UTILIZATION OF RUMEN CONTENTS AS A NATURAL BIODEGRADER IN COMPLETE FEED FERMENTATION

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ABSTRACT

Feed fermentation using rumen contents as a biodegradator can improve feed quality, especially the reduction of crude fiber and nutrient availability in feed. This is important to further improve feed efficiency and livestock productivity. In addition, the use of rumen contents as a natural biodegradator can also indirectly reduce feed production costs and provide economic benefits for farmers. This study aims to explore the potential use of cow rumen contents as an ingredient in complete feed to increase the efficiency of utilization of livestock waste that has not been optimally processed, namely rumen contents. Utilization of this waste not only has the potential to reduce negative impacts on the environment, but also contributes to the development of feed nutrition science. The parameters observed in this study are: Determining the type and quality of nutrients in complete feed with various levels of treatment of the addition of cow rumen contents, using proximate analysis consisting of protein content, crude fat, crude fiber, and BETN and Analyzing the effectiveness of fermentation of the addition of rumen contents on the quality of feed nutrients in the treatment given. The research design used was a complete randomized design (CRD), consisting of 4 complete feed treatments added with rumen contents as much as 0%, 20% 25% and 30% with 3 replications. Real differences between treatments were followed by Duncan's multiple range test. The results of the analysis of variance showed that the addition of rumen contents at different levels had a very significant effect ($P < 0.01$) on the content of crude fiber, and BETN and a significant effect ($P < 0.05$) on the content of crude protein, crude fat, but in general the optimal feed quality was obtained in the addition of rumen contents as much as (30%).

Keywords: Rumen contents, biodegradator, fermentation, complete feed.

INTRODUCTION

Livestock waste, including cow rumen contents, is often not optimally utilized and even thrown away, causing environmental pollution. (Nii, H, and T, Okabe. 2012).Whereas, cow rumen contents are rich in nutrients such as protein, fat, crude fiber, and various minerals that have the potential to be utilized as a biodegradator in complete feed fermentation. (Peres H.G. et al.2024).Microorganisms found in rumen, such as bacteria, protozoa, yeast, and fungi, play an important role in the natural fermentation proc ess in the rumen of cattle. By utilizing rumen contents as a biodegradator, we can not only reduce waste and its negative impact on the environment, but also improve the quality and digestibility of animal feed.

Feed fermentation using rumen contents as a natural biodegradator can improve feed quality, especially crude fiber and nutrient availability in feed. This is important for improving feed efficiency and animal health. In addition, the use of rumen contents as a bioactivator can

also reduce feed production costs, providing economic benefits for farmers. Therefore, this study aimed to explore the potential of cow rumen contents as a natural biodegradator in complete feed fermentation.(Keum, et al 2024)

MATERIALS AND METHODS

Research Materials

The materials used in this study were rice straw, elephant grass, fine bran, molasses, water, vitamins and minerals obtained around the city of Parepare, the biodegradator used came from the contents of the rumen of cattle obtained from the slaughterhouse of Parepare city. In addition, tools for making fermented feed are used such as basins for mixing ingredients, plastic silos, and storage racks for fermented feed samples.

Research Methods

This research is a good way to improve the quality of domesticated feed with the design method using a complete randomized design (CRD), with four (4) treatments consisting of three (3) replications. the treatment in question, are as follows: P0 = Complete feed without 0% rumen content P1 = Complete feed with RG + 20% rumen content P2 = Complete feed with RG + 25% rumen content P3 = Complete feed with RG + 30% rumen content

Preparation of Fermented Feed

Make fermented feed by chopping the forage into small pieces so that it is easy to mix and ferment. Mix rumen contents with forage, rice bran, and molasses in a large container. Add enough water to reach a humidity of about 60-70%. After mixing homogeneously, put the mixture into a plastic bag or drum that can be closed tightly. Make sure no air is trapped inside. Store the container in a cool and dark place for 14 days. The fermentation process will take place with the help of microorganisms in the contents of the rumen. After the fermentation period, observations were made on the feed samples. (Pramadana I. 2024)

Observed Parameters

Observation parameters The observation components measured in this study were the content of complete feed ingredients, namely Protein, Crude Fat, Crude Fiber and BETN.

