landfill. The solidification process requires several mixing materials such as gypsum, lime, fly ash, and so on, as well as adhesives such as lime, cement, clay, and so on (Riyanto, n.d.).

The steps for the stabilization process are as follows:

1. Analyze the characteristics of B3 waste to determine the materials used for stabilization;
2. The TCLP test stage is to measure the concentration in leachate (extract/eluate). The test results must not exceed the predetermined

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limits, one of which is the level of pollution concentration which has been low so that it is not dangerous (LHK, 2020);
3. The compressive strength test stage with the "Soil Penetrometer Test" with a pressure value of 10 tons/m^2 and passes the "paint filter test";
4. If it has been declared to have passed the TCLP test, it must be stockpiled at a landfill (TPA) that has been determined by the government in accordance with the stipulated procedure.

Incineration process (thermal treatment) incineration is a combustion process which is a process of oxidizing fuel (biomass) using excess air in the reactor (Naryono et al., 2015). In its implementation, it is necessary to pay attention to the surrounding conditions and the tools used must be operational standards in order to maintain a good environment.

The process that must be considered at the last stage of waste treatment is landfilling. B3 waste landfilling is an activity of placing B3 waste in a place that has been determined underground with the aim of not endangering human health and the environment around it. The provisions that must be considered in the landfilling of B3 waste include the person piling it up from a business entity that is tasked with landfilling B3 waste or it is carried out by the party generating B3 waste (Riyanto, n.d.).

B3 waste landfilling is obliged to make and keep documents related to waste such as:
1. The source of the B3 waste dumped;
2. Type, characteristics, and amount of B3 waste landfilled;
3. The name of the transporter of the B3 waste.

Documents or records regarding said waste must be reported at least once every six months to the responsible agency with a copy to the relevant agency such as the government (to the level II region) concerned (Riyanto, n.d.). These data are used for information material either in evaluation or in protecting the surrounding environment.

The location requirements used for B3 waste landfill are as follows:
1. Tidak banjir;
2. The maximum soil permeability is 10^{-7} centimeters per second;
3. The place according to the placement by the spatial planning agency;
4. A place that is geologically not prone to disasters, not a dense settlement, and outside a protected area;
5. Not a water catchment area, especially for consumption needs.

This requirement aims to protect the environment from B3 waste. Apart from that, the landfill of B3 waste must be equipped with an inner and outer layer, a cover, a water flow channel and a monitoring well. All of these things are based on the agreement of the person in charge (Kementrian LHK, 2020).

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In a location that is no longer operated, it is obliged to fulfill the things that have been determined, namely:

1. Cover the top of the hazardous waste landfill at least 0.60 meters deep;
2. Monitor the location of the hazardous waste landfill and mark the location for the landfill;
3. Monitor the condition of the sekidar, whether it is water, soil, or plants around the location;
4. The hoarding location is prohibited from being used as a public place, such as a settlement, or anything else (Riyanto, n.d.).

Thus the location for the landfill of B3 waste must comply with the provisions stipulated by the regulations concerning B3 waste treatment.

Conclusion

Hazardous and toxic waste (B3) is industrial waste that has characteristics, concentration, and/or quantity that can harm the natural ecosystem either directly or indirectly. In the processing process, it is regulated in detail so as not to cause harm to living things and the environment. The waste treatment process can be carried out by means of physical and chemical processing, stabilization or solidification, and / or inceneration. It is hoped that this research will have benefits for entrepreneurs related to chemical substances. Admittedly this research has limitations, namely simple takhrij and sharah hadith, so that a more adequate follow-up research through chemistry is needed. This study recommends that entrepreneurs related to chemical substances can treat B3 waste dan protect the environment together with the ministry of environment and forestry.

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