UTILIZATION OF FERMENTED CASSAVA WASTE- CASSAVA LEAF MEAL BY *Aspergillus niger* IN THE RATION ON FINAL BODY WEIGHT, CARCASS PERCENTAGE AND FEED CONVERSION OF BROILER

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ABSTRACT

This research was held to find out the effect and optimal percentage of fermented cassava waste – cassava leaf meal by *Aspergillus niger* (FOTDS) in the ration on final body weight, carcass percentage and feed conversion of broiler. The experiment used 120 broiler chick, were placed randomizely divided into six treatments and four replications.The treatments are R_0 (control ration, without FOTDS), R_1 (95% R_0 + 5% FOTDS), R_2 (90% R_0+ 10% FOTDS), R_3(85% R_0 + 15% FOTDS), R_4 (80% R_0 + 20% FOTDS) and R_5 (75% R_0 + 25% FOTDS). The experiment was done using Completely Randomized Design (CRD) and tested with Duncan Multiple Range. The result showed that using cassava-cassava leaf meal fermented by *Aspergillus niger* in broiler ration has no affect to final body weight, carcass percentage and feed conversion .It is concluced that FOTDS could used until 25% in broiler ration and has same effect with control ration (without FOTDS)

Key words : Cassava waste-cassava leaf meal, *Aspergillus niger*, final body weight, carcass percentage, feed conversion

INTRODUCTION

Onggok (Cassava waste) is a by product from tapioca industry and the availability of onggok was increased according to the tapioca production and could be an environmental problems, as a potential pollutant in the plant neighborhood. The utilization of onggok for poultry feeding is still very limited. This is due to low crude protein content from 1.60 to 3.92% and high crude fiber 14.54% (Davendra, 1977). Another waste product is cassava leaf by product of harvesting cassava tubers, being abundant and its utilization is still limited to ruminants. Crude protein content of cassava leaf is high (16.7 to 39.9%) and crude fiber 17.51%. Limiting factors of cassava leaf meal utilization as an ingredient of poultry feed is a low energy content, the glucoside sianogenik and its bulky. So we must increased the raw materials quality for an alternative sources, with biologically process e.q. fermentation with Aspergillus niger, that will increased the crude protein content for onggok and cassava leaf mixture to 21.19% and decreased the crude fibre to 10.31% with a low sianogenik glucosidal (0.15 mg/kg) so could be used in broiler ration (Rico, 2007).

Fermentation onggok with *Aspergillus niger* has the prospect to improve the nutritional quality of the materials (Aisjah, 1995 and Kompiang *et al* 1995). The activity of *Aspergillus niger* can produce cellulase enzymes, amylase and phytase, that will hydrolyzed substrate complex molecules to be simple molucle, so it could be digested (Purwadaria, *et al*, 1998). According to Hsiao and Chiou, (2006), *Aspergillus niger* fermentation product derived from waste substrate

plant are not harmful for chickens and has no harmful effect until level 30% in ration. The cellulase produced by *Aspergillus niger* will increased the utilization of nutrients such as protein substrate,will increased the digestibility and absorbility, at least will increased the body weight of broilers, because the crude fiber was degradable. This increasing of digestibility caused the degradation of crude fiber as inhibiting factors, as well as the positive influence of fermentation products in the gastrointestinal health improvement by lowering the pH of gastric chicken and suppresses the activity of microbial pathogens and to improve the structure of the digestive tract mucosa (Mathivanan *et al*, 2006).

The purpose of this experiment are to study the optimal utilization of fermented leaf meal of the product fermented (FOTDS) in broiler ration that will raised the final body weight , the carcass percentage and feed conversion of broiler.

MATERIAL AND METHODS

The research used 120 DOC of broiler Arbor Acres DOC, with average body weight 40.26 gram and coefficient variable 4.59%. The birds kept in litter system, as much as 24 flock, and each unit consist 5 chickens. Every flock is equipped with round feeder and waterer, and 60 watts bulb lamp as heater hanging at the middle of each flock, where of tube lamp as a house light.