Statistical analysis

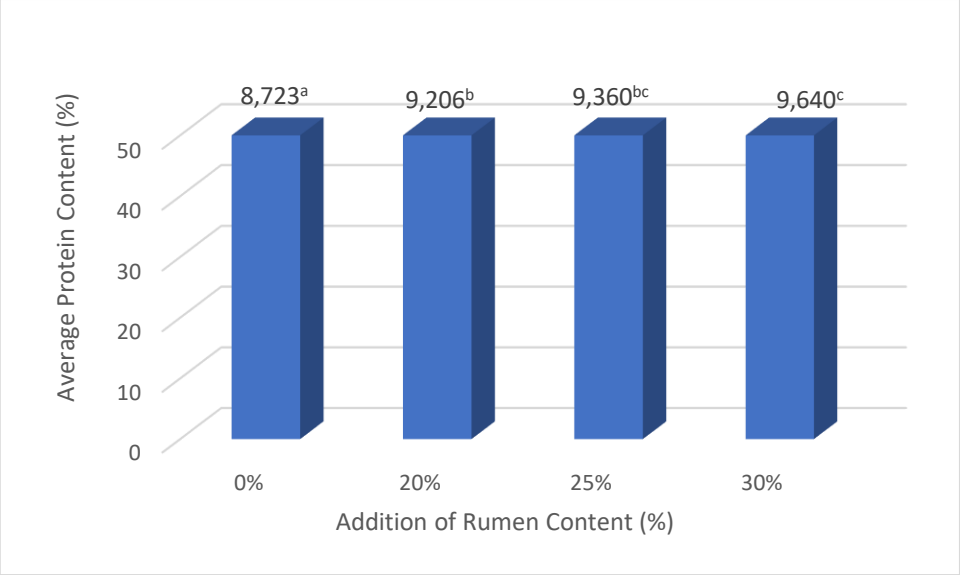
Fermentation data analyzed in the laboratory using the Wendee method were processed using the SPSS program. Observation data were analyzed by variance analysis (ANOVA) at 95% confidence level. If the effect is significant, it will be tested by Duncan.

RESULTS AND DISCUSSION

Based on the results of the research obtained in the form of proximate analysis, the contents of protein, crude fat, crude fiber and BETN are as follows:

Crude Protein Content

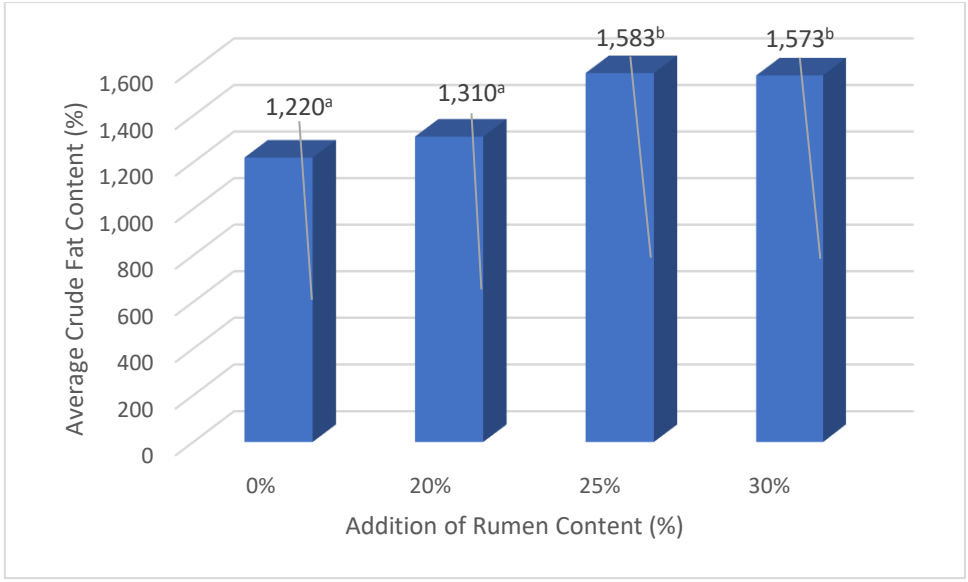
The data obtained and analyzed based on statistics obtained the results of the analysis of variance of the crude protein content of complete feed fermentations with the treatment of the addition of livestock rumen contents with different levels are as follows:



Picture 1. The results of the analysis of the protein content of complete feed given the addition of different rumen contents

