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Utilization of BioMC4 Probiotic Supplementation in Livestock Feed as An Effort to Enhance Animal Health and Productivity in Jombang Regency

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Abstract

Probiotics are supplements commonly referred to as "beneficial bacteria" and are widely recognized for their positive effects on health. Over the past decade, probiotics have been increasingly utilized in livestock production, either as single supplements or as feed additives. Probiotic supplementation has been shown to improve digestive processes and nutrient absorption, thereby ensuring adequate nutrient availability for livestock. These benefits are particularly valuable in efforts to improve animal health and production efficiency, especially amid the increasing incidence of Foot and Mouth Disease (FMD) and Lumpy Skin Disease (LSD) in Indonesia in recent years. This community service program targeted a Livestock Farmer Group in Pulosari Village, Bareng District, Jombang Regency. A total of 21 participants actively took part in agricultural extension activities and technical training on silage production using BioMC4 probiotic supplementation. The results of the program indicated that the activity successfully enhanced farmers' knowledge and practical skills, particularly in relation to the preparation of feed reserves. As a follow-up measure, the community service team established a WhatsApp group with representatives of the farmers to serve as a platform for communication and ongoing technical assistance. In addition, the BioMC4 product was also distributed to all participants so that it could be immediately implemented in their respective livestock facilities. Furthermore, this community service activity is expected to become a sustainable program and provide long-term benefits by reducing production costs associated with maintaining livestock health, improving farmers' welfare, and strengthening the resilience of the smallholder livestock sector in Jombang Regency.
Keywords: Animal Health, Feed, Probiotics, Silage, Livestock

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Introduction

In recent years, Indonesia has experienced a significant increase in cases of Foot and Mouth Disease (FMD) and Lumpy Skin Disease (LSD) in livestock. Although these diseases are not zoonotic and meat or milk from affected animals remains safe for consumption, they cause substantial economic losses. These losses include reduced body weight, decreased milk production, diminished work efficiency, and, in severe cases, animal mortality (Rohma et al., 2022). Disease control strategies include vaccination, quarantine and isolation of newly introduced animals, environmental sanitation, and maintenance of livestock immunity. Internal livestock health is strongly influenced by adequate nutritional intake, which can be achieved through balanced feed formulations. Livestock feed is one of the key determinants of successful and high-quality animal production. Inadequate feed intake can adversely affect the growth and development of livestock (Dewi et al., 2023).

Livestock productivity is generally determined by management practices, feed quality, housing systems, and disease control measures (Khirzin et al., 2022). Livestock health is closely associated with proper husbandry practices and supporting components of livestock management, including pen hygiene, adequate nutrition, disease prevention and treatment, as well as therapeutic interventions such as the use

of supplements or traditional remedies to enhance immune function (Ilham & Mukhtar, 2018). One approach to improving feed quality is the use of probiotics as daily supplements. Several studies have demonstrated a positive relationship between probiotic supplementation and enhanced rumen digestion processes (Adriani et al., 2023). Probiotics support rumen microbial activity in degrading organic feed components, thereby ensuring nutrient availability and improving nutrient absorption efficiency (Ulfa et al., 2019).

One effective strategy for improving the health of ruminants, particularly goats, is probiotic supplementation. Probiotics function as enhancers of rumen microbial activity, which is essential for efficient digestion and nutrient absorption. Consequently, probiotic supplementation is strongly recommended in ruminant feeding systems (Padang et al., 2023). Despite the benefits of probiotics, many smallholder farmers remain unfamiliar with their application. Therefore, educational outreach is essential to increase awareness and understanding of probiotic use, particularly as a preventive measure during outbreaks of FMD and LSD, as observed in recent years. With the result of that, this community service program aimed to ensure that farmers not only understood the benefits of probiotics but were also able to apply them sustainably in livestock feed management.

