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SOCIALIZATION OF COCONUT SHELL LIQUID SMOKE AS A DEODORANT OF FOUR-LEGGED LIVESTOCK MANURE IN LOBANG, KARANGANYAR

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Abstract - *This study aims to address the issue of unpleasant odors from cattle manure in Dusun Lobang, Karanganyar, Central Java, by applying liquid smoke derived from coconut shells. The primary problem identified is the ammonia odor that disrupts community comfort. The methods employed include observation, socialization, and practical training in liquid smoke production, followed by direct application to livestock shelters. The results indicate that liquid smoke effectively reduces unpleasant odors gradually, with 80% of residents demonstrating understanding and enthusiasm towards the technique. The benefits of this research include improved environmental quality and enhanced knowledge among farmers about waste management. The study's limitations include the gradual reduction of odor and the simplicity of the smoke production technology. Recommendations for future research include long-term studies and the development of more efficient production tools, as well as policy support for implementing similar technologies in other regions.*

Keyword: *liquid smoke, manure odor, waste management, livestock, socialization.*

Abstrak - *Penelitian ini bertujuan untuk mengatasi masalah bau tidak sedap yang dihasilkan dari kotoran ternak sapi di Dusun Lobang, Karanganyar, Jawa Tengah, melalui pengaplikasian asap cair dari tempurung kelapa. Masalah utama yang diidentifikasi adalah bau amonia yang mengganggu kenyamanan masyarakat. Metode yang digunakan meliputi observasi, sosialisasi, dan praktik pembuatan asap cair, serta penyemprotan langsung ke kandang ternak. Hasil penelitian menunjukkan bahwa asap cair efektif mengurangi bau tidak sedap secara bertahap, dengan tingkat pemahaman dan antusiasme warga mencapai 80%. Manfaat dari penelitian ini mencakup peningkatan kualitas lingkungan dan pengetahuan peternak tentang pengelolaan limbah. Keterbatasan penelitian meliputi variabilitas bau yang memerlukan waktu untuk menghilang dan teknologi alat pengolah yang masih sederhana. Rekomendasi untuk penelitian selanjutnya adalah kajian jangka panjang dan pengembangan alat yang lebih efisien, serta dukungan kebijakan untuk penerapan teknologi serupa di daerah lain.*

Kata kunci: *asap cair, bau kotoran, pengelolaan limbah, peternakan, sosialisasi.*

A. INTRODUCTION

Livestock waste is a by-product of unwanted livestock activities, so it must be managed or disposed of. Types of livestock waste include leftovers from animal digestion such as feces and urine, leftover animal feed, straw, and other materials. Every day, a cow can produce 10–15 kg of manure waste (Farid, 2020). The problem of cow dung waste requires special attention because it can cause air pollution, soil pollution, and become a source of disease, and this waste can increase methane gas emissions and cause aesthetic disturbances and comfort for the surrounding community (Ratriyanto et al., 2019).

Lobang Hamlet is one of the hamlets in Gedong Village, Karanganyar District, Karanganyar Regency, Central Java Province. Geographically, the condition of Lobang Hamlet has a topography in the form of lowlands with a wide expanse of rice fields. Supportive natural conditions allow the residents of Lobang Hamlet to have land for farming. In addition, Lobang Hamlet also has considerable livestock potential because it has a suitable temperature for livestock productivity.

Based on results assessment and environmental observation in Lobang Hamlet, in addition to focusing on agriculture, residents also raise livestock such as cows, goats, catfish, chickens, and ducks as additional income. Often, cattle cages are placed close to or made one with the farmer's house, which eventually causes environmental problems that interfere with community activities. The problem that is often complained about is the smell of livestock (cow) manure that is not properly managed, causing an unpleasant odor around the settlement. This condition is a complaint from the people of Lobang Hamlet, especially those who live close to livestock cages. There are two basic principles of environmental law politics as stated in Article 28 H paragraph (1) and Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia (UUD 1945), namely the inclusion of the principle of protection of Human Rights (HAM) on the environment to support health (Romansah, 2020). As explained above, the negative impact of cow dung can interfere with comfort and activities in the environment.

