Application of Fermented Palm Kernel Cake and Cassava Byproduct Mixture in Broiler

Nurhayati[1], C.U. Wirawati[2], and D.D. Putri[1]
[1] Department of Animal Science,Lampung State Polytechnique
[2]Department of Food Technology, Lampung State Polytechnique
email: nhyt1970@plasa.com

ABSTRACT

This experiment was conducted to evaluate the effect of feeding PKC-cassava byproduct mixture fermented by *Aspergillus niger* in ration on broiler performance. This research used 96 DOC broiler. The birds were reared in litter floor pen and were fed 0 (P0), 10 (P1), 20 (P2), and 30% (P3) of the fermented PKC-cassava byproduct mixture in the ration. Feed and water were given *ad libitum* and reared for 6 weeks. The experiment used Completely Randomized Design with 4 ration treatments and 4 replications and each replication consisted of 6 birds. Data were analyzed statistically using ANOVA and continued with Duncan's Multiple Range Test. The result showed that diet treatments did not affect ration consumption, gain, ration conversion, carcass percentage, meat crude fat, and blood cholesterol, but affected abdominal fat percentage, and IOFC. Utilization of fermented PKC-cassava byproduct mixture untill 30% in the ration was comparable with the control diet.

Key words: palm kernel cake, cassava waste, fermentation, broiler

INTRODUCTION

The usage of fermentation product in broiler ration is predicted to increase the ration palatability and final weight, and it can decrease body fat. Evaluation on nutrient ingredient of many composition of palm kernel cake (PKC)-cassava byproduct mixture fermented by *Aspergillus niger* was investigated by Nurhayati (2007). The result indicated that composition of PKC 60% and cassava byproduct 40% was the best mixture in nutrition value compared with the other composition (100% PKC, 80% PKC : 20% cassava byproduct, 60% PKC : 40% cassava byproduct, 40% PKC:60% cassava byproduct, 20% PKC:80% cassava byproduct, and 100% cassava byproduct). It could be proved by increasing of crude protein from 10,75% to 18,61% an by decreasing crude fiber and ex tract ether i.e. from 16,92% to 8,07% and from 10,13% to 2,39% respectively.

It is important to apply this fermentation product in broiler to investigate boilogical effect. The objective of this research was to evaluate the effect of feeding PKC-cassava byproduct mixture (60% PKC and 40% cassava byproduct) fermented by *Aspergillus niger* in ration on broiler performance.

MATERIALS AND METHODS

Ninety six Day Old Chick of broiler were used in this research. Ration formulation used and its nutrient content were presented in Table 1 and Table 2.

Table 1. Trial ration formulation for starter and finisher period

Feedstuff	Starter (%)				Finisher (%)			
	P0	P1	P2	P3	P0	P1	P2	P3
Consentrate***)**	43	40	37	34	35	32	29	26
Corn mill1)	57	50	43	36	52.5	45.5	38.5	31.5
Rice bran1)	0	0	0	0	10	10	10	10
Fermentation product	0	10	20	30	0	10	20	30
Palm oil	0	0	0	0	2.5	2.5	2.5	2.5
Total	100	100	100	100	100	100	100	100

Note: P0, P1, P2, and P3 = Diet with 0%, 10%, 20%, and 30% of fermentation product in the ration; *) Based on nutrient analysis of animal feedstuff factory (CP 40%; ME 2,974 ccal; EE 3%; CF 5%; Ca 2.5%; P 1.2%); 1) Wahyu (1992).

Table 2. Nutrient content in each treatment*)

Treatment	Nutrient content of starter diet						Nutrient content of finisher diet					
	CP	ME	EE	CF	Ca	P	CP	ME	EE	CF	Ca	P
P0	22.49	3,243.04	3.40	3.72	1.02	0.65	20.02	3,28.05	4.19	3.95	0.77	0.67
P1	22.50	3,200.64	3.29	4.21	1.04	0.69	20.03	3,185.65	4.08	4.44	0.80	0.70
P2	22.51	3,158.24	3.18	4.69	1.07	0.73	20.04	3,143.25	3.97	4.92	0.82	0.74
P3	22.52	3,115.84	3.07	5.18	1.09	0.77	20.06	3,100.85	3.86	5.41	0.85	0.78

*) Based on calculation result.

