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Enhancement of Milk Quality Through the Provision of High-Quality Forage for Livestock at Lucky Farm, Medowo Village, Kandangan District, Kediri Regency, East Java, Indonesia

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Abstract

This study aims to evaluate the effect of providing high-quality forage on the milk production of dairy cattle at Lucky Farm, located in Medowo Village, Kediri Regency. Lucky Farm is a modern dairy operation that utilizes a high-quality forage feeding system as a strategy to increase milk yield. The research was conducted over a three-month period, from April to June 2025, employing an educational and quantitative approach. Data were collected through daily milk volume logging (morning and evening), observation of the physical quality of the milk, and identification of the type and composition of the forage provided. The results indicated a significant increase in milk production from April (11,450.9 liters) to May (12,426.95 liters) and June (12,967.6 liters). This increase reflects the positive contribution of high-quality forages, such as elephant grass (Pennisetum purpureum), legumes, and sesbania leaves, in meeting the nutritional requirements of the livestock, enhancing the efficiency of rumen fermentation, and supporting milk synthesis. Therefore, a feed management system based on high-nutrient local forages has been proven effective in improving both the quantity and quality of milk and can be adopted as a model for sustainable dairy farming development in tropical regions.

Keywords: Dairy Cattle; Fermentation; High-Quality Forage; Milk Production; Milk Quality

1. Introduction

Lucky Farm is a modern dairy operation located in Medowo Village, Kandangan District, Kediri Regency. The farm's geographical area possesses significant potential to support the growth and development of the dairy enterprise. This potential is reinforced by the geographic conditions of Medowo Village, which is situated in a highland area with a relatively cool climate, a condition highly conducive to the productivity of dairy cattle [1]. Furthermore, the presence of a Village Unit Cooperative (KUD) provides support for the milk marketing system through partnerships with large-scale milk processing industries. This collaboration facilitates an efficient milk distribution chain and promotes price stability and income for farmers.

As one of the modern dairy farms in Medowo Village, Lucky Farm plays a pivotal role in supporting milk productivity in Kediri Regency. The implementation of high-quality forage management on this farm has demonstrated a positive impact on increasing the volume and quality of the milk produced. Nutrient-rich forages such as elephant grass, legumes, and silage serve as the primary feed sources, optimally supporting the energy and protein requirements of the livestock [2]. Additionally, the support of facilities like a technical training center and the application of artificial insemination

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(AI) further strengthen the sustainability of the production system at Lucky Farm. Empowerment through feed management training also fosters greater operational efficiency, which directly contributes to the enhancement of milk yield in terms of both quantity and quality [3-4].

Milk is a highly nutritious beverage rich in protein, essential fatty acids, vitamins, and minerals. Beyond its diverse nutritional content, milk is also categorized as an ideal food source because it contains nearly all essential nutrients required by the human body in complete and balanced proportions [5]. Dairy cattle are the primary source of milk production in Indonesia, and their productivity is highly dependent on nutritional management, particularly the provision of high-quality forage. Forage that is rich in protein, minerals, and energy has been proven to enhance milk production and quality [6]. Conversely, nutritional deficiencies lead to decreased milk production, compromised animal health, and reduced reproductive efficiency.

High-quality forages such as elephant grass (Pennisetum purpureum), legumes, and sesbania leaves are rich in crude protein and essential minerals for dairy cattle metabolism. Fresh forage with a balanced moisture and nutrient content plays a role in stimulating the growth of rumen microbes, which are essential for fiber fermentation and amino acid synthesis [7]. Therefore, evaluating the effect of high-quality forage provision on milk production is crucial for the development of livestock farming based on local forages [8].