Based on the results obtained showed that the treatment with the addition of rumen contents in the complete feed was able to increase the protein content and statistically gave a real effect (P <0.05) on the average increase in protein content of P0 (8.72%), P1 (9.21%), P2 (9.36%) and P3 (9.64%). This is due to the role of microorganisms in the rumen contents added in the fermentation of complete feed which helps in the degradation of feed and helps the fermentation process, especially in increasing the availability of nitrogens and microbial protein synthesis. The addition of rumen contents flour can increase the effectiveness of proteolytic enzymes that break down complex proteins into simpler forms and are easily digested by livestock, the results of this study are supported by the statement of Agustin N (2022) outlining that the addition of urea and rumen contents in rice straw fermentation can improve the quality of ruminant feed, including an increase in crude protein content.
Likewise, the results obtained by Ali U (2006) describe that the use of cow rumen contents in complete feed has a significant effect (P <0.05) on increasing consumption and better feed digestibility efficiency in Etawah breeding goats. In addition, Ramadhan M.R.G et al (2021) added that rumen contents that have been fermented using rumen microbes are more easily digested by animals and can improve feed quality by increasing the digestibility of crude fiber and extract materials without nitrogen.
Thus, the results of this study can provide information that microorganisms in rumen contents can play an important role in feed degradation and microbial protein synthesis, so it is expected to increase the effectiveness of digestion and protein content in complete feed.

Crude Fat Content (LK)
The data obtained and analyzed based on statistics obtained the results of the analysis of variance of the content of crude fat fermented complete feed with the treatment of the addition of rumen contents of livestock with different levels are as follows:

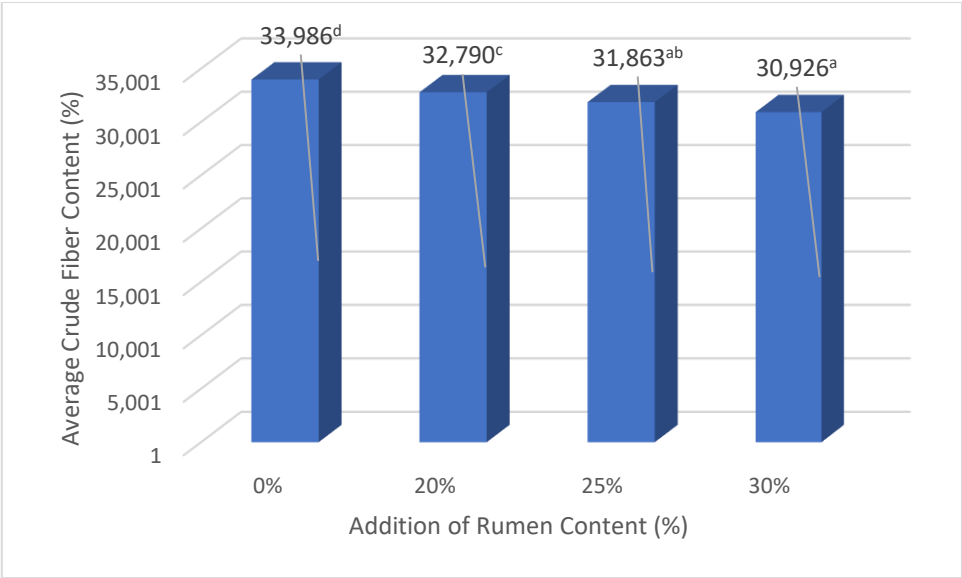


Picture 2. The results of the analysis of the Crude Fat content of complete feed given the addition of different rumen contents.

Based on the results obtained that the treatment with the addition of rumen contents in the complete feed statistically significant effect (P <0.05) on the content of crude fat (p = 0.024) according to the average results of the analysis of LK content of P0 (1.2%), P1 (1.31%), P2 (1.58%) and P3 (1.57%) but there seems to be a tendency to increase the LK content on the percentage of addition of rumen contents in P1, P2 and P3 compared with the treatment without the addition of rumen contents. This is possible because fermentation in complete feed focuses more on the breakdown of carbohydrates and protein rather than fat. While the fat content in feed ingredients tends to be more stable and does not undergo major changes during fermentation. This is supported by research by Yoram A.T.S et al (2024) which states that the fat content in feed remains stable during fermentation, because the provision of complete feed containing waste rumen contents fermentation does not have a significant effect on cholesterol, hemoglobin, and triglyceride levels in the blood of feeder Bali cattle, as well as the statement of Ndaru P.H. et al (2021) that rumen fermentation focuses more on breaking down carbohydrates and proteins.

