PERFORMANCE OF BROILER CHICKENS FED DIET WITH DIFFERENT LEVELS OF ANABIONG (*Trema orientalis* (*Linn*) *Blume*) LEAF MEAL

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ABSTRACT

This study was conducted using 120-day old colored broiler chickens to evaluate the effect of different levels of anabiong leaf meal (ALM) on the growth performance of broilers. Chicks were randomly distributed into four treatments replicated thrice with 10 chicks per replication. The experiment was laid out using Completely Randomized Design (CRD) with the following treatments: T1 – Control (Formulated ration without ALM); T2 – Formulated ration with 5% ALM; T3 – Formulated ration with 7.5% ALM and T4 – Formulated ration with 10% ALM. Results showed that broilers fed with 5% ALM had significantly ($P<0.05$) higher body weight and gain in weight on the 5th and 6th week of the study. Results obtained in terms of the cumulative feed consumption, percentage rate of growth, dressing percentage with and without giblets, feed conversion ratio and efficiency were similar among treatments. With regards to income above feed cost, broilers fed ration with 5% ALM obtained the highest return of Php 134.75 per broiler, followed by the broilers fed with 7.5% level of ALM and without ALM. Results suggest that ALM at 5% and 7.5% level can be safely used as feed ingredients to broilers.

Key words: anabiong leaf meal, broiler, growth performance,

INTRODUCTION

The biggest impediment livestock production in the Philippines is the high cost of feed ingredients. Feed cost represents 60 to 70% of the total production costs. Feed additives have also been widely used in poultry industry to increase animal's performance where growth and feed efficiency are concerned (Collington *et al.*, 1990). The use of indigenous feed resources with medicinal properties therefore is an important way of helping farmers reduce their costs of production.

The use of locally available feed resource like anabiong (*Trema orientalis (Linn) Blume*) leaves maybe a solution to this problem. Anabiong is a small tree, 5 to 8 meters high with elongated branches. The leaves are distichous, oblong-ovate to lanceolate and measures

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8 to 15 cm long (Stuart, 2016). Anabiong has various uses as herbal medicine. For example, the leaves and bark are used to treat coughs, sore throats, asthma, bronchitis, gonorrhea, yellow fever, toothache, and as an antidote to general poisoning. Furthermore, leaves have a potential as a protein source for non-ruminants in the form of leaf meals (Narayan *et al.*, 2013). This leaf meal when supplemented to animal's diets can play a role in supporting both performance and health status of the animal (Horton *et al.*, 1991; Bakhiet and Adam, 1995; Manzanilla *et al.*, 2001; Wenk, 2003). The protein content of anabiong is 18.9-19.0% and therefore can be used as an alternative for expensive feed ingredients such as corn and soybean (Gerpacio and Castillo, 1979; Devendra, 1985; PCARRD, 1986; Narayan *et al.*, 2013). Availability of this feed stuff in the locality could reduce production cost and improve production performances of broilers. This study was conducted to evaluate the growth performance of colored broiler chickens and to determine the level of anabiong leaf meal that would give the highest return above feed cost.

MATERIALS AND METHODS

Anabiong leaves were collected from the vicinity of Jones, Isabela. It was sun dried until it become brittle and crispy to touch. Big stems were discarded and dried leaves were grounded using hammer mill for efficient pulverization of the leaf meal. For every 1000 grams fresh anabiong leaves gathered, at least 260 -280 grams are recovered after air drying. The nutrient requirement of broilers was used as basis in the formulation of diets. Shown in Table 1 is the composition and calculated analysis of the experimental diets used in the study.

An existing house was used for the rearing of experimental birds with a dimension of 2.6 m x 6 m and was divided into 12 compartments. The structure was built using wood, bamboo and G.I sheet. Each compartment was provided with 50 watts incandescent bulb as source of heat during brooding, automatic feeders and plastic water bowls. Equipment were thoroughly cleaned and disinfected before the arrival of the birds.

