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Effect of Dietary Levels of Cooked *Lablab purpureus* Beans on the Performance of Broiler Chickens

[1]F.O. Abeke, [1]S.O. Ogundipe, [1]A.A. Sekoni, [2]I.I. Dafwang, [1]I.A. Adeyinka, [1]O.O. Oni and [1]A. Abeke
[1]National Animal Production Research Institute, ABU Zaria, Nigeria
[2]National Agric Extension and Research Liaison Services, ABU Zaria, Nigeria

Abstract: A study was conducted to determine the response of broiler starter and finisher chicks to dietary levels of *Lablab purpureus* beans processed by boiling in water for 30 min at 100°C. For both the starter and the finisher phases, seven isonitrogenous diets containing 23.78% crude protein for the starter and 20.91% crude protein for the finisher were formulated to contain lablab seed meal at 0.0, 5.0, 10.0, 15.0, 20.0, 25.0 and 30.0% levels respectively. Diet 1, in each phase had no lablab and served as the control. Each dietary treatment for the starter and the finisher phases was replicated three times in a completely randomized design. There were 25 birds per replicate. Feed and water were given *ad libitum*. The experiment lasted from 0 to 4 weeks for the starter phase and from 5 to 8 weeks for the finisher phase. Results obtained for the starter phase shows significant ($p<0.05$) depression in final weight, weight gain, feed intake, feed efficiency and feed-gain ratio. These parameters decreased as the level of lablab seeds in the diets increased. However, feed cost (₦/kg feed and ₦/bird) were significantly ($p<0.05$) reduced as the level of lablab seed meal increased in the starter diets. The results obtained for the finisher phase also showed a similar trend. While there were significant ($p<0.05$) decreases in final weight, weight gain, feed intake and feed efficiency as the level of lablab seed meal increased in the diets, feed cost (₦/kg feed and ₦/bird) were significantly ($p<0.05$) lowered. Parameters measured for carcass analysis such as live weight and weights of the breast, thigh, wing, neck, legs and head showed a significant ($p<0.05$) decrease as the dietary levels of lablab seed meal increased. The PCV, Hb and the TP status of the blood indicated significant ($p<0.05$) decreases as the levels of lablab in the diets increased. However, *Lablab purpureus* beans can be included up to 5% level in broiler starter and up to 10% level in broiler finisher diets without any adverse effect on the performance of the birds.

Key words: *Lablab purpureus* beans, carcass, haematological parameter, broilers, antinutritional factors, dietary levels

INTRODUCTION

Increasing animal protein production in Nigeria and other developing countries of the world has been advocated as the panacea to the imminent problem of malnutrition in these countries (Ekenyem *et al*., 1999; Ekenyem, 2002). According to Oruseibio and Onu (2000), the animal nutritionists have a long-term challenge for investigative research into least cost rations in order to guarantee sustainable livestock production. They further stated that this challenge is ever increasing in the face of the current economic problems in Nigeria, notably high feed costs. According to Ani and Okorie (2003), the level of consumption of meat and animal protein in Nigeria is estimated at 8 g per capita per day, which is about 27 g less than the minimum requirement recommended by the National Research Council (NRC) of the United States of America. Amaefule and Obioha (2001) suggested that

Corresponding Author: F.O. Abeke, National Animal Production Research Institute, ABU Zaria, Nigeria

the best logical solution to our national meat scarcity is to increase poultry production. But one of the major constraints towards the realization of this objective is the ever-increasing cost of poultry feeds arising from the high cost of feed ingredients. Earlier reports by Akpodiete *et al.* (2001) showed that 70-80% of the total cost of intensive broiler production is spent on feeds alone. Consequently it becomes imperative that cheap alternative feedstuffs with little or no import contents be used in place of the present scarce and costly feedstuffs being used in feed formulation for broilers. This study was therefore conducted to test the response of broilers chicks to graded levels of *Lablab purpureus* beans.