Crude Fiber Content

The data obtained and analyzed based on statistics obtained the results of the analysis of variance of the Coarse Fiber content of complete feed fermentation with the treatment of the addition of cattle rumen contents with different levels, namely as follows:

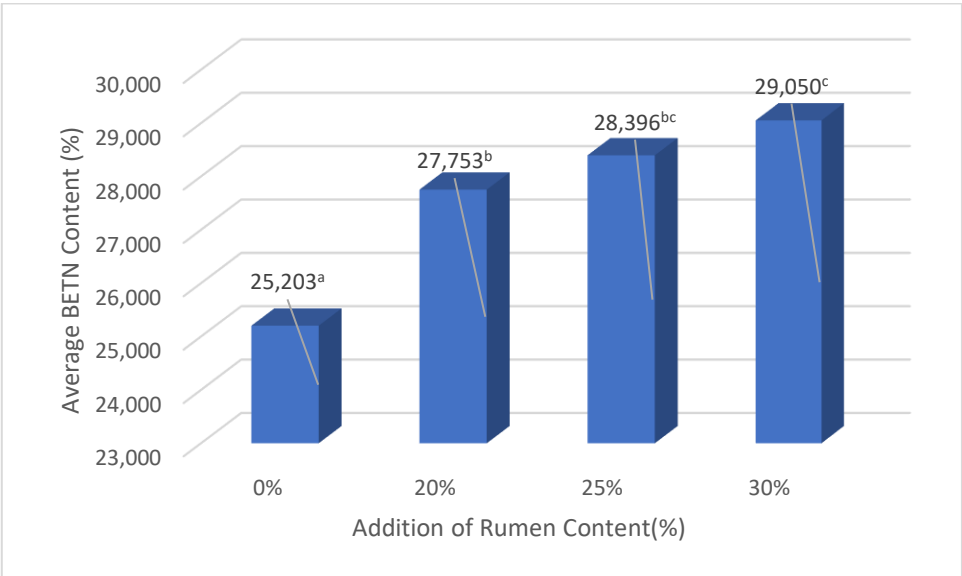


Picture 3.Results of analysis of crude fiber content of complete feed given the addition of different rumen contents

Based on the results obtained in this study showed that the treatment with the addition of rumen contents in complete feed at different levels statistically gave a very significant effect ($P < 0.01$) on crude fiber content ($p = 0.000$). Fermentation with the addition of rumen contents can increase the degradation of crude fiber through microbial activity that produces cellulase and hemicellulase enzymes. This causes a decrease in crude fiber content because most of the fiber has been broken down into simpler and more digestible compounds. This is in accordance with the statement of Sony A.E. Moningkey et al (2020) Complete feed with 30% fermented rumen content mixture showed the best results in terms of feed consumption, weight gain, and feed conversion in rabbits.

BETN content

The data obtained and analyzed based on statistics obtained the results of the analysis of variance of BETN content of complete feed fermentation with the treatment of the addition of rumen contents of cattle with different levels are as follows:



Picture 4. The results of the analysis of BETN content of complete feed given

the addition of different rumen contents.

The results of this study showed that the fermentation of complete feed with the addition of rumen contents flour treatment tended to increase, namely PO (25.20%), P1 (27.75%), P2 (28.40%), and P3 (29.50%) content gave a very significant effect (P <0.01) on BETN content significantly increased (p = 0.000). This is because the fermentation of complete feed is able to increase energy availability through the breakdown of complex carbohydrates into simple sugars. Microorganisms in the rumen contents help convert organic matter into compounds that are more easily absorbed by livestock, thus increasing BETN content. This is reinforced by the statement of Ramadhan M.R.G, et al, (2021) stating that rumen contents fermented using rumen microbes can improve feed quality because the content of crude Sera becomes more easily digested by livestock and increases the digestibility of extracts without nitrogen. The results of this study indicate that there has been a decrease in crude fiber content in feed so that the digestibility value increases.

CONCLUSION

The addition of cattle rumen flour in the fermentation of complete feed gives a very significant effect on the content of crude fiber, BETN, and has a significant effect on the content of protein and crude fat. This shows that fermentation with rumen contents is more effective in increasing the availability of nutrients that play a role in energy metabolism and livestock growth.
Implementation of feeding in cattle gives an effect on palatability increased in P2 (25%) compared to other treatments.

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