Volume-2, Issue-4,April-2019: 58-63
International Journal of Current Innovations in Advanced Research ISSN: 2636-6282

Nutrition Content of White Teak Leaf-Based Complete Ration Formulated on *As Fed* Basis in Different Periods of Storage

Reski Amaliah[1], Syahriani Syahrir[2] and Asmuddin Natsir[2]

[1]Post Graduate Program, Hasanuddin University
[2]Department of Animal Science, Hasanuddin University
Corresponding Author E-mail:

Received: April 17, 2019; **Accepted:**April24, 2019; **Published:**April28, 2019

Abstract: Unconventional feedstuff use such as white teak leaf is one of the alternatives to produce complete ration. The objective of the study is to analyze nutritioncontent of dry matter, crude protein, crude fiber and NFE in white teak leaf-based complete ration formulated on *as fed* basis with various storage periods. The study used Complete Randomized Design (CRD) with 4 treatments and 5 reduplications. Treatment P1: storage for 0 week (control treatment), P2: treatment for 2 weeks, P3: storage for 4 weeks and P4: storage for 6 weeks. The data were analyzed with Analysis of Variance (ANOVA) and continued with the Duncan Multiple Range Test (DMRT). The results showed that the treatments were significantly different (P<0.05) in dry matter, crude protein, crude fiber, and NFE content. As a conclusion, the nutrition content showed a decline starting from second week of storage to sixth week of storage.
Keywords: Complete ration storage, Nutrition content, White teak leaf.

Citation: Reski Amaliah, Syahriani Syahrirand Asmuddin Natsir. 2019. Nutrition Content of White Teak Leaf-Based Complete Ration Formulated on *As Fed* Basis in Different Periods of Storage.International Journal of Current Innovations in Advanced Research, 2(4): 58-63.

Introduction

Sustainable and practical forage crop availability is one of the farmer's needs. The tropical climate of Indonesia has a great impact on the availability of forage crops. During the dry season, the availability of forage crop is in decline and as the consequence, it becomes a major problem in providing livestock forage crop needs. In order to anticipate the problem, it is necessary to provide alternative feed of forage crop. One of the alternatives utilization of agricultural or agri-industrial waste rich in fiber content is white teak leaf. It production during the dry season and are potentially processed as feed. However, the potential has not been utilized optimally.

Awotoye *et al.,* (2016) argued that white teak leaf is effective feed containing phenolic acids or proportional tannins. It has positive effects, i.e. as a substance preventing *bloat* in cattle and support the intestine to digest and absorb protein (*bypass* protein), by forming tannin-protein bond in the rumen (Frutos *et al.*, 2004). Generally, the use of agricultural waste is not sufficient to fulfil nutrition needs of the livestock due to its low palatability and nutrition content. Therefore, additional feed composed in balanced ration is necessary to sustain nutrition needs of livestock such as complete ration. Complete ration is feed with adequate nutrition content for livestock in particular physiological level which is produced and provided as one alternative to sustain primary feeding and production needs without any additional substances except water (Hartadi *et al.,* 2005). All of the feed contents including coarse feed or concentrate that are mixed homogeneously.

Feedstuff processed into complete ration in this study was produced on *as fed* basis or available water content at field. Further expectation in the ration processing on *as fed* basis is that it may improve feed quality and the farmer accessibility to adopt simple processing technology. In addition to that, white teak leaf as complete ration feedstuff is beneficial to the cattle health

Material and Methodology

The research was conducted in 3 months. The nutrition content was analyzed in Feed Chemistry Laboratory, Faculty of Animal Husbandry, Hasanuddin University using Near Infra-Red (NIR) Spektroskopi.Feedstuff of the ration included white teak leaf, bran, milled corn, tofu waste, molasses, mineral, urea and salt.

Research Methodology

Treatment in Research Stage I was 20 samples of white teak leaf-based complete ration with 4 treatments and 5 reduplications. The treatments of the research are as follows:

P1: Storage for 0 weeks (control).
P2: Storage for 2 weeks.
P3: Storage for 4 weeks.
P4: Storage for 6 weeks.

The procedure of Complete Ration Production

The production process of complete ration begins with collecting white teak leaves and the feedstuff was analyzed in Feed Chemistry Laboratory to identify its nutrition content and after the identification, the process was continued to complete ration production with ±9% crude protein content. White teak leaves and the corncobs were crushed with *grinder*. After that, all weighed feedstuffs were mixed based on *as fed* formulation (Tabel 1). Homogeneously mixed feedstuffs were weighed for 1 kg, packaged and stored in anaerobic condition.