The enhancement of dairy cattle productivity is determined not only by the quantity of forage provided but also by its nutritional quality, including its crude protein content, digestible fiber, and a balanced calcium-to-phosphorus ratio [9]. Low-quality forage, such as that from open grazing systems without rotation and soil improvement, often contains insoluble fiber and is poor in energy content. This leads to a decrease in Dry Matter Intake (DMI), limited rumen fermentation, and reduced milk synthesis [10]. In tropical contexts like Indonesia, the additional challenges of high temperature and humidity can also reduce forage intake, thereby hindering the lactation performance of dairy cattle [11].

The utilization of high-quality forage enriched with legumes such as Indigofera zollingeriana, Gliricidia sepium, or sesbania (Sesbania grandiflora) has been shown to improve nitrogen use efficiency and enhance the rumen protein balance. The crude protein content in these legumes ranges from 18–28%, significantly higher than that of common grasses (13–15%) [12]. This combination can support microbial synthesis in the rumen and extend the duration of rumen fermentation, ultimately leading to an increase in daily milk production. Moreover, high-quality forages also contain secondary metabolites, such as tannins and saponins, in low concentrations, which act as natural antimicrobial agents to maintain the health of the livestock's digestive tract [13].

Based on the critical role of high-quality forage in the dairy production system, this research was conducted to evaluate the effect of providing high-quality forage on the milk production of dairy cattle at Lucky Farm, Kediri Regency. By employing a daily observation approach over a three-month period, this study is expected to provide a tangible overview of the relationship between forage feed management and daily milk productivity at the smallholder farm scale.

Reference should be cited at appropriate point in the text by number(s) in square brackets in line with the text. e.g.: '..... was reported earlier [1, 2].'

2. Material and methods

2.1. Time and Place

This research was conducted from April to June 2025 at Lucky Farm, located in the Medowo district of Kediri Regency

2.2. Research Objective

The objective of this research was to determine the effect of forage quality on the milk production of dairy cattle at Lucky Farm in Medowo, Kediri.

2.3. Implementation Method

The methodology for this study was based on an educational and quantitative approach, featuring the direct measurement of the impact of providing high-quality forage on the milk production of dairy cattle. The study was implemented over a three-month period, from April to June 2025, at Lucky Farm, Medowo Village, Kediri.

Milk yield from the morning and evening milkings was routinely recorded. This data on production changes was analyzed as a direct indicator of the success of the high-quality forage intervention. According to [14], longitudinal observation of milk volume combined with testing of its nutritional quality can reflect the physiological response of cattle to changes in feed nutrition. Furthermore, research by [15] demonstrates the application of statistical tests to assess significant differences resulting from forage treatments among different groups of dairy cattle.

The rationale for this method is based on the principle that the consumption of forage with high nutrient quality can increase Dry Matter Intake (DMI), enhance rumen fermentation efficiency, and improve milk output. The provision of high-quality, balanced forage promotes optimal rumen activity, increases nitrogen retention, and directly influences the quantity and quality of milk [13]. Therefore, a quantitative approach through daily milk volume measurement is considered a valid method for evaluating the effect of forage nutrition on the lactation performance of dairy cattle [16].

3. Results and discussion

The research activities were conducted through the analysis of milk production data collected from April to June 2025 at Lucky Farm, Kediri. This period was selected due to the stability of environmental conditions and the relatively uniform husbandry management, which facilitated a more objective evaluation of the effect of high-quality forage on milk production performance [17].

During this timeframe, daily milk volume was recorded, and the types and composition of forage provided to the livestock were identified. Additionally, observations of the physical quality of the milk—including its color, odor, and consistency—were performed to support the quantitative analysis. The results of the analysis revealed a consistent upward trend in milk production, indicating the significant role of high-quality forage in supporting the metabolic efficiency and physiological health of the dairy cattle at Lucky Farm. This approach is expected to serve as a benchmark for developing local forage-based feed management strategies to support the sustainability of national milk production [18].

Table 1 Milk Production of Dairy Cattle at Lucky Farm in Medowo Village, Kediri.

