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Effect of Dietary Inclusion of Antibotics and Wild Sunflower Leafmeal {*Tithonia diversifolia*} Fed to Laying Birds

Ademola S.G*. and G.O. Farinu

Department of Animal Production and Health,
Ladoke Akintola University of Technology Ogbomoso Nigeria.,

Target Audience: Animal Nutritionists, Livestock Farmers and Research Scientists

Abstract

The effect of addition of penicillin, streptomycin and wild sunflower leaf in layer diet on the performance of hens was investigated. Forty (40) Shaver Brown layers at twenty four weeks of age were involved in a completely randomized design experiment. They were randomly allocated to give dietary treatments. Each treatment was relicated twice with four birds in a replicate. The control diet contained 0% wild sunflower leaf meal WSFLM (diet 1). Basa diet contained 7.5% WSFLM. Penicillin and streptomycin were separately added to basal diets at 100ppm. The last diet contained basal diet with the mixture of the two antibiotics at 100ppm each.
There was significant improvement in egg weight ($p<0.01$), and hen day production ($p0.005$) of birds fed basal and antibiotic supplemented diets. Yolk colour was significantly(<0.01) enhanced by the leaf meal however, feed intake, haugh unit, yolk index and shell thickness were not affected by dietary treatments.
Conclusively, the use of wild sunflower leaf meal and these antibiotics may be adequate for laying performance of birds in the tropics.

Key Words: Antibiotics, Wild sunflower leaf meal, egg quality, Laying performance.

Description of Problem

Poultry production is one of the means of meeting dietary protein intake in Nigeria. Efficient poultry production system depends much more on the use of rich nutritious food with readily available nutrients. The high cost of feed has led to the use of non-conventional feed ingredients in diet formulation as a way of reducing cost.

Recently, leaf meals have been incorporated into mongastric diets. The forages include amaranthus (1), pigeon peas (2), cassava (3), wild sunflower (4) and mimosa (5). The performance of animals fed these meals was sub-optimal (6). This was because of the inherent anti-nutrient composition, high fibre and low energy content of these leaf meals which resulted in reduced feed intake that adversely affected the performance of animals. There was a significant reduction in hen day production and feed intake of layer birds fed more than 5% wild sunflower leaf meal (6). Dietary inclusion rates of 5% and 10% for leguminous leaf meals have been recommended for broilers chicks and laying birds respectively (7). Thus, the suboptimal growth performance and reduction in laying performance of birds fed wild sunflower leaf meal may be overcome by inclusion of feed additives such as antibiotics and enzymes in the diets. Several authors have documented the beneficial effect of antibiotics on the performance of mongastric animals. The dietary usage of antibiotics at different concentrations such as tetracycline (200ppm), flavomycin (4,8mg/kg), chlortetracycline (50,100mg/kg) have been reported (8,9,10,11). The improved performance of hens and broiler chickens could resulted in

*Correspondence Author

gain (11). The dearth of information on the use of antibiotics and WSFLM in layer diet stimulated this study.

This study was carried out to determine the effect of dietary inclusion of wild sunflower leaf meal with and without penicillin and streptomycin on the laying performance of hens in the tropics.

Materials and Methods

A total of 40 six-month old Shaver Brown hens that weighed 1.83±0.04(mean ±SD)kg were used for this study. The birds were randomly allocated on similar weights basis into five treatment gropus. Each treatment contained two replicate groups of four birds per replicate. The birds were housed individually in a battery cage.

A three weeks adaptation period to the experimental diets was maintained before data collection. Daily egg production was noted while feed intake, egg weight, egg size and egg quality indices were monitored weekly. Two eggs from each replicate were used for the determination of egg quality and egg weight.

The experimental diets were maize-groundnut cake based. Control diet contained 0% wild sunflower leaf meal (WSFLM). WSFLM was included in the diets 2 to 5 at 7.5% to replace part of maize and groundnut cake. Penicilline and sytreptomycin were included in the diets 3 and 4 at 100ppm respectively. The mixture of the two antibiotics at the concentration of 100ppm each was added to diet 5 (Table 1).

Two laying birds of similar weights were selected from each replicate for the nutrient retention trails for seven day. A daily allowance of 90g feed was given to a bird. Total excreta were collected daily during the last four days of the trial. Diets and faecal samples were then analysed for proximate nutrients.

All data collected were subjected to analysis of variance and significant differences between the means were separated by using Duncan's multiple range test as outlined by (12)

Results and discussion

Table 3 shows the summary of the laying performance of the experimental birds during the study. Control birds had higher food consumption than those fed other diets. However, feed intake increases from birds fed basal diet to birds fed streptomycin added diet. Many authors have observed depressed feed intake for birds fed diets containing leaf meal of various kinds (2,13). The reduced feed intake on these diets may be due to antinutritional factors and bitter taste of the leafy vegetable as suggested by (14)

Birds fed WSFLM diets had the heaviest eggs ($p<0.01$), and excellent hen-day production ($p<0.05$). The contribution of protein from the leaf meal may account for the higher protein content in the WSFLM diets (Table 2), which may have been translated for tissue synthesis resulting in the enhanced performance of the birds fed this leaf meal. This suggestion agrees with the finding of (6) who reported that leaf meal increased the protein content of diets. It has been reported that high dietary protein significantly improved egg yield, egg production and egg size (15,17).

