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Fermented Thitonia Innovation for Dairy Goat Feed Efficiency in Muda Mandiri Farmer Group, Sungai Pua Sub-District, Agam District

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ABSTRACT

One of the Muda Mandiri farmer groups located in Nagari Sungai Pua, Sungai Pua District, has 30 Peranakan Etawa goats, and this farmer group consists of 11 farmers. This group is one of the highly developed dairy goat farming businesses in Agam Regency. This community service activity aims to apply fermented tithonia technology as an alternative forage feed for ruminants to improve the feed efficiency of dairy goats. The activity method consists of several steps. First, farmer groups were taught about how to manage forage feed and the benefits of thitonia fermentation. Second, they learned the fermentation process, which starts with chopping tithonia, mixing it with inoculum (*L. bulgaricus*), adding molasses, and mixing it with bran. This mixture was kept in a container without air exposure for fourteen days. Third, the fermented product was tested directly as feed for dairy goats to determine how palatable it was and how much it impacted milk production. Important results showed that although milk production was almost the same as the previous feed using field grass, fermented tithonia could replace up to 30% of field grass. The farmer does not need to search for grass daily, as time and effort are spent more efficiently providing feed. In conclusion, fermented tithonia is an effective and easy-to-implement technology to help dairy goat farmers obtain a more efficient alternative feed, which eases their workload.

Keywords: dairy goat, fermented tithonia, livestock productivity, local feed, sugarcane waste

INTRODUCTION

Nagari Sungai Pua is located in Sungai Pua District, Agam Regency, West Sumatra. It is two to three hours from Padang City and about twenty minutes from Bukittinggi City to Nagari. The Nagari is located on a fertile plateau at the foot of Mount Merapi. Sungai Pua is directly bordered by Nagari Bukik Batabuah to the east, bordered by Nagari Banuhampu to the west, bordered by Nagari Sariak to the south, and bordered by Nagari Kubang Putiah to the north. The local people are primarily farmers because the area's conditions are

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essential for various types of vegetables, rice, corn, and sweet potatoes, and there are also many tithonia plants growing wild.

Although tithonia can be used as animal feed, especially in this area, many Peranakan Etawa goat farms exist. Therefore, there is a need for technology to process fermented tithonia so that it can be used as green feed. Therefore, the author tried to empower the community by holding a demonstration or demonstration of making fermented tithonia, which aims to improve the community's ability to process wasted tithonia so that it can be utilized by livestock.

The community started this via the "Muda Mandiri" Farmer Group. This farmer group was established in 2012, focusing on dairy goat-rearing activities. This farmer group was first formed in January 2012. The farmer group can only raise around 30 dairy goats, but there is an excellent opportunity to increase their production. The group's main product is Etawa goat milk. This group of farmers cannot meet the high demand for dairy products. However, with this community empowerment program, it is expected that they will be able to increase the productivity of their livestock. This is mainly expected through the enthusiasm and participation of the farmer group members, who will absorb the knowledge and experience gained from this training.

Feed using tithonia can be used as forage for livestock; however, due to its high phytic acid content, tithonia must be processed before it can be used as animal feed. The results of research by Fasuyi et al. (2010) stated that tithonia leaves contain several anti-nutritional substances and toxins, such as phytic acid (79.1 mg/100g), tannins (0.39 mg/100g), oxalates (1.76 mg/100g), saponins (2.36 mg/100g), alkaloids (1.23 mg/100g), and flavonoids (0.87 mg/100g). Furthermore, it is explained that the content of anti-nutritional substances of Tithonia plants, namely phytic acid compounds found in Tithonia leaves, amounting to 79.1 mg/100 g, is a barrier to using this plant as animal feed. One way to process tithonia is through fermentation with inoculum (*L. bulgaricus*), which functions as a phytic acid compound breaker contained in tithonia. Thitonia can be used as feed for sheep, goats, cows, buffaloes, and other livestock. According to Pazla's 2018 research, the chemical composition of tithonia plants includes 34.59% cellulose, 18.17% crude fiber, 22.98% crude protein, and 84.01% organic matter.

Sungai Pua has many tithonia plants, but the community and farmer groups do not know how to process them, so they have not been optimally utilized. Therefore, fermentation technology converts the waste into more efficient and valuable animal feed. Fermentation is a technique of biological processing and storing foodstuffs by utilizing microorganisms to improve the nutrition of poor-quality feed. The objective of this activity is to improve the ability of farmers to utilize tithonia through fermentation technology so that they can depend on less field grass and produce more efficient feeds.

METHOD

The methods used in this activity are based on procedures developed in forage fermentation research and practice. In particular, the method of Pazla et al. (2021) and a modification of the study by Pazla et al. (2023) on the use of inoculum (*L. bulgaricus*) to reduce phytic acid content in thitonia. This program occurred in Nagari Sungai Pua, Agam Regency, at the Muda Mandiri Farmer Group from August to October 2024. This group consists of dairy goat farms with a total of 30 goats.

1. Target Audience

The target audience of this activity is members of the Mandiri Young Farmers Group who are involved in raising dairy goats, focusing on improving skills and lengthy processing of fermented tithonia-based feed.