Method

This community service activity was conducted in Pulosari Village, Bareng District, Jombang Regency. The implementation consisted of several stages as outlined below:

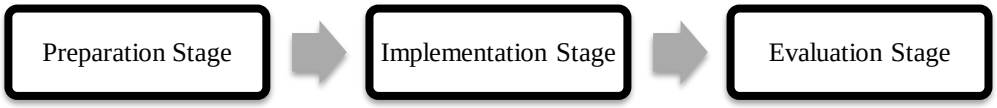

Figure 1. Stages in The Community Service Program

1. Preparation Stage

a. Survey and Permits

The community service team conducted an initial survey by directly visiting a Livestock Farmer Group in Pulosari Village. Permissions and cooperation agreements were subsequently obtained from relevant stakeholders, including the Head of the Farmer Group and the Village Head of Pulosari. A representative from the farmer group was appointed as a field coordinator responsible for determining the activity location and inviting participants. The number of participants was limited to a maximum of 25 farmers, based on the community service team's logistical capacity.

b. Problem Identification

Interviews were conducted to assess the conditions and challenges faced by the farmer group. Based on the findings, the community service team proposed solutions in the form of educational counseling and technical training on probiotic supplementation in livestock feed to improve animal health and production efficiency.

c. Coordination and Equipment Preparation

Intensive coordination was carried out one week prior to implementation. Activities included preparation of tools and materials, task allocation among the community service team members, and demonstration-based training for student assistants before the techniques were introduced to farmers.

2. Implementation Stage

a. Educational Counseling

The community service team delivered educational sessions on the benefits of probiotics for livestock health, particularly in ruminants. As probiotics are still relatively unfamiliar to many

farmers, educational outreach was considered essential to improve understanding and adoption (Ulfa *et al.*, 2019). The session was conducted through presentations, followed by an interactive discussion.

b. Technical Training

Technical training on the use of BioMC4 probiotics as a feed supplement was conducted using demonstration methods. Farmers were trained in groups to mix probiotics and process feed into silage. Silage is preserved forage produced through anaerobic fermentation and stored in airtight containers (Septian *et al.*, 2020). The formulation for making silage was as follows:

Table 1. Formulation for Making Silage (for 100 kg of feed material)

Material	Amount
Sugarcane tops	60 kg
Rice bran	20 kg
Tofu by-products	15 kg
Molasses	3 kg
Salt	2 kg
BioMC4 (diluted in 10 L of clean water)	300 mL

Fermentation was carried out for approximately seven days in airtight containers such as silos or plastic drums. Based on organoleptic evaluation, good-quality silage exhibits a pleasant, slightly sweet aroma, minimal color change, and high palatability for livestock (Septian *et al.*, 2020).

3. Evaluation Stage

a. Farmer Feedback

Anonymous feedback in the form of comments and suggestions was collected from farmer representatives and used as evaluation material for future community service programs.

b. Activity Reporting

A WhatsApp group was established to facilitate communication and follow-up after the activity. This platform also served to monitor program outcomes and assess achievement of the primary objectives, namely addressing the challenges faced by the target community

Results and discussions

The community service program was conducted in Pulosari Village (RT 03 RW 03), Bareng District, Jombang Regency, and was attended by 21 participants from the local Livestock Farmer Group. The activity consisted of two main sessions: educational counseling and technical training on the utilization of probiotic supplementation in livestock feed to improve animal health. The probiotic used was BioMC4, an innovative appropriate-technology product developed by a member of the community service team (Purnamasari et al., 2025). BioMC4 has been widely applied to enhance livestock productivity and has been shown to reduce crude fiber content while increasing feed protein levels (Kurnijasanti, 2016).

Probiotics are live microorganisms that provide health benefits when administered in adequate amounts, primarily by improving the balance of gut microbiota. In ruminants, probiotics have been proven to enhance digestive performance when incorporated into feed rations. This improvement occurs through increased feed digestibility, allowing greater absorption of nutrients and improved animal performance (Pribadi et al., 2023). According Astuti et al. (2015), probiotic supplementation influences animal feed intake and body weight gain. Furthermore, it has been reported that feed utilization efficiency shows a significant improvement when probiotics are added to the diet with well-balanced composition and nutritional content.