The pungent odor emitted from cattle manure is produced from ammonia gas (NH_3) in a clear and colorless form. The unpleasant smell from this manure is a source of complaints and disturbs the comfort of the residents of Lobang Hamlet because many farmers do not process the cow dung into fertilizer or dispose of it properly. This condition encourages the research team to find a solution to solve the environmental problem by reducing the smell of ammonia in livestock waste sourced from livestock manure by applying coconut shell liquid smoke. Liquid smoke is known to be effective in eliminating unpleasant odors, including odors from cattle manure waste (Sahrum et al., 2021; Wianto & Arrahimi, 2021).

Based on the problems that have been identified, then a discussion is held between the research team and local residents to justify the agreed problems so that the problems can be solved. The research team consists of UIN Sunan Kalijaga Yogyakarta students who are carrying out the 114th Real Work Lecture (KKN) of 2024 in Lobang Hamlet. The training activities on the manufacture and application of liquid smoke aim to improve the skills and knowledge of farmers on

how to turn coconut shell waste into something useful. Therefore, this study was conducted to explain how the community's response regarding the socialization of liquid smoke to eliminate the smell of cowsheds by providing materials and how to apply directly to residents' livestock cages as an effort to create a comfortable environment in the Lobang Hamlet environment.

B. METHOD

Implementation Method

The plan to implement liquid smoke socialization activities to the community begins with environmental observation to identify and collect information about the problems complained about by residents. After the problem was identified, the research team discussed with the environmental coordinator and several residents to discuss and find solutions that could be applied, namely by carrying out socialization to provide new information and knowledge to residents about liquid smoke processing to reduce the smell of cattle manure. After determining the objectives of socialization, the research team prepares needs such as developing socialization materials, preparing logistics and facilities, planning schedules and agendas, designing liquid smoke processing equipment, and conducting trials. In addition, an evaluation tool is also prepared to get feedback to assess whether the socialization goals are achieved or not. Then, the implementation of socialization activities, the practice of liquid smoke making techniques and spraying directly into residents' livestock cages, continued by conducting evaluations.

This training was attended by 20 residents who owned four-legged cattle who were participants in the liquid smoke socialization program and would be fostered during community service. The media used in the socialization are posters and powerpoints. Simple liquid smoke processing equipment and liquid smoke samples were also presented as real examples for participants. Environmental observation activities, equipment design, provision of raw materials and socialization to the community will be realized from July to August 2024, as shown in Table 1.

Table 1. Schedule of Liquid Smoke Socialization Activities

Time Range	Form of Activity	Parties Involved
July 22 – August 5, 2024	Observation, assessment, and discussion with residents	Research team and residents
August 6 – 13, 2024	Activity planning, assembly, and commissioning of liquid smoke making equipment	Research team
August 15, 2024	Liquid smoke socialization activities	Research team, residents, and youth organizations
August 16 – 23, 2024	Liquid smoke application (spraying) process and evaluation	Research team

Data Analysis Methods

This research is a type of descriptive qualitative research, which is a study that focuses on examining the quality of a relationship, activity, situation, or various events described descriptively. Descriptive qualitative research tends to elaborate on ongoing events rather than comparing the consequences of a particular treatment, or explaining people's attitudes and behaviors (Fadli, 2021). The data used in qualitative research can be obtained by conducting observations, interviews and analyzing documents. The descriptive qualitative research procedures are 1) analyzing the problem, 2) limiting and formulating the problem, 3) setting the goals and benefits of the research, 4) carrying out a literature study on the topic of the problem, 5) compiling a framework of thinking and research questions, 6) designing the research method to be used, 7) collecting, integrating and interpreting data, and 8) compiling a report (Rusandi & Rusli, 2021).

C. RESULTS AND DISCUSSION

Environmental Assessment and Observation

Assessment and observation activities were carried out by a research team in the Lobang Hamlet environment which included RT 01 and RT 02, for 15 days. In the first week, the research team toured the area and observed which locations had cages and four-legged pets. In the second week, the research team asked for data on the list of residents who owned livestock to each RT head and visited residents' homes one by one to briefly dig up information related to the problems experienced related to the smell of livestock manure. After that, the research team *brainstormed* to formulate a solution that would be implemented to overcome the problem of the smell of livestock manure in Lobang Hamlet.