2. Activity Stages

a. Counseling (Lectures and Interactive Discussions)

Counseling was conducted to Young Mandiri Farmer Group members directly by providing material on dairy goat husbandry management, reproduction and health management, fermented tithonia technology, and its benefits as an alternative feed. This extension also includes interactive discussions to allow farmers to convey ideas and questions. Hanafi et al. (2024) and Reski et al. (2024) also carried out this extension stage with lecture and discussion methods

b. Fermentation Process Demonstration

The demonstration was carried out using demonstration (Reski et al., 2023; Rusli et al., 2023) by directly demonstrating the process of tithonia fermentation, starting from chopping tithonia using a chopper machine, mixing with inoculum (L.bulgaricus), adding molasses and 3% bran, to storage in an airtight container for 14 days. Detailed activities at this stage are as follows:

The materials and tools used in making this fermented tithonia are:

Material:

1. Thitonia
2. Inoculum (L.bulgaricus)
3. Molasses
4. Bran

Tools:

1. Cooper engine
2. Drum (150L)

The steps taken in this demonstration of making feed concentrate utilizing fermented tithonia are as follows:

1. Chop or mince the titonia using a machine, then flatten it on an open mat
2. Sprinkle 3% bran until evenly distributed
3. Give molasses as much as 3%, add inoculum (*L. bulcaricus*) as much as 1 L, then stir until evenly distributed.
4. Put it into the drum until it is complete, then close it tightly.
5. Fermentation was carried out for 14 days

c. Fermented Feed Trial on Livestock

The fermented feed was tested directly on dairy goats to determine the level of palatability and its impact on consumption and milk production.

3. Indicators of Success

Indicators of success for this activity include:

1. Adoption of fermentation technology by farmer groups with an application rate of at least 30% of the total forage needs.
2. Improved farmer time efficiency in feed provisioning, as measured by a reduction in the frequency of field grass thawing.
3. Good palatability of fermented feed, indicated by the level of consumption by dairy goats.
4. Stable or increased milk yield compared to previous use of field grass feeds.

Farmer group members actively participated in implementing this program, from providing ideas to helping with the fermentation process of tithonia into feed. The participation of farmer group members will be the first step in applying science and technology. Active participation also encourages farmer group members to innovate and create tools to help them save time, energy, and money for raising livestock.

RESULTS AND DISCUSSION

This activity was designed to improve the feed efficiency of dairy goats through the utilization of fermented tithonia. The results of the activity are presented in the following subchapters:

1. Extension and Training

Understanding fermentation technology, tithonia processing, and dairy goat-rearing management was the first stage of this activity. According to Ediset et al. (2023), counseling is done by presenting materials with the aim that participants understand theories and concepts. Participants were allowed to ask questions and discuss their problems with feed provision. Extension results showed that participants understood the benefits of fermented tithonia in reducing its phytic acid content, which makes this waste a quality feed alternative.

2. Demonstration of Fermentation Process

A live demonstration of the tithonia fermentation process was conducted in the second stage. This started with the chopping of thitonia with a chopper machine, followed by mixing bran (3%), addition of inoculum (*L. bulgaricus*), and molasses mixture. Afterward, the mixture was put into airtight drums and fermented for 14 days. The process from shredding to storage in drums is depicted in Figure 1. This fermentation process is intended to improve the forage feed quality of livestock by maximizing the degradation of phytic acid and tannin in thitonia.

Figure 1. Manufacture of fermented thitonia

3. Feed Trials on Livestock

Trials on fermented feed were conducted on dairy goats to determine the palatability of the feed and how it affects milk consumption and productivity. The test results showed that the goats liked this feed and consumed much of it. The goats enthusiastically consumed the fermented feed, as shown in Figure 2. Judging from the milk productivity, it was almost the same as the previous field grass feed. Fermented Thitonia has a significant advantage in replacing up to 30% of field grass requirements, helping farmers reduce the work they must do every day.

Figure 2. Feeding fermented thitonia to dairy goat

3. Impact and Changes for Partners

This activity provided significant benefits to the partners. Farmers recognized that the fermented tithonia technology helped them lower their dependence on field grass, especially during the dry season. Farmer group members have also started using the fermentation technology independently to meet their animal feed needs. The main benefit of this technology is the efficient time to provide feed, which allows farmers to allocate their time to other things.

4. Contraints Faced

Although this activity went well, there were some problems. One of them is the lack of tools; not all farmers have chopping machines, which causes the fermentation process to be less than optimal. One of these problems is thitonia, which is sometimes difficult to obtain outside the harvest season. To solve this problem, training, and cooperation with related parties are needed to provide tools and fermentation materials.

CONCLUSION

This activity aimed to capitalize on fermentation techniques to improve the feed efficiency of dairy goats. The results showed that fermented thitonia can meet the needs of up to 30% of field grass without reducing milk productivity. The technology is easy to implement and helps farmers improve their ability to process tithonia and reduce their workload.

Procurement of supporting equipment such as chopping machines and further training for farmers are needed to keep the activities running. Expanding the application of this technology to other farmer groups requires cooperation with related parties. For a larger scale, development on how to optimize fermented feed formulation is recommended.

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