Table 1. White Teak Leaf-Based Complete Ration Composition Formulated on *As fed* basis

No	Feedstuff	Feed Percentage (%)
1.	White Teak Leaf	35.17
2.	Bran	22.72
3.	Milled Corn	11.07
4.	Tofu Waste	17.18
5.	Molasses	11.45
6.	Mineral	1.37
7.	Urea	0.34
8.	Salt	0.69
Total		**100**

The Observed Parameters

The parameters observed in stage I were the effect of storage length of white teak leaf-based complete ration to nutrition content (dry matter, water, protein, fat and nitrogen-free extract (NFE) content by using Near Infra-Red (NIR) Spectroscopy.

Research Design

The research was arranged byCompleted Randomized Design with 4 treatmentsand 5 replications using Anova. Then the treatment significantly affected will be arranged by Duncan Test (Gomez dan Gomez, 2010). statistical analysis was performed by using SPSS 16.0 software with mathematics model as below;

$$Yij = \mu + Ti + \mathcal{E}ij$$

Description:

Yij : Observed results of variables on the complete ration formula for i with reduplication for j.
μ : Mean of observation
Ti : Effect of treatment for - i (1, 2, 3, 4)
Ɛij : effect of random error of treatment for I (1,2,3 and 4) and reduplication for j (1,2,3,4 and 5).

Results and Discussion

A. Percentage and Changes in Nutrient Mass of White Teak Leaf-Based Complete Ration formulated on *as fed* basis with different periods of storage

Based on the proximate analysis consisting of the dry matter (DM), crude protein (CP) crude fiber (CF) and nitrogen-free extract (NFE) in white teak leaf-based complete ration formulated on *as fed* basis with different periods of storage can be seen from Table 3.

Table 3. The percentage of nutrition content in white teak leaf-based complete ration with different periods of storage

Parameters	Treatments			
	P1	P2	P3	P4
DM (%)	76.48±0.18 ^{d}	75.96±0.28 ^{c}	74.78±0.17 ^{b}	73.80±0.30 ^{a}
CP (%)	9.07±0.43 ^{c}	8.64±0.27 ^{bc}	8.07±0.75 ^{ab}	7.75±0.30 ^{a}
CF (%)	14.67±0.30 ^{b}	14.10±0.29 ^{a}	14.54±0.38^{ab}	14.03±0.48^{a}
NFE (%)	54.30±0.42^{b}	55.51±0.24^{c}	52.86±0.61^{a}	53.11±1.16^{a}

Description: Numbers followed by different letters on the similar line shows significant differences (P<0.05), Treatment P1: periods of storage for 0 week (control), P2: 2 weeks, P3: 4 weeks and P4: 6 weeks.

Based on the analysis of variance, the periods of storage of white teak leaf-based complete ration (P<0.05) showed significant difference in dry matter. The results of Duncan Multiple Range Test (DMRT) (Table 3) showed that treatment P1 76.48% is higher than treatment P2 (75.96%), P3 (74.78%) and P4 (73.80%).Mean of dry matter content percentage declined in accordance with the periods of storage to the sixth week. It is due to the process of nutrition content decomposition and it caused increasing lactate acid and water content. As the water content increases, dry matter content will decrease.

This is in line with Sartini's statement (2003), stating that decrease in silage dry matter is caused by respiration and fermentation. Respiration will cause nutrition decomposition and subsequently, will decrease dry matter content. However, fermentation will produce lactate acid and water. Furthermore, Surono *et al.,* (2006) stated that the increase in water content during the ensilage process results in dry matter loss (feed preservation). The more water is produced during the ensilage process, the more dry matter loss increases.

White teak leaf-based complete ration period of storage was significantly different ($P<0.05$) in crude protein content. Duncan Multiple Range Test (DMRT) showed that treatment P1 was significantly different from treatment P3 and P4, but not different from P2. During the storage period, crude protein content declined. This was different from the study result performed by Shoalihin (2018) that the crude protein mass of complete ration formulated on *as fed* basis during the storage increased.

The increased produced protein is related to feedstuff quality and the success rate of the complete ration production. On the other hand, the decrease in crude protein percentage during the experiment was caused by high protein degradation during the storage and changes in chemical composition in complete ration feedstuff. This is similar to the research performed by Mukhlis (2017), that the decrease of crude protein content in complete ration from control treatment to storage process for 3 months was caused by microorganism activity proven by the emergence of fungi during the storage for one month.

White teak leaf-based complete ration was significantly different ($P<0.05$) in crude fiber content. The result of Duncan Multiple Range Test showed that treatment P1 was significantly different from treatment P2 and P4, but there was no difference from P3. The lowest crude fiber acquired from treatment P4 (storage for 6 weeks) was 14.03%. The decrease in percentage of crude fiber of each storage period due to decomposition of crude fiber by microbial activity on prepared complete ration. Microorganism activity in ration was generated by the nutrition content in crude fiber of complete ration such as cellulose, hemicellulose, polysaccharide and lignin.