The ration consist of corn-meal, fish meal, rice bran, broiler concentrate and FOTDS, are 22% protein and 3000 Kcal/kg of metabolizable energy (Soeharsono,1976).

The formula rations were

R_0	Control ration	R_3	85% R_0 + 15% FOTDS
R_1	95% R_0 + 5% FOTDS	R_4	80% R_0 + 20% FOTDS
R_2	90% R_0 + 10% FOTDS	R_5	75% R_0 + 25% FOTDS

The ration control (R_0) was made of 54% from corn- meal , 7% rice bran , and 39% broiler concentrated broiler. In Table 1 and Table 2 are the compositions of the rations and the metabolizable energy and nutrient content consecutively.

Table 1. Composition of Experimental Rations

No	Ingredient	R_0	R_1	R_2	R_3	R_4	R_5
	…….%……..						
1.	R_0	100	95	90	85	80	75
2	FOTDS	0	5	10	15	20	25
	Total	100	100	100	100	100	100

Table 2. The Nutrient and Energy Metabolism Content of Experimental Rations

No	The Nutrient	R_0	R_1	R_2	R_3	R_4	R_5
		……..%.....					
1	Crude Protein	22,26	22,22	22,19	22,15	22,11	22,08
2	Crude Fat	3,87	3,88	3,89	3,89	3,89	3,89
3	Crude fiber	4,25	4,34	4,64	4,94	5,23	5,53
4	Calcium	1,15	1,14	1,13	1,12	1,12	1,12
5	Phosphor	0,75	0,75	0,74	0,74	0,74	0,73
6	ME (kcal/kg)	3012,00	3011,71	3011,43	3011,15	3010,87	3010,59

CRD experiment was used, with six treatments, and each treatment was five times repeated. Data was analyzed with randomized simple test and Duncan's Multiple Range Test, for final body weight, carcass percentage, and feed conversion index.

RESULTS AND DISCUSSION

In Table 3, showed the average final weight, carcass percentage and feed conversion of broiler chickens.

Table 3. The Average Final Weight, Carcass percentage and Feed Conversion of Broiler Chickens

No	Parameters	R_0	R_1	R_2	R_3	R_4	R_5
1	Final Weight (g)	1496.63	1494.41	1499.53	1492.26	1496.51	1493.80
2	Carcass Weight (g)	1000.20	1008.73	1010.26	1000.26	1002.66	995.62
3	Carcass (%)	66.83	67.50	67.42	67.03	67.00	66.67
4	Feed Conversion	1.85	1.81	1.84	1.88	1.82	1.85

Final Body Weight

By analysis of variance showed that the control ration has not significantly ($P>0.05$) effect on the final weight. The addition of FOTDS in broiler rations until 25% level, has no significancy to control ration (R0), because the fermentation with *Aspergillus niger* on cassava-waste-cassava leaf meal can improved the quality of fermented products. *Aspergillus niger* activities can produced proteolytic and amilolytic. Proteolytic activity will degradation the protein substrate into simple products so easy to digest, and also will be better to absorp the nutrients. Thus, FOTDS product easier to digest and more absorbed in the digestive tract of broiler chickens, are used for meat production. Mihrani (2003), recommend that the product fermented by *Aspergillus niger* will increase the essential amino acids and non essential amino acids thus be balanced. The use of products in the ration FOTDS provide nutrients that are beneficial to produce the same final weight control

Carcass Percentage

Broiler carcass weight was determine after eviceration. The carcass weight percentage, often used as a measure of meat production, in this research were in the normal range, from 67.50 to 66.67 %. According Siregar (1982) that carcass weight ranged around 65-75% of live weight. Analysis of variance showed that product of FOTDS that added into the ration until 25% has no significancy (P>0.05) to carcass weight and carcass percentage. In this treatment, final weight also has no significancy, because of the fermentation of *Aspergillus niger* and the protein and essential amino acids in the ration positively responded by chicken broiler; so the carcass weight is consistent. Morran and Orr, (1997) recommended that influence carcass weight in addition to the nutrients in the diet is the age when slaughtered.