The improvement in laying performance of birds particularly hen day production by antibiotics concurs with the findings of (11). Birds fed diets containing antibiotics retained nutrients better than those fed basal diet (Table4). This may be due to reduction in the intestinal bacterial load and gut thinning by the antibiotics as suggested by (16) which enhanced nutrient absorption of these birds.

Birds fed antibiotics treated diets laid heavier eggs ($p>0.01$) than those fed basal and control diets with the exception of those on the mixture of antibiotics. Birds on the combination of antibiotics may have experienced negative interaction of the activities of the two antibiotics, therefore, birds in this group could not perform like those fed diets containing one antibiotic.

Yolk colour of the eggs was significantly ($p<0.01$) influenced by the dietary inclusion of the WSFLM and that addition of antibiotics to the diet did not adversely affect the primentation of the eggs. The observation on the influence of leaf meal on yolk coloration agrees with the report of other

Table 1: Composition of Experimental diets (%)

Ingredients	Control	2	3	4	5
Maize	57.75	52.79	52.79	52.79	52.79
Groundnut cake	22.00	19.46	19.46	19.46	19.46
Fish meal	2.00	2.00	2.00	2.00	2.00
Wild sunflower leaf meal	-	7.50	7.50	7.50	7.50
Palm kernel cake	5.00	5.00	5.00	5.00	5.00
Blood meal	1.00	1.00	1.00	1.00	1.00
Oyster shell	7.00	7.00	7.00	7.00	7.00
Bone meal	4.00	4.00	4.00	4.00	4.00
Methionine	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
*Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.50	0.50	0.50	0.50	0.50
Penicillin	-	-	+	-	+
Streptomycin	-	-	-	+	+
Total	100	100	100	100	100
Calculated Analysis++					
Crude Protein(%)	17.44	17.17	17.17	17.17	17.17
Metabolizable Energy (kcalkg-1)	2749.20	2694.40	2694.40	694.40	2694.40
Ether Extract (%)					
Crude fibre(%)	4.03	4.00	4.00	4.00	4.00
	2.88	3.75	3.75	3.75	3.75

* Antibiotics were included in the diets at 100 mg/kg
* Pfizer's product at recommended rate to meet requirement for micro-nutrients.
++Crude protein was determined with the crude protein value of 18.4% for WSFLM as reported by 4. The ME value of WSFLM was not determined, so the ME value indicated I the table were short of whatever ME of WSFLM will have contributed.

Table 2: Chemical composition of the experimental diets (%)

Parameters	Control	2	3	4	5
Crude protein	16.63	17.51	17.51	17.84	17.80
Crude fibre	3.00	2.85	2.50	2.68	2.98
Ether extract	4.20	4.00	4.00	4.10	2.98
Ash	10.00	9.50	9.00	9.45	9.50
Nitrogen free extractive	66.17	66.14	66.56	65.93	65.82

Table 3: The effect of antibiotics and wild sunflower leaf meal on the laying performance of birds from 1 - 11 weeks of the study

Parameters	Diets					SEM	Level of
	Control	2	3	4	5	significance	
Egg weight(g)	54.76[c]	57.17[b]	58.64[a]	57.64[a]	56.76[b]	0.22	**
Feed intake (kg)	3.50	3.27	3.28	3.42	3.31	0.03	NS
Feed efficiency (Feed intake/dozen of eggs)	2.05	1.91	1.61	1.68	1.85	0.06	NS
Hen-ay production (%)	73.86[b]	79.19[a]	81.96[a]	82.79[a]	73.54[b]	1.08	*
Egg shape index	0.69	0.69	0.71	0.71	0.71	0.02	NS
Shell thickness x 10-2(mm)	42.85 37.11	37.45	37.45	37.22	0.50	NS	
Yolk weight (%)	25.33 24.78	24.11	24.53	23.75	0.55	NS	
Haugh Unit	61.51 63.05	63.25	63.25	62.70	0.27	NS	
Yolk index	0.45 0.43	0.43	0.43	0.43	0.44	0.01	NS
Albumen weight (%)	62.33 61.99	61.08	62.14	58.26	1.68	NS	
Yolk Colour	1.00b 5.75[a]	6.25[a]	6.25[a]	5.99[a]	0.27	**	

Means in the same row with different superscripts differ significantly (*P<0.05, **P<0.01)

Table 4: Nutrient retention of the experiemental birds (%)

	Control	2	3	4	5	SEM
Crude Protein	74.58	69.98	76.71	75.71	71.22	3.41
Crude fibre	59.17	55.04	68.33	65.35	62.35	10.60
Ether extract	75.59[a]	58.79[b]	84.24*	78.25[a]	64.38[b]	10.17
Ash 53.64	49.07	52.74	51.00	50.00	12.90	
Nitrogen free extractive	48.62[b]	83.65[a]	85.26[a]	84.00[a]	80.00[a]	12.35
Dry matter	79.39	65.59	77.57	70.00	65.00	2.92

Means in the same row with different superscripts differ significantly (p<0.05)

authous (2,6). It has been reported that WSFLM contained adequate amount of xantophyll that was responsible for yellow colouration of egg yolk (6). Other qualities of egg were not significantly affected. Birds fed WSFLM diets laid egg with thicker shell ($p<0.05$) than those reported by (8) of 0.331mm compare with 0.374mm ± 1.19 (mean ±SD) in this study. This implies that dietary treatments did not interfere with the metabolism of calcium and phosphorus and this ensures the strength of the egg shell.