MATERIALS AND METHODS

This study was carried out at the Poultry Research Unit of the National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Shika, Zaria, Nigeria, from March to May 2003. Shika is geographically located between latitude 11° 12'N and longitude 7° 33'E at an altitude of 640 m above sea level (Akpa *et al.*, 2002). Shika is located about 20 km along the Zaria Sokoto road in Kaduna state, North Western Nigeria. It has three distinct climatic seasons. These are the cold dry season (November-February), the hot dry season (March-May) and the wet season (June-October). The total annual rainfall ranges from 617 to 1365 mm with a 50 year average of 1041 mm Most of the rains fall between July and September (Bawa *et al.*, 2003b).

The *Lablab purpureus* beans used for this experiment is the Rongai variety. It is milky white in colour. They were obtained from the Sabon-gari market in Zaria, Nigeria. The cooking duration to properly process lablab beans was 30 min as determined in an earlier experiment.

For each cooking time 50 L of water was first brought to boiling in a 200 L metal drum container. The batch (25 kg) of lablab beans was then poured into the boiling water. From this point, the beans were cooked for 30 min. At the end of the period of cooking, the excess water was drained off and the cooked beans were sun dried for 3 days before milling. The average ambient temperature for the three days of drying was 32°C and average relative humidity was 35%. After sun drying, chemical evaluation of the processed lablab beans was done according to AOAC (1990) procedure (Table 1).

Seven isonitrogenous and isocaloric rations were formulated to contain lablab bean meal at 0.0, 5.0, 10.0, 15.0, 20.0, 25.0 and 30.0%, respectively (Table 2 and 3). Each diet constituted a treatment and each treatment was replicated three times in a completely randomized design. There were 25 birds per replicate. Feed and water were provided *ad libitum*. The starter phase lasted from 0-4 weeks, while the finisher phase lasted from 5-8 weeks of age. The strain of birds used is the naked neck broiler. The initial weight of the birds per replicate was taken before the commencement of the experiment. They were thereafter weighed weekly. For the first four weeks, the birds were fed on 23.78% CP broiler starter rations followed by 20.91% CP broiler finisher rations from the 5th to the 8th week of age. At the end of the experiment, five birds per replicate were bled to determine the value of some haematological constituents such as Packed Cell Volume (PCV), Haemogglobin level (Hb) and Total Protein (TP). Afterwards, five birds per replicate representing the average weight of birds per replicate were fasted overnight except that they were given water. They were weighed and slaughtered by cervical dislocation. They were then dressed for carcass analysis.

Table 1: Chemical composition of cooked *Lablab purpureus* beans

Components	Percentage
Dry matter	95.97
Crude protein	23.29
Crude fibre	11.19
Ether extract	9.13
Ash	3.85
Calcium	1.32
Total phosphorus	0.11

These are average values of 3 determinations of the cooked lablab beans

Table 2: Composition of experimental broilers starter diets containing graded levels of *Lablab purpureus* beans fed between 0 and 4 weeks of age

	Treatments						
Ingredients	1	2	3	4	5	6	7
Maize	49.35	46.35	42.22	40.19	37.15	34.12	31.05
GNC	41.00	39.00	37.13	36.16	33.20	31.23	29.30
Lablab	0.00	5.00	10.00	15.00	20.00	25.00	30.00
W/offal	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Bonemeal	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Limestone	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Salt	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Premix	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Calculated analysis							
CP %	23.78	23.78	23.78	23.78	23.78	23.78	23.78
M.E kcal kg^{-1}	2794.00	2793.00	2790.00	2789.00	2788.00	2786.00	2784.00
CF (%)	3.39	3.80	4.20	4.60	5.01	5.41	5.81
Calcium (%)	1.27	1.25	1.25	1.24	1.24	1.24	1.24
Avail. P (%)	0.84	0.82	0.82	0.82	0.82	0.80	0.80
Lysine (%)	1.12	1.12	1.12	1.12	1.11	1.10	1.10
Methionine (%)	0.42	0.42	0.41	0.41	0.41	0.40	0.40
Cystine (%)	0.39	0.38	0.38	0.38	0.37	0.37	0.37
Meth+cyst (%)	0.81	0.80	0.79	0.79	0.78	0.77	0.77