Participants demonstrated strong enthusiasm throughout the activity, which included presentations on probiotic concepts and benefits, introduction to the BioMC4 product, hands-on silage production using BioMC4 as a fermentation promoter, and interactive discussions. BioMC4 contains selected cellulolytic

and proteolytic microorganisms which are designed to synergize with rumen microbes in degrading organic feed materials (Larasati et al., 2023). This probiotic formulation is claimed to increase crude protein content, reduce crude fiber levels, improve overall feed nutritional value, and accelerate the achievement of optimal body weight. In addition to improving feed efficiency, probiotic supplementation contributes to maintaining digestive tract health and enhancing immune function in livestock (Ulfa et al., 2019).

Figure 2. Demonstration of Silage Making (left) with BioMC4 Probiotics (right)

This community service initiative aimed to educate farmers and broaden their understanding of probiotic use as a sustainable feeding strategy. The application of BioMC4 is expected to improve feed efficiency and livestock health, particularly during periods of FMD and LSD outbreaks, thereby increasing farmers' income and reducing the risk of economic losses. In addition, the resulting fermented feed can improve nutritional content and enhance feed quality, while also providing a feed reserve during dry season when the availability of forage is limited (Dewi *et al.*, 2023). This method has been widely applied to improve production efficiency and enhance farmers' economic outcomes (Pribadi *et al.*, 2023).

At the conclusion of the activity, BioMC4 products were distributed to all participating farmers to enable its immediate application in their respective livestock facilities. Furthermore, a WhatsApp group was established to provide ongoing consultation and technical support. Initial evaluation involved reviewing the quality of silage produced and stored for one week. Farmers are expected to provide feedback on livestock performance following several months of probiotic application. The activity concluded with a group photo session. This program was fully funded and supported by Universitas Wijaya Kusuma Surabaya and is expected to be sustained for the broader benefit of the community.

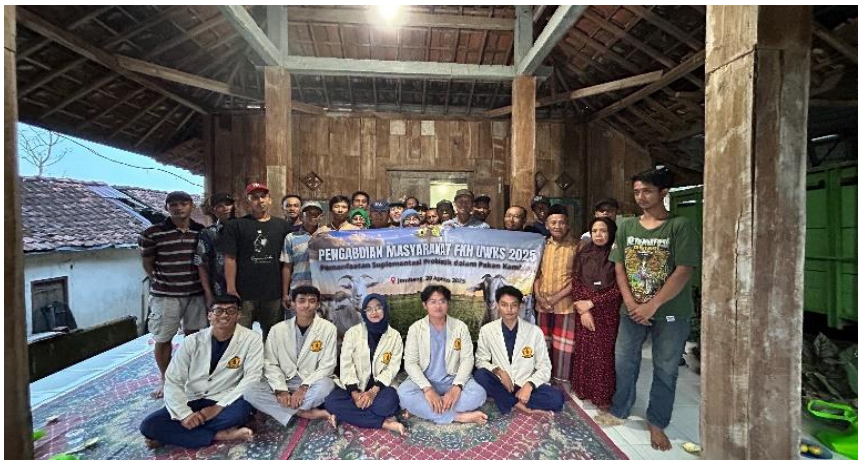

Figure 3. Group Photo After The Community Service Activities were Completed

Conclusion

The community service program conducted in Pulosari Village, Bareng District, Jombang Regency, was successfully implemented and well received by the target group. Farmers demonstrated high levels of enthusiasm and active participation throughout the program. Through this initiative, the community service team effectively transferred knowledge and practical skills related to probiotic supplementation in livestock feed. It is expected that farmers will implement this technique on a sustainable basis and gain long-term benefits, particularly in improving livestock health and resilience

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