Socialization, Practice of Making and Applying Liquid Smoke

The socialization of making liquid smoke was attended by residents and youth organizations of Lobang Hamlet, and attended by the service committee. There were 20 socialization participants who took part in this activity. Other participants who were also present were youth organizations from the nearest hamlet, namely Pellet Hamlet. Participants who attended this socialization event seemed enthusiastic and active so that there was productive two-way communication. This can be seen when the youth of the youth organization and breeders responded to the material presented by the team and asked several questions.

This socialization activity was carried out on Thursday, August 15, 2024 in Lobang Hamlet in the form of presentation of material and practices for making liquid smoke, as shown in Figure 1. The resource persons are a research team that provides education about four-legged livestock manure waste, the dangers of livestock waste, the use of livestock waste, the process and benefits of liquid smoke for livestock waste. The participants were given education about the benefits of liquid smoke for livestock waste, how to plan, assemble, process, and apply liquid smoke. That way, it is hoped that this activity can achieve the same goals as in the previous section.

Figure 1. Presentation of Liquid Smoke Socialization Material to Residents of Lobang Hamlet (Source: Personal Document)

The first session of the socialization activity began with a presentation of material about the content contained in the feces of quadrupeds, such as nitrogen (N), phosphorus (P), potassium (K) and other nutrients. After that, what impacts can be caused by the accumulation of livestock manure waste and its impact on humans, animals and the environment are discussed. This certainly has a bad impact on health, the quality of the air inhaled, the quality of the environment, and its impact on the ecosystem. After the provision of material by the research team, it was then continued with a demonstration or practice of using tools to obtain liquid smoke.

In the second session, Figure 2 shows the demonstration team practicing how to make and obtain liquid smoke to remove the smell of four-legged livestock waste. The trainees looked more enthusiastic at this stage because they were curious about how to obtain the liquid smoke and were interested in seeing it firsthand.

Figure 2. Liquid Smoke Making Practice Activities (Source: Personal Documents)

The next day, the research team sprayed directly to five livestock cages of local residents as part of the coaching. Spraying is done once per week on each drum, as shown in Figure 3. At the end of the spraying session, the research team also conducted direct interviews with livestock pen owners to find out the effectiveness of liquid smoke in reducing the smell of four-legged livestock waste. As a result, the five farmers stated that although the unpleasant smell from the manure was reduced, the process did not occur directly but gradually. Until the last spraying, the smell of feces was not as pronounced as usual.

Figure 3. The process of spraying liquid smoke liquid into residents' livestock cages (Source: Personal Document)

Design and Installation of Simple Liquid Smoke Processing Equipment

Liquid smoke is a blackish-brown liquid produced from biomass processed through pyrolysis technology. Pyrolysis is the process of heating organic matter without oxygen so that the components that make up coconut shells decompose (Pradhana & Trivana, 2018). The resulting temperature usually ranges between 400 and 600 degrees Celsius. Liquid smoke is divided into three grades, namely *Grade 1*, *Grade 2*and *Grade 3* (Pradhana & Trivana, 2018). The higher the *grade, the safer it is for human consumption (Grade 1 > Grade 2 > Grade 3*) (Sahrum et al., 2021). The content of chemical compounds contained in liquid smoke, namely alcohol, phenol, and acetic acid, functions as plant health ingredients, increases livestock productivity, removes unpleasant odors, and is health and pharmaceutical (Wianto & Arrahimi, 2021). Pure liquid smoke contains other components and has a function as an inhibitor of bacterial growth which is safe to use as a natural preservative (Afrah et al., 2023).

A simple tool used to produce liquid smoke can be made with the help of a welding workshop. Initially, dried coconut shells are burned in tubes with holes in the bottom. After that, close the tube tightly. The smoke from combustion will enter the pipeline and then be flowed to the cooling section to liquefy or cool the smoke. The change in the shape of an object from gas to liquid is called condensation. The liquid smoke produced by the appliance in Figure 4 has *Grade 3*, so its

use is limited to reducing the unpleasant odor of livestock manure, not for consumption like *Grade 1* liquid smoke.