In conclusion, the use of WSFLM at a level of 7.5% may be considered as satisfactory for the formulation of layer diets in the tropics and that dietary supplementation of antibiotics positively affected the performance of the birds. Higher levels of WSFLM and dietary addition of different antibiotics are recommended for further study.

References

1. Fragas, I.M., Romas,N., Venerco, M.I, Martime O., and Sistaches M. (1993). Amaranthus forages in diets of broilers. Cuban J. of Agricultural Sci. 27:193-198.
2. Udedibie, A.B. and Igwe, F.O. (1989). Dry matter yield and chemical composition of pigeon pea. (C.cajan) leaf meal and the nutritive value of pigeon pea leaf meal and grin meal for laying hens. J. of Anim. Feed Sci. and Tech. 24:111-119.
3. Ogbonna, J.U. and Oredein, A.O. (1998) Growth performance of cockerel chicks fed cassava leaf meal.Nig. J. of Anim. Prod. 25: 129-133.
4. Odunsi, A.A., Farinu, G.O. and Akinola, J.O. and Togun V.A. (1999). Growth, carcass characteristics and body composition of broiler chickens fed wild sunflower (Tithonia diversifolia) forage meal. Trop. Animal production invest. 2:205-211.
5. Nworgu F.C. and J.B Fapohunda. (2002). Performance of broilers chicks fed Mimosa (Mimosa invisa) leaf meal supplements. Proc. 27th Ann. Conf., NSAP, FUT, Akure, Nigeria. March, 17-21, 2002: 128-131.
6. Odunsi, A.A., Farinu, G.O. and Akinola, J.O. (1996). Influence of dietary wildflower (Tithonia diversifolia Helms A. Gray) leaf meal of layers performance and egg quality. Nig. J. of Anim. Prod. 23:28-32.
7. D'Mello, J.P.F (1995) Leguminous leafmeals in non-ruminant nutrition. In: Tropical legumes in animal Nutrition. D'mello, J.P.F and Devendra C. (eds.) CAB International U.K 247-283.
8. Jamorz, D., Skoripinska, J., Orda, J. and Wilczkiewicz, A (1998). Influences of antibiotic promoters on the egg production and quality as well as nitrogen and phosphorus utilization in laying hens: Archie-fur Gefluge Ikunde 62:5,200-208.
9. Pan Chingmoo; Chem-ijeni: Lin-chungyi; Chen-Tianfwn; Tseng H..; Panc, M; Chen I.J.;Lin C.Y., (1998). The effect of feeding chlortetracycline and oxytetracycline on the production and egg tissue residue n Tsai-Ya duck; J of Taiwan livestock Research 31:4,393-402.
10. Mandal, L., Mandal, S.K., Baidya, N and Sarkar, S.K. (2000) Pro and antibiotic sequence perform well in broiler diet. Feed Mix Vol.8 (No. 1) pp. 18-20.
11. Eruvbetine D., M.A. Dipeolu and E.B. Oguntona. (2002). Comparison of enzyme and Gragas antibiotic inclusion in diets for laying hen.Proc. 27th Ann. Conf. NSAP,FUT, Akure, Nigeria March 17-21, 2002. 101-104.
12. Steel, R.G. and J.H Torrie (1980). Principle and procedure of statistics. A biometrical Approach. (2nd Ed.) Mcgraw Hill Book. Co. NY.
13. Udedibie, A.B. and Opara, C.C (1998). Responses of growing broilers and laying hens to the dietary inclusion of leaf meal from *Alchornia cordifolia* (*Allchornia Cordifolia*) anmal Feed Sci and Tech. 91:1-2, 157-164.

14. Dutta, P., Bhattacharayya, P.R. Rabha, L.C. Bordolon, D.N. Bania, N.C., Chowdhurry, P.K. Sharma, R.P. and Bania J.N (1986). Feeding deterrents for philosomiarian from Tithonia Diversifolia. Phytoparastica. 14(1):77-80.

15. Li-Fengxue,Wu-Zhanfu; Zhang-Heliong and Fan-zengyi (1998). Effects of protein-energy ratio on egg production of laying hens in summers. Chinese J. of Anim. Sci. 34:1,34-35.

16. Visk, W.J. (1978). The mode of growth promotion by antibiuotics. J. Anim. Sci. 46:1447-1469.

17. Yin, Q. and Han, Y. (1998). The optimum dietary amino acid patterns and requirement of young laying hens: Chinese J. of Veterinary Sc. 15:4,398-402.