A total of 120-dayold Bounty Fresh-Hubbard strain (Redbro x JA57KI) broiler chicks were purchased from a reliable dealer. The experimental birds were allotted into four (4) treatments and replicated thrice with 10 birds per replication. The treatments used in the study were:

T1 – Control (Formulated feeds without anabiong leaf meal
T2 – Formulated feeds with 5% anabiong leaf meal
T3 – Formulated feeds with 7.5% anabiong leaf meal
T4 – Formulated feeds with 10% anabiong leaf meal

The formulated rations (Table 1) were used for a period of 35 days. This was placed on old newspaper for the first week and feeder for the rest of the experimental period. *Ad libitum* feeding was practiced throughout the study. Clean and fresh drinking water was given at all times which was changed two times a day, morning and afternoon or as needed. The feeders and waterers were regularly cleaned including the surroundings. Identical care and management was provided to the birds throughout the duration of the experiment.

The performance of broiler chicken was evaluated based on the collected average weekly body weight, and feed consumption. The average gain in weight, feed conversion ratio and efficiency, growth rate and dressing percentage was determined and the income above feed cost was estimated to determine the economic profitability. All data gathered

Table 1. The formulated feed used in the study.

Ingredients (%)	T1	T2	T3	T4
Anabiong leaf meal *	-	5.00	7.50	10.00
Rice bran	5.00	-	-	-
Fish meal	5.00	5.00	5.00	5.00
Soybean meal	25.40	26.00	25.60	24.90
Corn meal	62.00	60.80	57.10	54.30
Salt	0.50	0.50	0.50	0.50
Oil	-	0.40	2.00	3.00
Dicaphos	0.90	1.00	1.00	1.00
Limestone	0.60	0.70	0.70	0.70
Methionine	0.10	0.10	0.10	0.10
Min./Vit.	0.50	0.50	0.50	0.50
Total	100	100	100	100
Calculated Analysis				
Crude Protein, %	20.11	20.12	20.13	20.08
Metabolizable Energy, kcal/kg	2866.96	2824.80	2830.84	2807.96
Calcium,%	0.86	0.82	0.82	0.82
Phosphorous,%	0.42	0.42	0.41	0.41
Lysine, %	1.10	1.09	1.07	1.04
DL Methionine, %	0.42	0.41	0.40	0.390
Cost of feeds, (PhP)*	21.85	21.92	22.06	21.96

* Based on the cost of dried leaves of PhP 5.00 per kg and the prevailing price of feedstuff used

were subjected to Analysis of Variance (ANOVA) following a Completely Randomized Design (CRD). Comparison of treatment means was done using Least Significance Difference (LSD).

RESULTS AND DISCUSSION

The initial and weekly body weights of the experimental birds are shown in Table 2. The Analysis of Variance (ANOVA) revealed insignificant differences among treatments in the initial body weight of birds. This shows that the birds had uniform initial body weight. Insignificant result was observed from the first week up to the third week of the study. However, on the 4th, 5th and 6th week of the study, significant result (P<0.01) was noted. Birds in Treatments 3 and 4 were significantly heavier than the control group but those in Treatments 2, 3 and 4 did not vary with each other. However, on the 6th week of the study, birds in Treatments 2 and 3 were significantly heavier than Treatments 1 and 4. The results suggest that the level of 5% and 7.5% influenced body weight nevertheless, it indicate that ALM can be safely fed up to 10% without any effect as compared to the control diet. The

Table 2. Initial and weekly body weight of the experimental birds fed with ALM (g).

