Protein Digestibility of Trembesi Leaf Fermented with *Lactobacillus plantarum* AK-3

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Abstract

This study aims to assess the digestibility of trembesi leaf protein fermented with Lactobacillus plantarum AK-3. Trembesi leaves are fermented by adding Lactobacillus plantarum AK 3 which is isolated from cow's milk waste. Then the protein digestibility was analyzed for ruminants. This research is descriptive so the data obtained is descriptive data about the level of digestibility of crude protein from fermented leaves. The conclusion obtained is the level of crude protein digestibility of the leaves of fermented trembesi Lactobacillus plantarum AK-3 by 71%.

Key word: fermentation, trembesi leaf, protein digestibility, *Lactobacillus plantarum* AK-3

Introduction

Lactobacillus was found in stale fresh cow's milk which was identified as Lactobacillus plantarum. There were two Lactobacillus plantarum found, namely Lactobacillus delbrueckii and Lactobacillus plantarum which were later named after Lactobacillus plantarum AK-1. Lactobacillus plantarum was also found in stale pasteurized milk which was later named for Lactobacillus plantarum AK-2 and Lactobacillus plantarum AK-3 (Sariri and ali-Mursyid, 2016).

Trembesi leaves have high potential as animal feed but have limitations in the presence of saponin content in them. Fermentation is one way to reduce saponin content in leaves of trembesi. Trembesi leaf fermentation using Lactobacillus plantarum AK-3 is effective in reducing the saponin content of trembesi and also increases the nutrient content, especially the crude protein content of trembesi. Lactobacillus plantarum AK-3 can reduce saponin content up to 0.12% and increase protein content by 22.70%.

From the description above, it is necessary to examine how much the digestibility value of the leaves of trembesi is fermented with Lactobacillus plantarum AK-3 so that it can be known for its feasibility for ruminants.

Method

This research will be carried out according to the plot as in Figure 1.

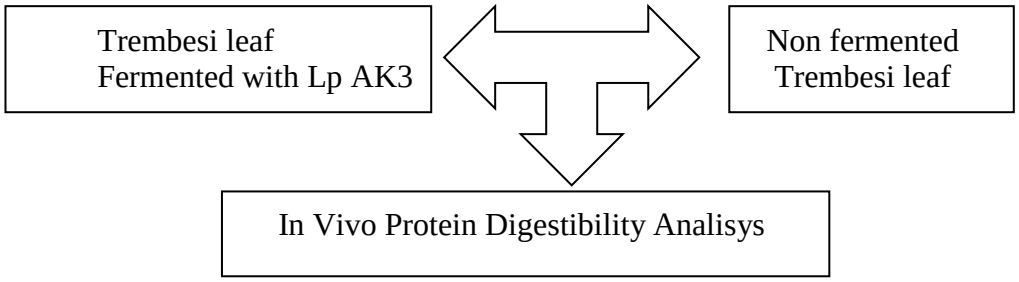

Figure 1. Research flow in Vivo Digestion Test on Holstein Frisien Cattle (PFH)

Material

The material used in this third year research is:

1. Trembesi Leaves which have been fermented with *Lactobacillus plantarum* (Lp) AK-3.
2. Holstein Frisien Cattle (PFH)

In Vivo Digestion Test on Holstein Frisien Cattle (PFH)

To test the level of in vivo digestibility used PFH cattle. The in vivo digestibility test was carried out in three periods, namely: 7-day adjustment period, preliminary period for 7 days, and collection period for 14 days (Soejono, 2004). Stool during the collection period is collected for analysis. To avoid decomposition until the laboratory analysis is carried out, the stool is stored in the freezer.

Experimental design

This experiment was designed with a completely randomized design in the same direction as two treatments, namely the digestibility of trembesi leaves and trembesi fruit, each treatment was applied to three PFH cattle. Data were analyzed using variance analysis (ANOVA) unidirectional pattern. Further test using Duncan's Multiple Range Test (DMRT) (Ali-Mursyid, 2011).

Result and Discussion

This study was conducted to determine the digestibility of fermented trembesi leaves. It is carried out in two stages, namely the preliminary and collection periods. The stools were analyzed to find out how much digestibility of the nutrients consumed.

Tabel 1. Crude Protein Digestibility of Trembesi Leaves Fermented.

Parameter	Trembesi Leaves Fermented
Crude Protein Content (mg/g)	22,70
Crude Protein Digestibility (%)	71

Crude protein is the quotient of total ammonia nitrogen by a factor of 16%. The factor of 16% comes from the assumption that protein contains 16% nitrogen. In fact, nitrogen in feed is not only derived from protein but there is also nitrogen derived from non-protein non-nitrogen or nitrogen compounds (Non-protein nitrogen / NPN). Then the calculation results are called crude protein (Saleh, 2004).

Crude protein digestibility is a total protein feed that is absorbed by the body and is not excreted in feces. Crude protein does not only contain protein but also contains nitrogen which is not derived from protein (non-nitrogen protein). Non-nitrogen protein is nitrogen not from ordinary protein compounds derived from free amino acids, nucleic acids, ammonia, and urea. Which can be converted into proteins by microbes (Sumadi et al., 2017).

The fermentation treatment gives a large increase in crude protein content in the leaves of trembesi, which is 22.70 mg / g. The addition of Lactobacillus plantarum AK-3 in fermentation provides a high protein content. This can be caused because the Lactobacillus plantarum AK-3 is a lactic acid-producing bacteria that also produces bacteriocin. Bacteriocin is a bactericidal protein compound (James et al., 1992 in Afriani, 2010).

The protein content in the feed will increase the palatability of the feed. With high palatability, it will increase livestock consumption in the feed. This is also supported by the value of fermented trembesi leaf protein digestibility by 71%. This shows that the leaves of trembesi which are fermented by using Lactobacillus plantarum AK-3 can increase the protein content of the leaves of trembesi and also increase their digestibility.

The high protein digestibility of leaf fermented trembesi can be influenced by differences in nutrient content (protein or organic matter), protein type (structure and solubility), interaction of nutrients, especially carbohydrates in some feeds in the rumen (Hermon, 2009)

Conclusion

This study concluded that the crude protein digestibility of fermented trembesi leaves was 71%.

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