Similar to the study performed by Sari *et al.*, (2015), stating that the decrease in crude fiber for each period of storage was caused by microorganism that decomposes lignocellulose from crude fiber lignin. Lignin content in crude fiber can be decomposed by microorganism by producing the extracellular enzyme. The microorganism decomposes crude fiber lignocellulose such as cellulose and hemicellulose into glucose that can be utilized as microbial feed. In addition, the decrease of crude fiber caused by the increasing water content in feedstuff every week during storage which affected the growth and microbial activity during the storage. Therefore, crude fiber content decreased in each week.

According to analysis of variance, the treatment of (Table 2) storage period was significantly different ($P<0.05$) in NFE. The lowest NFE content on treatment P3 was 52.86%. This showed that during the storage, NFE content percentage decreased. A similar result was acquired from the study performed by Syahrir *et al.,* (2014) concerning changes in silage protein, fat, fiber, and NFE mass of rice straw and mulberry-based complete feed that showed the decrease of NFE on the treatment which reflects an effective process of fermentation in each treatment.

NFE is a nutrient fraction that is easily fermented and will quickly be hydrolyzed in the fermentation process because it will reduce NFE content in the fermentation media.

Conclusion

Based on the result of the study, it can be concluded that dry matter, crude protein, crude fiber and NFE content in white teak leaf-based complete ration formulated on *as fed* basis decreased during the storage period for 6 weeks.

Acknowledgements

The authors would like to express their gratitude toHasanuddin University that has provided inspirations andexpertise that greatly contributed to the research. The authorswould like to show their gratitude to laboratory staff for sharingtheir knowledge during this research as well.

Author's Contributions

Reski Amaliah: Conceived the manuscript and performed the field experiments
Syahriani Syahrir: Designed field experiments.
Asmuddin Natsir: Performed chemical analyzed data.

EthicsThis Manuscript

EthicsThis Manuscript has not been published or presented elsewhere in part or in entirely and is not under the consideration by another journal. All the authors have approved the manuscript and agree with submission of interest to be declared.

References

1. Awotoye, O.O., Ogunbanjo, O.R., Jeminiwa, S.M., Okanlawon, F.B. and Oyelami, B.A. 2016. Comparative evaluation of fodder yield and leaf quality of some selected tree species. Environment and Ecology Research, 4(3): 116-118.

2. Frutos, P., Hervas, G., Giráldez, F.J. and Mantecón, A.R. 2004. Tannins and ruminant nutrition. Spanish Journal of Agricultural Research, 2(2): 191-202.

3. Gomes, K.A. and dan A.A. Gomez. 2010. Prosedur Statistik untuk Penelitian Pertanian. (Terjemahan). E. Syamsudin dan J.S. Baharsjah. Edisi kedua. Penerbit UI Press, Jakarta.

4. Hartadi, H., Reksohadiprodjo, S. and Tillman, A.D. 2005. Tabel Komposisi Pakan untuk Indonesia. Yogyakarta (ID): Gadjah Mada University Press.

5. Mukhlis. 2017. The effect of storage periods of ammoniated palm fronds-based complete ration to nutrient content and fungal spore growth. Minithesis. Faculty of Animal Husbandry, Andalas University, Padang.

6. Sartini. 2003. In Vitro Dry Matter and Organic Matter Digestibility of Napier Grass Silage at Cutting Age and Level of Additive Differences. J. pengembangan Peternakan Tropis.

7. Sari, M.L., Ali, A.I.M., Sandi, S. and Yolanda, A. 2015. Kualitas serat kasar, lemak kasar, dan BETN terhadap lama penyimpanan wafer rumput kumpai minyak dengan perekat karaginan. Jurnal Peternakan Sriwijaya, 4(2): 35-40.

8. Shoalihin, M. 2018.Effect of Complete feed substitution with Corn Hydroponic Fodder on Rumen Characteristics and Nitrogen Balance in Domestic Goats. Tesis. Pacasarjana Ilmu dan teknologi Peternakan, Hasanuddin University, Makassar.

9. Surono, M., Soejono dan and Budhi, S.P.S. 2006. Dry Matter and Organic Matter Loss of Napier Grass Silage at Different Age of Defoliation and Level of Additive. Faculty of Animal Husbandry, Universitas Diponegoro. Semarang.

10. Syahrir, S., Rasjid, S., Mide dan Harfiah, M.Z. 2014. Changes in Protein, Fat, Fiber and NFE Mass in Mulberry Biomass and Rice Straw-Bassed Complete Feed Silage. Hal.135-139. Forage Crops and Livestock Nutrition Department, Hasanuddin University. Makassar.