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Making Biogas Using Polyethylene Plastics By Hery Koesmantoro

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Making Biogas Using Polyethylene Plastics Hery Koesmantoro1, Karno2, Beny Suyanto3 1,2&3Health Polytechnic of Ministry of Health in Surabaya, Indonesia Abstract Waste that is not managed properly can pollute the environment and cause health problems for humans. One strategic effort that can be applied is to utilize cow dung waste as biogas and liquid organic fertilizer. In general, biogas digester is a permanent tub of concrete, but in Milangasri Village, Panekan Subdistrict, Magetan Regency, East Java Province, Indonesia has made biogas digester in the form of polyethylene plastic. This biogas digester is easier to manufacture and does not cost a lot. In addition to reducing environmental pollution and improve public health, this technology is also an appropriate form of empowerment efforts that can improve economic resilience of community. Keywords: Biogas, Cow dung, Polyethylene plastic. I. INTRODUCTION Waste that is not managed properly will pollute the environment and can cause health problems for humans. Therefore, waste should be well managed, for example used as raw material for other products. One type of waste is cow dung derived from cattle farms. Within about 6 months, this new waste can be used as manure. By using appropriate technology, cow manure can be used as a raw material for making biogas as well as an environmentally friendly liquid organic fertilizer. In Milangasri Village, Panekan Subdistrict, Magetan Regency, East Java Province, Indonesia there are about 15 families of cattle ranchers, with a total of 30 cows. In a day, a cow can produce about 10 kg of cow dung, so the total cow dung that can be produced by the whole cow is about 300 kg per day. In addition to cow dung, each cow also produces approximately 2 liters of urine per day, so the total urine produced is about 60 liters per day. Based on the above explanation it can be said that the utilization of cow dung as a raw material of biogas is a strategic effort in order to obtain alternative energy sources, as well as a manifestation of human resource development efforts. This effort also has a positive impact economically, which can increase the economic resilience of local communities. II. PROCESS OF BIOGAS MAKING Figure 1 and Figure 2 show schematically the sequence of the process of making biogas with cow dung as the base material, and using polyethylene plastic as biogas digester. Figure 1. The Process of Biogas Making Using Polyethylene Plastic as Biogas Digester (Global) Figure 2. The Process of Biogas Making Using Polyethylene Plastic as Biogas Digester (Detail) The following is the sequence of steps of making biogas with polyethylene plastic as biogas digester: 1. Choosing the right location near the cow shed. 2. Measurement of digester. 3. Making brick of digester brick. 4. Making digester from plastic. 5. Making Inlet tub and outlet. 6. Installation of inlet valves and outlets. 7.

Installation of piping installation. 8. Installation of gas container. 9. Installation of gas stove. 10. Specimen preparation of cow dung and dilution water. 11. Biogas trial. The manufacturing process as described above takes approximately 6 days. Furthermore, cow dung and water can be put into it with a ratio of 1: 2. The digester filling is carried out for 21 days and if the gas container has been visibly inflated, the gas stove can be switched on. To avoid full biogas digester after 21 days, the contents should be removed with the same volume as the fill volume. Thus, the proportion of the digester volume is: ¾ part is cow dung and water, whereas ¼ part is a space containing biogas. Dama International Journal of Researchers, www.damaacademia.com, editor@damaacademia.com 53 III. DISCUSSION Preparation of practical biogas as described above can be done alone by the community of cattle ranchers, with assistance by lecturers and instructors from the Department of Environmental Health in Magetan which is part of the Health Polytechnic of the Ministry of Health in Surabaya. This activity is a manifestation of the dissemination of appropriate technology with low cost and easy application, but provides many advantages for the community, which includes aspects of knowledge and skills. Economically, the project is also benefiting from energy savings. Ecologically, this project can also provide many advantages, among others, can reduce environmental pollution and health problems in humans that occur due to cattle dung. During the course of the above project were found several obstacles are: 1. Schedule of activities must follow the willingness of the local community 2. Placement of the digester requires special land for maintenance easier 3. Plastic polyethylene with a thickness of 0.8 mm easily torn, so it takes 3 layers of plastic in the implementation in the field 4. Polyethylene plastics are susceptible to sharp objects and animal disturbances, requiring strict custody 5. Polyethylene plastic can not be used for more than 5 years IV. CONCLUSION This biogas digester is easier to manufacture and does not cost a lot. In addition to reducing environmental pollution and improve public health, this technology is also an appropriate form of empowerment efforts that can improve economic resilience of community. REFERENCES 1. Herdiyanto, 2009. Biogas: Alternative Bahan Bakar Masa Depan. Bandung: Universitas Padjadjaran. 2. Fakultas Peternakan Universitas Padjadjaran, 2017. Modul Pelatihan Pengembangan Biogas Limbah Peternakan. Bandung: Universitas Padjadjaran. 3. Karno, 2011. Teknologi Pemanfaatan Limbah. Madiun: IKIP PGRI. 4. Karno, Beny Suyanto, Hery Koesmantoro, 2013. Panduan Praktis: Membuat Biogas itu Mudah dan Murah. Surabaya: Poltekkes Kemenkes Surabaya. 5. Kementerian Dalam Negeri RI, 2012. Petunjuk Teknis OIperasional Pengembangan Desa Mandiri Berbasis Biogas. Jakarta: Direktorat Jenderal Pemberdayaan Masyarakat dan Desa. 6. Peraturan Menteri Riset, Teknoogi dan pendidikan Tinggi RI Nomor 44 Tahun 2015 tentang Standar Nasional Pendidikan Tinggi. 7. Unit Pelayanan dan Pengabdian Kepada Masyarakat Poltekkes Kemenkes Surabaya. 2016. Pedoman Penulisan Proposal Pengabdian Masyarakat. Surabaya: Poltekkes Kemenkes Surabaya. 8. Wikipedia. 2017. Plastic. https://en.wikipedia.org/wiki/Plastic Dama International Journal of Researchers (DIJR), ISSN: 2343-6743, ISI Impact Factor: 1.018 Vol 2, Issue 6, June, 2017, Pages 52 - 54, Available @ www.damaacademia.com Dama International Journal of Researchers (DIJR), ISSN: 2343-6743, ISI Impact Factor: 1.018 Vol 2, Issue 6, June, 2017, Pages 52 - 54, Available @ www.damaacademia.com Dama International Journal of Researchers (DIJR), ISSN: 2343-6743, ISI Impact Factor: 1.018 Vol 2, Issue 6, June, 2017, Pages 52 - 54, Available @ www.damaacademia.com Dama International Journal of Researchers, www.damaacademia.com, editor@damaacademia.com 52 Dama International Journal of Researchers, www.damaacademia.com, editor@damaacademia.com 54