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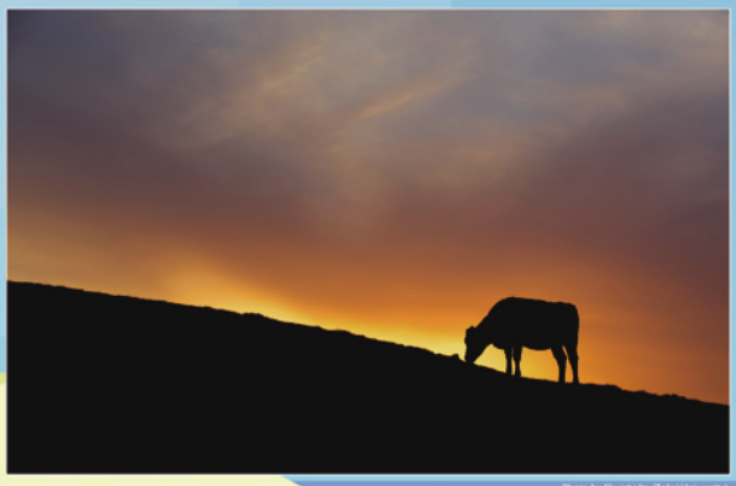

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UTILIZATION OF gGOROHO h BANANA STEM (Musa acuminafe,sp) MEAL AS AN ALTERNATIVE FEED ON BROILER PERFORMANCE

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Abstract

A research evaluating the effects of utilization of "goroho" banana (*Musa acuminafe,sp*) stem meal as an alternative feed on broiler performance. "Goroho" banana stem was collected from Kawangkoan, Minahasa region in North Sulawesi Indonesia. 100 of one week old chick broilers strain CP 707 were used. Completely randomized design (CRD) with 4 treatments and 5 replications was used and each replication consisted of five birds. The treatments were R_0 = 0% of "goroho" banana stem meal in the ration; R_1 = 2.85 % of "goroho" banana stem meal in the ration ('goroho' banana stem substituting 5% corn); R_2 = 5.70 % "goroho" banana stem meal in the ration ('goroho' banana stem substituting 10% corn), and R_3 = 8.55 % "goroho" banana stem meal in the ration ('goroho' banana stem substituting 15% corn). Variables measured were ration consumption, average body gain, feed conversion, carcass percentage and percentage of abdominal lipid. Analysis of variance showed that there were no significant effects ($P>0.05$) on ration consumption and percentage of abdominal lipid; however, there were significant effects ($P<0.05$) on average body gain, feed conversion, and carcass percentage. Tukey test showed that average body gain and feed conversion of R_0 (863.39 g and 2.14) and R_1 (844.39 g and 2.19) were significantly higher compared to R_2 (733.66 g and 2.53) and R_3 (670.66 g and 2.71). While carcass percentage of R_3 (77.72%) was lower compared to R_0 (86.70 %), R_1 (84,12 %) and R_2 (82,40 %). It can be concluded that "goroho" banana stem meal can be utilized up to 2,85% (substituting 5% corn) in broiler ration.

INTRODUCTION

"Goroho' banana (*Musa acuminafe,sp*) is endemic banana in North Sulawesi, Indonesia. This species of banana has a special characteristic which the pill is still green although the fruit already ripe (Tasirin, 2012). The largest portion of banana tree component is the stem (60 %) compared to leaves (10%) and fruit (30%) (Munadjim, 1983). Its nutrient contents are : crude protein (4.81% %), crude fiber (27.73%), lipid (11.23 %), lignin (9.92%), and ash (23.12 %) (Hashrida, 2011); while Wina (2001) reported that nutrient compositions of banana stem are: crude protein 2.4 - 8.30%, crude fiber 13.40 - 31.70%, lipid 3.20 -8.10%, and ash 18.24 -24.76%. On the other hand, banana stem also contains lignin and tannin (Qotimah, 2000) which act as inhibitors to decrease dry matter and organic matter digestibility by binding protein (Zimmer and Cordesse, 1996). Tidi *et al*. (2011) also reported that tannin is a fenol compound that reduce organic matter digestibility especially protein by binding protein. Santoso (1987) reported that tannin affected digestibility in poultry by reducing amino acid digestibility due to depressing nitrogen retention.

Water content in banana stem ranged from 80 to 90%, so that it is easy to decay. Banana stem can be used as in-conventional feed (Mathius and Sinurat, 2001).

The utilization of banana stem in ruminant's diet had no negative effect on young sheep performance and showed increasing in N retention compared to control ration (Mathias *et al*, 2001). Only a few research had been conducted in utilizing banana stem in the diets on broiler performance.

The objective of this research was to evaluate the effects of utilization of "goroho" banana stem meal as an alternative feed on broiler performance.

MATERIALS AND METHODS

This research was conducted in Manado, North Sulawesi, Indonesia; used 100 one week old unsexed broilers strain CP 707. Completely Randomized Design (CRD) with 4 treatments and 5 replications was applied to this experiments. The treatments were : R0 = diet without 'goroho' banana stem meal; R1 = diet with 2.85% 'goroho' banana steam meal (substitute 5% corn); R2 = diet with 5.70% 'goroho' banana stem meal (substitute 10% corn); R3 = diet with 8.55% 'goroho' banana stem meal (substitute 15% corn). The chicken had been raised for four weeks (up to 35 days old). Variable measured were ration consumption, average body gain, ration conversion, carcass percentage, and abdominal lipid percentage. Data were analyzed by Analysis of variance (Anova), and the

differences among means by Tukey test (Steel and Torrie, 1990).
Table 1. showed nutrient compositions and metabolic energy of ingredients and Table 2 showed composition and nutrients of the rations.