Month	Morning (Liter)	Afternoon (Liter)	Total (Liter)
April	6972,8	4478,1	11450,9
May	7639,1	4787,85	12426,95
June	7991,1	4976,5	12967,6

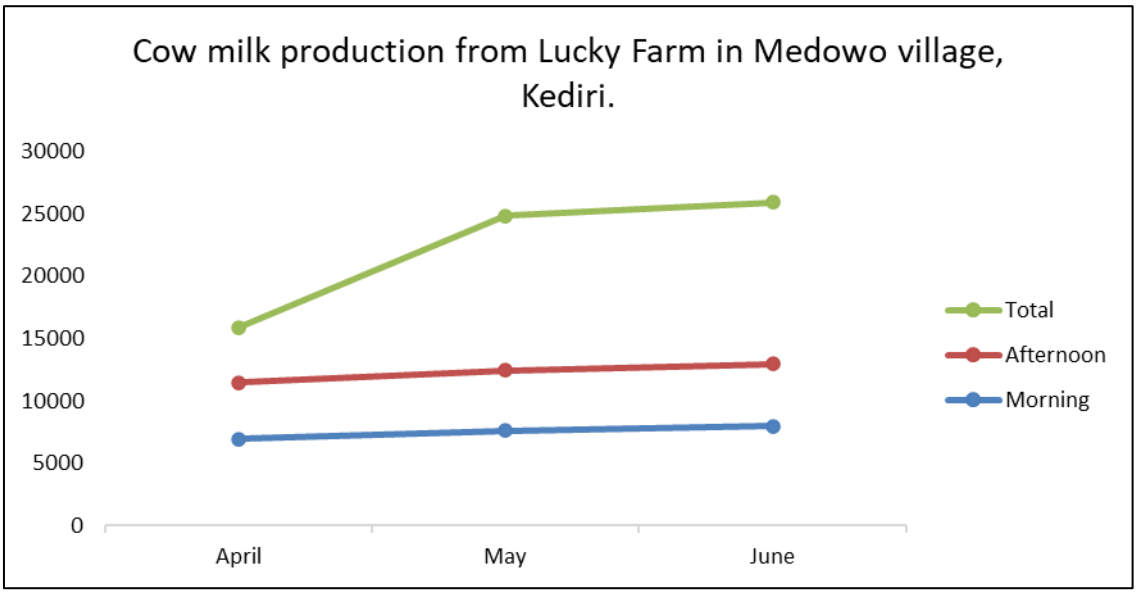

Figure 1 Graph illustrating the milk production of dairy cattle at Lucky Farm, Kediri.

The data in Figure 1 indicate that milk production at Lucky Farm experienced a total increase from April (11,450.9 liters) to May (12,426.95 liters), and subsequently to June (12,967.6 liters). This enhancement occurred consistently in both the morning milking sessions (from 6,972.8 liters to 7,991.1 liters) and the evening sessions (from 4,478.1 liters to 4,976.5 liters).

This pattern reflects the positive influence of implementing high-quality forage feeding on the productivity of dairy cattle. High-quality forages, such as elephant grass (*Pennisetum purpureum*), legume leaves, and sesbania leaves, contain high levels of crude protein and digestible fiber, which are crucial for supporting rumen microbial activity. Rumen microbes play a vital role in fiber fermentation and the formation of volatile fatty acids, which serve as the primary energy source for dairy cattle and support the process of milk synthesis in the udder [10]. An increased intake of protein and energy from high-quality forage improves the nutritional balance and enhances metabolic efficiency, directly impacting milk production and quality [13].

A study by [14] also emphasized that fresh forage with a protein content exceeding 14% can increase total milk solids, fat content, and milk protein levels, while also reducing the risk of subclinical mastitis. This suggests that in addition to increasing volume, high-quality forage contributes to the enhancement of the physiological quality of the milk. Overall, these findings support the importance of a nutrition-based approach utilizing local forage as an efficient and sustainable strategy for increasing milk production. Given the potential availability of forage resources in tropical regions like Kediri, this intervention could serve as a model of good practice for other smallholder farms in Indonesia.