Week	T1	T2	T3	T4	C.V. %
Initial^{ns}	53.17	54.17	54.17	54.33	3.94
1^{ns}	148.40	128.77	143.30	152.23	8.31
2^{ns}	250.67	252.33	269.17	164.50	5.79
3^{ns}	505.07	507.33	562.20	541.17	9.17
4**	691.11^{b}	801.91^{ab}	887.98^{a}	893.17^{a}	11.21
5*	1102.00^{b}	1223.33^{ab}	1371.33^{a}	1294.00^{a}	9.84
6*	1499.67^{b}	1781.33^{a}	1754.00^{a}	1653.00^{b}	8.06
7^{ns}	1995.00	2087.00	2102.00	1977.67	5.36

*Significant at $P<0.05$
**Significant at $P<0.01$
^{ns}Not significant

Table 3. Weekly average gain in weight of birds fed with ALM (g).

Week	T1	T2	T3	T4	C.V. %
1*	95.23^{a}	74.60^{b}	89.13^{ab}	97.90^{a}	12.58
2^{ns}	197.50	198.17	198.33	200.50	5.48
3^{ns}	451.90	453.17	508.04	487.00	4.02
4*	637.95^{b}	764.58^{a}	833.82^{a}	837.46^{a}	12.24
5*	1048.83^{b}	1169.17^{ab}	1317.17^{a}	1239.67^{a}	10.32
6*	1492.83^{b}	1727.17^{a}	1699.83^{a}	1598.67^{ab}	6.65
7^{ns}	1941.83	2023.83	2046.83	1923.17	5.51

*Significant at $P<0.05$
^{ns}Not significant

higher body weight in Treatments 3 & 4 may be attributed to the medicinal composition of anabiong leaf meal. Anabiong leaf meal when supplemented to animal's diets can play a role in supporting both performance and health status of the animal (Horton *et al.*, 1991; Bakhiet and Adam, 1995; Gill, 2000; Manzanilla *et al.*, 2001).

The weekly gain in weight of the birds is reflected in Table 3. The table revealed insignificant differences among treatments on the second, third and seventh week of the study. However, on the first, fourth, fifth and sixth week of the study, significant differences among treatments were observed. Birds in treatments 2, 3 and 4 significantly ($P<0.05$) obtained higher weight gain than those birds in the control diet. This result implies that ALM significantly improved weight gain of the birds starting from the 4th week up to the sixth week of the study.

The percentage rate of growth of the birds is shown in Table 4. It was observed that on the first week of the study the analysis of variance revealed significant differences among treatments. However, insignificant differences among treatments were observed from second week up to the last week of study in terms of the percentage rate of growth.

Table 4. Percentage rate of growth of the birds (%).

Week	T1	T2	T3	T4	C.V. %
1*	94.33[a]	81.65[b]	90.09[a]	94.72[a]	6.81
2[ns]	51.37	64.60	61.00	50.33	15.75
3[ns]	67.33	66.93	70.46	71.17	8.31
4[ns]	36.78	43.43	55.00	49.54	21.63
5[ns]	45.81	41.03	42.83	36.69	16.38
6[ns]	33.43	30.65	27.68	24.38	24.42
7[ns]	21.81	15.79	17.97	17.83	30.17

*Significant at $P<0.05$

[ns]Not significant

Table 5. Weekly and cumulative feed consumption of birds fed with ALM (g).

Week	T1	T2	T3	T4	C.V. %
1[ns]	166.00	163.33	158.67	163.00	3.96
2[ns]	359.00	361.67	374.00	371.33	2.90
3[ns]	433.00	441.33	489.33	447.33	8.99
4**	501.33[c]	513.00[bc]	580.00[ab]	605.00[a]	8.84
5*	812.00[b]	907.67[a]	925.67[a]	861.33[ab]	6.10
6*	1216.00[b]	1340.33[a]	1220.67[b]	1175.00[b]	6.25
7[ns]	1325.67	1312.67	1363.67	1320.33	4.21
Cumulative[ns]	4857.67	4764.00	5092.67	4877.67	3.74

*Significant at $P<0.05$

**Significant at $P<0.01$

The findings in the study revealed that at a certain point in time, the growth rate of the experimental birds would experience a decreasing or a downward trend. This corresponds with the findings of Reyes (2005) wherein the growth of animals normally precedes in a sigmoid manner. That is, the gain in weight of experimental birds tends to increase from the first to the third week and declines towards the end of the experiment.