Table 3. Performance, carcass percentage and blood cholesterol of broiler fed diets containing fermentation products

Variabel	Diet treatments			
	P0	P1	P2	P3
Ration consumption (g)	4,926.08 ± 68.91	5,053.28 ± 78.02	4,986.24 ± 126.25	5,102.59 ± 163.39
Gain (g)	2,393.23 ± 48.40	2,397.86	2,363.78	2,322.25
Ration conversion	2.06 ± 0.04	2.11	2.11	2.20
IOFCC (Rp)	2,733.16 ± 1,303.54[a]	3,415.77[a]	5,098.07[b]	6,254.06 [c]
Carcass percentage (%)	66.19 ± 1.47	67.56	67.82	65.17
Abdominal fat percentage (%)	2.20 ± 0.10 [b]	2.07 [a]	2.05 [a]	1.99 [a]
Meat fat content (%)	8.46 ± 0.66	8.20	7.99	8.05
Blood cholesterol (mg/100g)	127.73	117.26	115.18	112.52

Note: Different superscript in the same row indicated significant effect (P<0.05);
P0, P1, P2, and P3 = Diet with 0%, 10%, 20%, and 30% of fermentation product in the ration.

RESULTS AND DISCUSSION

The result indicated that ration consumption of broiler from the highest to the lowest were P3 (5,102.59 g), P1 (5,053.28 g), P2 (4,986.24 g), and P0 (4,926.08 g) respectively. The treatments did not affect ration consumption (P>0.05). It does mean that the fermentation did not increase feed consumption. In contrast, Saono (1976) stated that fermentation product could increase ration palatability.

Table 3 showed that gain in treatment P1, P0, P2, and P0 were 2.397,86 g, 2,393.23 g, 2,363.78 g, and 2,322.25 g respectively. The result indicated also that treatment did not affect birds gain (P>0.05). It's mean that ration containing fermentation product until 30% did not disturb gain of the birds.

Many factors responsible for the growth of birds, one of them is fibre content in the ration. Birds ration contained high crude fiber would cause difficulty in metabolizing the ration so that it would disturb nutrient metabolizing and it would go out with feces (Hough and Basett, 1975; Borgman and Wardlow, 1975) cited by Latif *et al*. (1999), and as a consequence the nutrient will not be used for birds growth. The fibre content of the diets used in this research were 3.72 – 5.18 % (Table 2), still match with NRC recommendation.

The treatments did not affect ration conversion (P>0.05). The ration conversion of birds fed P0, P1, P2, and P3 were 2.06, 2.11, 2.11, and 2.20 respectively. The result indicated that products fermentation made of cassava and palm kernel cake can be used until 30% in broiler ration.

The treatment did not affect carcass percentage (P>0.05) but significantly affected abdominal fat percentage. Carcass percentage of broiler fed P2, P1, P0, and P3 were 67.82%, 67.56%, 66.19%, and 65.17% respectively. Carcass percentage in the present study ranged from 65.17% to 67.82%. This result was fit to the standard range stated by Siregar *et al*. (2003) that carcass percentage of broiler range from 65% to 75% of body weight.

The treatments did not affect ration conversion (P>0.05). The ration conversion of birds fed P0, P1, P2, and P3 were 2.06, 2.11, 2.11, and 2.20 respectively. The result indicated that products fermentation made of cassava and palm kernel cake can be used until 30% in broiler ration.

The treatment did not affect carcass percentage (P>0.05) but significantly affected abdominal fat percentage. Carcass percentage of broiler fed P2, P1, P0, and P3 were 67.82%, 67.56%, 66.19%, and 65.17% respectively. Carcass percentage in the present study ranged

from 65.17% to 67.82%. This result was fit to the standard range stated by Siregar *et al*. (2003) that carcass percentage of broiler range from 65% to 75% of body weight.