4. Conclusion

The consistent provision of high-quality forage significantly improved daily milk production in dairy cattle at Lucky Farm. Local forages rich in protein, digestible fiber, and minerals not only enhanced milk volume but also improved its quality. This study will benefit society by strengthening food security and promoting sustainable dairy farming practices in tropical regions.

Compliance with ethical standards

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Disclosure of Conflict of interest

The authors declare no conflict of interest regarding the publication of this article.

References

[1] Widiati N, Purnomoadi A, Retnani Y. The impact of geographical conditions on dairy cattle productivity in highland areas. J Indones Anim Sci. 2021;23(1):35–42.

[2] Sembada P, Ramadhan I, Raihan MRF, Mugniawan A, Hendrawan MRR. Production and reproduction performance of dairy cattle at UPTD BPPIP-TSP Bunikasih. J Appl Sci. 2020;10(2):70–82.

[3] Setiyawan R, Suryani E, Adiwinarti R. Dairy cattle feed management to improve milk production and quality. J Vet Anim Sci. 2020;25(1):55–63.

[4] Safitri NI, Nugroho BA. Effect of high-quality forage supplementation on milk production of dairy cattle in highland areas. J Nusantara Anim Sci. 2021;7(2):112–8.

[5] Wiranti N, Wanniatie V, Husni A, Qisthon A. Quality of fresh cow's milk in morning and afternoon milking. J Anim Husbandry Res Innov. 2022;6(2):123–8.

[6] Widyobroto BP, Priyanto R, Wahyuni S. Optimization of dairy cattle feed quality through forage management. Proc Natl Semin Anim Sci. 2021;9:67–74.

[7] Sutardi. The role of rumen microbes in fiber digestion and their effect on livestock productivity. J Anim Sci. 2001;6(1):45–52.

[8] Rokhim RA, Yuniati E, Solikin N. Effect of different forage types on quality and quantity of cow's milk. Proc Natl Semin Health Sci Learn. 2024;4(1):617–26.

[9] Sutardi T. Effect of forage/concentrate ratio on milk production and quality and energy and protein requirements of lactating dairy cows. [dissertation]. 2024.

[10] Ferraretto LF, Shaver RD. Production of high quality and digestible forages to increase milk performance. J Anim Sci. 2022;94(Suppl_5):695–706.

[11] Habeeb AAM, Gad AY, Attia G. Impact of climate change on animal production and strategies for adaptation. Animals. 2023;13(3):396.

[12] Sari NP, Widyobroto BP, Priyanto R. Utilization of leguminous tree leaves as alternative protein sources for ruminants: Nutrient content and digestibility. Trop Anim Sci J. 2021;44(3):189–98.

[13] Berntsen J, Kristensen T, Sehested J. A forage allowance by forage type interaction impacts daily milk yield and milk composition in dairy cows. Animals. 2023;13(8):1406.

[14] Hardjosubroto W. Application of Animal Breeding in the Field. Yogyakarta: Gadjah Mada Univ Press; 2019.

[15] Rahmawati T, Yuniarti E, Ningsih S. Effect of leguminous forage supplementation on milk volume and quality of dairy cows. J Appl Anim Sci. 2021;10(2):134–41.

[16] Siregar AR, Mahmud A. Quantitative analysis in animal husbandry research: A case study of production performance evaluation. J Indones Anim Sci. 2020;22(3):195–204.

[17] Krisnawan TJA, Budiarti C, Sudjatmogo S. Effect of forage-to-concentrate ratio and different urea supplementation in lactating cows on protein intake, protein digestibility and milk protein [dissertation]. Faculty of Animal Science and Agriculture; 2017.

[18] Suhendra D, Anggiati GT, Sarah S, Nasrullah AF, Thimoty A, Utama DWC. Milk quality performance of dairy cows due to different concentrate and forage ratios. J Anim Husbandry Sci. 2015;25(1):42–6.