Feed Conversion.

Utilization onggok (cassava leaf meal product) fermented by *Aspergillus niger* in the ration did not affect significantly (P> 0.05) to the feed conversion. This indicates that the fermentation of onggok (cassava leaf meal) with *Aspergillus niger* to increase the nutritional value of products and biological FOTDS. *Aspergillus niger* that produced protease enzyme activities, which can break down the protein substrates, resulting in crude protein increased 66.67%; from 12.92% to 21.53%. FOTDS products also increased but decreased the crude fiber content of sianogenic glucoside because *Aspergillus niger* is cellulotic microbes that are capable to change the coarse fibers and their derivatives, also have a positive impact on ration palatability. Palatability on ration, will affect the amount of feed intake, the treatment R0 to R5 showed a relatively equal amount of consumption and feed conversion, thus generate the same final weight. Utilization of FOTDS mixture in broiler ration until level 25%, can produced feed conversion equal to the control ration (R0).

CONCLUSION

Utilization of onggok (cassava leaf meal product) fermented with *Aspergillus niger* in broiler rations to 25%, has no harmfull effect.

REFERENCES

Aisjah, T. 1995. Biokonversi Limbah Umbi Singkong Menjadi Bahan Pakan Sumber Protein oleh Jamur *Rhyzopus Sp* Serta Pengaruhnya terhadap Pertumbuhan Ayam Pedaging. Disertasi. Program Pascasarjana Universitas Padjadjaran. Bandung.

Devenda , C.1977. Cassava as a Feed Source for Ruminants. In : Cassava as Animal Feed. (Eds. Nestel, B and Graham,M.) Procceding of Workshop. University of Guelph. IDRC-095e, 107 Ottawa.

Hsiao,M.L and Chiou, P. 2006. Nutritional and Toxicological Evaluation of Italicize *Aspergillus niger* Fermentation Product on Taiwan Country Chicken. Abstracts of Papers. National Chung-Hsing University, Taichung, Taiwan. http://www.poultryscience.org/abs00/00psab15.pdf.23 .

Kompiang, I.P., Simurat,A.P. and Supriyati. 1995. The Effect Using Protein Enriched Sago and Its By-Product in Comparison to Fermented Cassava Fiber in The Rations on The Performance of Broiler Chicken. Research Results on Poultry and Miscellaneous. Animals Research Institute for Animal Production. Ciawi,Bogor. P.490-498.

Mathivanan, R., Selvaraj,P and Nanjappan,K.2006. Fedding of Fermented Soybean Meal on Broiler Performance. International Journal of Poultry Science 5 (9): 868 -872.

Mihrani. 2003. Fermentasi Buah Semu Jambu Mete (*Anarcardium occidentale*) oleh Kapang *Aspergillus niger* dan Implikasinya dalam Ransum terhadap Performans Ayam Broiler. Disertasi. Program Pascasarjana Universitas Padjadjaran. Bandung.

Moran, E.T and H.R.Orr. 1977. Influence of Strain on The Yield of Commercial Part from The Chick Broiler Carcass. Poultry Sci. 49 : 725-726.

Purwadaria, T., A.P. Sinurat, T. Haryati, I. Sutikno, Supriyati, and J.Darma. 1998. Korelasi Antar Aktifitas Enzim Mananase dan Selulase terhadap Kadar Serat Lumpur Sawit Hasil Fermentasi dengan *Aspergillus niger*.. J. Ilmu Ternak Vet.3:230-236.

Siregar, Z and Mirwandhono,E. 2004. Evaluasi Pemanfaatan Bungkil Inti Sawit yang Difermentasi *Aspergillus niger*. Hidrolisat Tepung Bulu Ayam dan Suplementasi Mineral Zn Dalam Ransum Ayam Pedaging. *USU digital library*. Universitas Sumatera Utara. http/://www.library.usu.ac.id/modules.

Soeharsono. 1976. Respon Broiler terhadap Berbagai Kondisi Lingkungan. Disertasi. Progream Pascasarjana Universitas Padjadjaran. Bandung.