RESULTS AND DISCUSSION

Data of variables measured of the utilization of 'goroho' banana stem meal as an alternative feed on broiler performances were showed in table 3.

The data showed that averages of feed consumption in this experiment ranged from 1812.97 to 1849.69 grams/head. There were no significant effects (P>0.05) on feed consumption by utilization of 'goroho' banana stem meal in the ration. It is assumed that because of metabolic energy content of the four treatments was so close, therefor no significant effects on feed consumption due to feed consumed was to fulfill metabolic energy needs.
Averages of body gain ranged from 670.66 to 863.39 grams/head. Utilization of 'goroho' banana stem meal in the ration significantly (P<0.05) affected averages of broiler body gain. Tukey test showed that there were no significant different (P>0.05) between R0 and R1, and between R2 and R3; however, R0 and R1 were higher in average body gain compared to R2 and R3 (P<0.05). It is assumed that the inhibitor agents such as tannin in banana stem bound protein and minerals that caused decreased the availability of protein and minerals. Wina (2001) reported that liquid of banana stem contained 0.14 - 4.96 of condensed tannin; so that by increasing banana stem in the ration could decrease body gain of the chickens.
Averages of feed conversion and carcass percentage in this experiment were 2.14 - 2.71 and 77.72 - 86.70%, respectively. There were significant effects of utilization of banana stem in the ration (P<0.5) on feed conversion and carcass percentage.
Tukey test showed that feed conversion of R0 was no significantly different (P>0.05) compared to R1; however, feed conversion of R0 and R1 were lower (P<0.5) than R2 and R3. There was no significant difference (P>0.05) of carcass percentage among R0, R1, and R2, however, carcass percentage of R0, R1, and R2 were higher compared to R3. As in body gain, tannin had negative effects on feed conversion and carcass percentage. Increasing of banana stem portion in the ration increased feed conversion, on the other hand, increasing banana stem in the ration decreased carcass percentage of the chickens. This result was supported by Zimmer and Cordesse (1996), who reported that tannin could decrease dry matter and organic matter digestibility. Tidi *et al*. (2011) also reported that tannin is a fenol compound that reduce organic matter digestibility especially protein by binding protein. Santoso (1987) reported that tannin affected digestibility in poultry by reducing amino acid digestibility due to depressing nitrogen retention. So that increasing banana stem meal in the ration increased tannin content and this condition could suppress digestibility, on return, caused in increasing feed conversion and decreasing carcass percentage.
Averages of abdominal lipid percentage ranged from 1.90 to 2.26 %. There was no significant effect of utilizing banana stem meal in the rations on abdominal lipid percentage. The abdominal lipid percentages in this research were in the range of Becker et al (1979) report that abdominal lipid percentage of five broiler strains were 0.73 - 3.78%.

CONCLUSION

'Goroho' banana (*Musa acuminafe,sp*) stem meal as an alternative feed could be utilized up to 2,85 % (substituting 5 % corn) in broiler ration.

KEYWORD : Banana, stem, performance, broiler

Table 1. Nutrients Composition and Metabolic Energy of Ingredients Used in the Experiment of Utilization of 'Goroho Banana Stem Meal as an Alternative Feed on Broiler Performance

Ingredients	Crude Protein	Lipid	Crude Fiber	Ca	P	ME
Corn *	9.42	5.17	2.15	0.22	0.60	2983.50
Rice bran *	13.44	6.07	6.35	0.19	0.73	2695.50
Coconut meal *	24.74	9.36	15.02	0.11	0.47	3279.75
Fish meal*	55.59	12.10	0.017	5.10	2.08	3470.40
Soybean meal*	40.38	9.91	6.56	0.24	0.58	2540.00
Banana stem meal**	2.53	1.49	23.48	0.85	0.14	2792.00
Coconut oil**		100.00				8812.00
Mineral mix**				5.38	1.44	

Sources : *) Dengah, *et al*, 2016
**) Makanan Ternak Laboratory, Padjadjaran University, 2015

Table 2. Ingredients and Nutrients Composition of the Ration

Ingredients	R0	R1	R2	R3
Corn	57	54.15	51.3	48.45
Rice bran	5	5	5	5
Coconut meal	9	9	9	9
Fish meal	12	12	12	12
Soybean meal	15	15	15	15
Banana stem meal	0	2.85	5.7	8.55
Coconut oil	1	1	1	1
Mineral mix	1	1	1	1
Total	100	100	100	100
Nutrient composition	R0	R1	R2	R3
Crude Protein	21.00	20.80	20.60	20.41
Lipid	8.03	7.93	7.82	7.72
Crude Fiber	3.88	4.49	5.10	5.70
Ca	0.85	0.86	0.88	0.90
P	0.77	0.76	0.75	0.73
ME	3016.12	3010.66	3005.21	2999.76

Calculated based on Table 1.

Table 3. Averages of Feed Consumption, Body Gain, Feed Conversion, Carcass Percentage and Abdominal Lipids during the Experiment of Utilization of 'Goroho' Banana Stem Meal as an Alternative Feed.

Parameter	Treatments			
	R_0	R_1	R_2	R_3
Feed Consumption *(gram/head/)*	1849,69	1838.03	1843.49	1812.97
Body gain *(gram/head)*	863.39 ^{a}	844.39 ^{a}	733.66 ^{b}	670.66 ^{b}
Feed Conversion	2,14^{a}	2,19 ^{a}	2,53 ^{b}	2,71 ^{b}
Carcass Percentage	86,70^{a}	84,12^{a}	82,40^{a}	77,72^{b}
Abdominal lipid Percentage	2,08	2.20	2.26	1.90

Different Superscripts in the same row showed there were significant differences (P< 0.05).

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