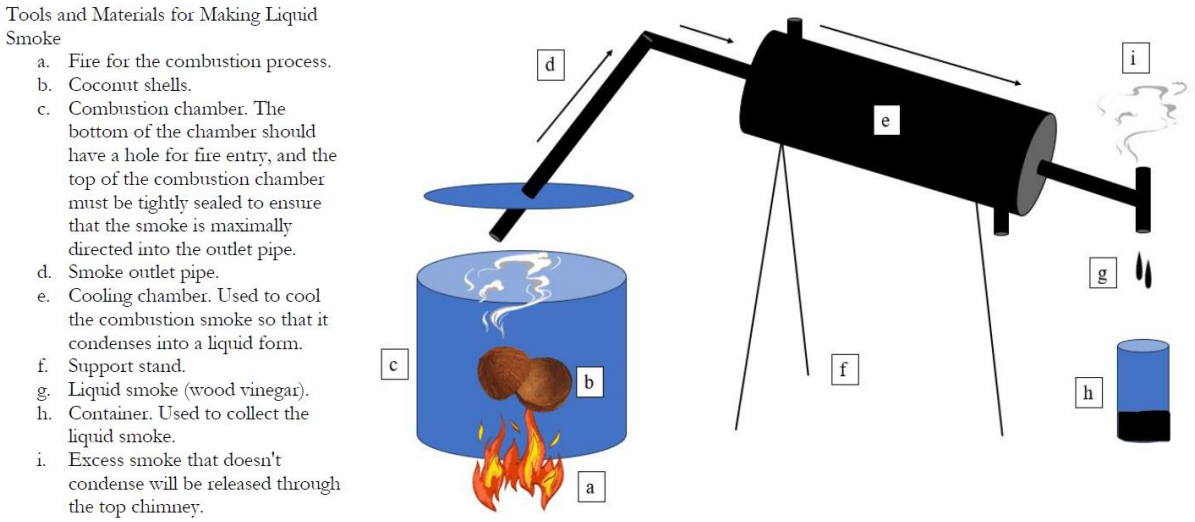

Figure 4. Simple Tool Display of *Grade 3 Liquid Smoke Maker*
(Source: Personal Documents)

Evaluation of Socialization Activities

The socialization of liquid smoke to the community in Lobang Hamlet, Karanganyar District, Karanganyar Regency aims to provide a solution to the problem of unpleasant odors caused by the feces of four-legged livestock owned by residents. The evaluation of the socialization activity was given to the community when the socialization of liquid smoke had been completed by providing questions to the residents of Lobang Hamlet. The benchmarks and success indices of this activity can be determined from the level of understanding and enthusiasm of residents for exposure, socialization, application of tools and production of liquid smoke as well as the use of liquid smoke as the main raw material to reduce the smell of four-legged livestock manure. Responses to questions asked to residents are used as a benchmark in assessing the success of activities and the implementation of the formulated goals. To strengthen the evaluation results, in addition to asking questions during the socialization activities, the researcher also conducted interviews with five residents who owned four-legged cattle whose cages had been sprayed with liquid smoke to remove the smell of feces (Figure 5).

Based on the answers to the questions asked to the residents, it was concluded that 80% of the residents understood and were enthusiastic about the material presented by the researcher. For the results of interviews with residents, it can be known that the use of liquid smoke from coconut shell waste as a deodorizing liquid has proven to be effective in reducing unpleasant odors from four-legged livestock manure. In addition, the indicator of the success of this activity is also shown by the enthusiasm of the community who also wants their livestock cages to be sprayed with liquid smoke to remove the smell of livestock manure after knowing that a week after spraying the smell of

livestock manure becomes much reduced. Thus, the socialization of liquid smoke to remove the smell of four-legged livestock manure can be said to be successful in achieving the targeted goals.

Figure 5. Interview Process Regarding Residents' Responses to Liquid Smoke Socialization (Source: Personal Documents)

D. CONCLUSION

In this study, it has been proven that the application of liquid smoke from coconut shells is effective in reducing the unpleasant odor of cattle manure in Lobang Hamlet. Liquid smoke has been shown to be able to reduce odors gradually, with 80% of residents showing understanding and enthusiasm for this technique. The main benefits of this study are the improvement of environmental comfort and local community health, as well as the improvement of farmers' knowledge and skills in managing livestock waste. However, this study has limitations, such as odor variability that takes time to fully dissipate and limitations of the processing tools used. For further research, it is recommended to examine the long-term effects of the use of liquid smoke and develop liquid smoke processing equipment with more efficient technology. Recommendations for policy makers include the implementation of similar training programs in other regions with similar problems and support in the development of more effective waste treatment technologies to improve the quality of the environment and public health at large.

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