The average weekly and cumulative feed consumption of the birds is presented in Table 5. Insignificant differences were observed on the 1st, 2nd 3rd and 7th week of the study. Surprisingly, significant differences among treatments were noted on the fourth, fifth and sixth week of the study. Although significant variation was noted on the 4th, 5th and 6th week in feed consumption, the cumulative feed consumption at the end of the study did not vary significantly. This means that ALM up to 10% levels did not affect feed consumption and an indication that ALM can be safely added to poultry ration.

The feed conversion ratio and efficiency are shown in Table 6. No significant variation was observed on the feed conversion ratio of the birds. The Analysis of Variance (ANOVA) showed that all the different treatments had statistically the same amounts of

feeds consumed to produce a kilogram gain in weight with means ranging from 2.43 to 2.58 grams.

The same trend was observed in terms of feed conversion efficiency. This result showed that all the different treatments had statistically the same feed efficiency with means ranging from 34.84% to 41.14%.

Table 6 shows the dressing percentage with and without giblets, liver and pancreas weights of the birds. The dressing percentage of the birds with and without giblets revealed insignificant differences among treatments. This means that the formulated feeds with and without ALM did not affect significantly the dressing percentage of broilers with and without giblets.

Insignificant differences were obtained in terms of the liver weight with means which ranged from 41.67 grams to 45.00 grams. Likewise, the pancreas weight revealed insignificant results. The result showed that there was no substance present in the organic diet that could cause toxicity based on the live and pancreas weights of broilers. Results from this study was in agreement with the findings of Devendra (1989) that ALM fed to broilers was safe and did not depress growth of broilers. In addition, ALM when added to layer diets at 3-5% levels produced egg yolks with a desirable yellow pigment comparable to egg yolk of layers fed with 40% yellow corn.

The income over feed and chick costs of the broiler fed with organic diets is presented in Table 7. The higher income derived from broilers fed diet containing lowest amount of anabiong leaf meal can reduced feed cost and gives economic value to non-conventional feedstuffs which are just thrown to waste.

In conclusion, the use of anabiong leaf meal in diets for broiler chickens with an inclusion rate of 5% and 7.5% levels obtained the best result in terms of body weight, gain in weight and income over feed cost. However, more research should be undertaken to unlock the potential of anabiong as feeds for poultry and livestock.

Table 6. Growth performance characteristics of broilers fed with anabiong leaf meal.

Parameters	T1	T2	T3	T4	C.V. %
Initial weight (g)	53.17	54.17	54.17	54.33	3.94
Final weight (g)	1995.00	2087.00	2102.00	1977.67	5.36
Feed consumption (g)	4857.67	4764.00	5092.67	4877.67	3.74
FCR	2.50	2.58	2.47	2.43	5.04
FE (%)	40.81	41.14	40.06	34.84	5.15
Dressing percentage with giblets (%)	84.62	84.07	84.88	84.62	0.49
Dressing Percentage without giblets (%)	79.23	79.30	79.55	79.18	0.33
Liver weight (g)	43.33	41.67	45.00	45.00	9.48
Pancreas weight (g)	5.33	5.33	5.33	5.00	6.25

Table 7. Income over feed and additive costs.

ITEM	T1	T2	T3	T4
Weight gain per broiler (g)	1941.83	2032.83	2046.83	1923.17
Return per 1 broiler (Php)[1]	233.02	243.94	245.62	230.78
Amount of feeds consumed (g)	4857.67	4764.00	5092.67	4877.67
Cost of feeds (Php)[2]	21.85	21.92	22.06	21.96
Cost of feeds consumed (Php)	106.14	109.19	112.34	107.11
Return above cost (Php)	126.88	134.75	133.28	123.67

[1]Computed based on the prevailing market price of 120 php per kilo liveweight.

[2]Computed based on the prevailing price of the different ingredients used.

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