Abdominal fat percentage of birds fed P0, P1, P2, and P3 were 2.20%, 2.07%, 2.05%, and 1.99% respectively. Abdominal fat of birds fed diet P0 was higher than those birds fed P1, P2, and P3 (P<0.05), but no significant was found among abdominal fat of birds fed P1, P2 and P3. Abdominal fat percentage in the present study was still normal. Mountney (1976) cited by Yotolembah (2003) stated that abdominal fat percentage of broiler ranged from 1.3% to 7.3%. Abdominal fat percentage was affected by fermentation adding in the ration. The more fermentation product in the ration the lower abdominal fat percentage. It is supposed that the fibre present in the diet was responsible for the abdominal fat content. In this study, the fibre content increased as increasing utilization of fermentation product in the ration (Table 2). Crude fiber in the digestion tract will bind bile acid. This condition caused gall function to help in absorbing lipid impeded. Furthermore bile acid bound by crude fiber will be sent out together with crude fiber in the form of feces. If this condition was running continually, it would imped the formation of abdominal fat (Hough and Basett, 1975; Borgman and Wardlow, 1975) cited by Latif et.al (1999).

Income Over Feed and Chick Cost (IOFC) of P3, P2, P1, and P0 were Rp6,254.06, Rp5,098.07, Rp3,415.77, and Rp2,733.16 respectively. The treatments affected IOFC (P<0,05), where IOFC of P3 was higher than that of P2, P1, or P0 (P<0.05). IOFC of P2 was higher than that of P1 and P0 (P<0.05), while IOFC of P1 and P0 did not differ significantly (P>0.05). The higher IOFC of P3 was caused by the lower price of the ration per kg than that of P0, P1 or P2. The lower price of P3 diet was related to the lower use of concentrate and corn mill in the ration, where price of corn mill and concentrate was more expensive compared with that of fermentation product.

The treatment did not affect blood cholesterol and meat fat content. The blood cholesterol content P0, P1, P2, and P3 were 127.73 mg/100g, 117.26 mg/100g, 115.18 mg/100g, and 112.52 mg/100g respectively. The meat fat content of broiler fed P0, P1, P2, and P3 were 8.46%, 8.20%, 7.99%, and 8.05% respectively. The blood cholesterol and meat fat content were correlated with fibre content of the diet, where the higher fibre content in the diet, the lower blood cholesterol and meat fat content. The fibre content of the diet in this study (Table 2), however, was not enough to decrease blood cholesterol and meat fat content.

CONCLUSIONS

Diet treatments did not affect ration consumption, gain, ration conversion, carcass percentage, meat crude fat, and blood cholesterol, but affected abdominal fat percentage, and IOFC. Utilization of fermented PKC-cassava byproduct mixture until 30% in the ration was comparable with the control diet.

REFERENCES

Latief, A., F. Manin, S. Syarif. 1999. Pengaruh Penggunaan Kulit Ari Biji Kedelai Fermentasi dalam Ransum terhadap Kadar Kolesterol Ayam Broiler. Laporan Penelitian. Fakultas Peternakan. Universitas Jambi. Jambi.

Nurhayati. 2007. Peningkatan Daya Guna Campuran Bungkil Inti Sawit dan Onggok melalui Teknologi Fermentasi dengan *Aspergillus niger*. Laporan Penelitian Dosen Muda. Politeknik Negeri Lampung. Bandar Lampung

Rusdi, U.D. 1992. Fermentasi Konsentrat Campuran Bungkil Biji Kapok dan Onggok serta Implikasi Efeknya terhadap Pertumbuhan Ayam Broiler. Disertasi. Universitas Padjadjaran. Bandung

Siregar, Z., Supriadi, dan E. Mirwandhono. 2003. Peningkatan Mutu Bungkil Inti Sawit melalui Fermentasi Rhizopus oligosporus dan Suplementasi Nopcozime-II untuk Ayam Pedaging. Abstrak. Fakultas Pertanian Universitas Sumatera Utara. Medan.

Steel, R.G.D. and J.H. Torrie. 1980. Principles and Procedures of Statistics, A Biometrical Approach. International Student Ed. McGraw-Hill. Kogakusha Limited, Tokyo

Yotolembah, A. 2003. Pengaruh Penggunaan Kultur Aspergillus niger dan Bacillus spp. Serta Kombinasinya sebagai Imbuhan Pakan terhadap Performan Ayam Pedaging. Tesis. Program Pascasarjana Universitas Padjadjaran Bandung.