Biomix premix supplied the following per kg diet: Vit. A. 10000 iu, Vit. D_3, 2000 iu,Vit. E, 25 mg Vit. K, 2 mg. Thiamine B_1, 1.8 mg. Riboflavin B_2, 5 mg. Pyridoxine B_6, 3.5 mg. Niacin, 28 mg. Vit. B_{12}, 0.015 mg. Pantothenic acid 7.5 mg. Folic acid, 0.75 mg, Biotin, 0.06 mg. Choline chloride 300 mg. Manganese, 40 mg. Zinc, 30 mg. Iron 20 mg. Copper, 3 mg. Iodine, 1 mg. Selenium, 0.2 mg. Cobalt, 0.2 mg

Table 3: Composition of experimental broiler finisher diets containing graded level of *Lablab purpureus* beans fed between 5 and 8 weeks of age

	Treatments						
Ingredients	1	2	3	4	5	6	7
Maize	61.90	58.85	55.80	52.77	49.70	46.66	43.61
GNC	33.50	31.50	29.55	27.58	25.65	23.69	21.74
Lablab	0.00	5.00	10.00	15.00	20.00	25.00	30.00
Bonemeal	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Limestone	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Salt	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Premix	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Calculated analysis							
CP (%)	20.91	20.91	20.91	20.91	20.91	20.91	20.91
M.E kcal kg^{-1}	2972.00	2969.00	2967.00	2966.00	2964.00	2963.00	2961.00
CF (%)	2.95	3.35	3.75	4.15	4.56	4.96	5.36
Calcium (%)	1.24	1.23	1.23	1.23	1.22	1.22	1.22
Avail. P (%)	0.89	0.88	0.88	0.88	0.87	0.87	0.87
Lysine (%)	0.74	0.72	0.70	0.68	0.67	0.66	0.66
Methionine (%)	0.28	0.28	0.28	0.28	0.27	0.27	0.27
Cystine (%)	0.34	0.34	0.34	0.34	0.33	0.32	0.32
Meth+cyst (%)	0.62	0.62	0.62	0.62	0.60	0.59	0.59

Biomix premix supplied the following per kg diet: Vit. A. 10000 iu, Vit. D_3, 2000 iu Vit. E, 23 mg Vit. K, 2 mg. Thiamine B_1, 1.8 mg. Riboflavin B_2, 5 mg. Pyridoxine B_6, 3 mg. Niacin, 27.5 mg. Vit. B_{12}, 0.015 mg. Pantothenic acid 7.5 mg. Folic acid, 0.75 mg, Biotin, 0.06 mg. Choline chloride 300 mg. Manganese, 40 mg. Zinc, 30 mg. Iron 20 mg. Copper, 3 mg. Iodine, 1 mg. Selenium, 0.2 mg. Cobalt, 0.2 mg

Data collected included weekly feed intake, as well as weekly weight gain. Mortality was recorded as they occurred. The weights of the various body parts of the birds were also taken during the carcass analysis. All data collected were subjected to the analysis of variance using the SAS (1985), general linear model procedure. Differences between treatment means were separated using Duncans Multiple Range Test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The result obtained in this study demonstrated that the level of inclusion of lablab beans in broiler starter diets significantly ($p>0.05$) reduced the performance of the birds in terms of final weight, weight gain, feed intake and feed efficiency. Feed cost (₦/bird) was significantly ($p<0.05$) reduced as the dietary levels of lablab beans increased, but the level of inclusion of lablab beans had no significant ($p>0.05$) effect on mortality rate.

The reduction in cost per kilogram feed and cost of feed per bird obtained in this study is in line with the objective of the study and is supported by the result obtained by Amaefule and Obioha (2001), Esonu (2001) and Pezzato *et al.* (1997). These workers also observed significant ($p<0.05$) reduction in feed cost per kilogramme feed and feed cost per bird as the dietary levels of unconventional legumes beans such as boiled pigeon pea seed, velvet beans and leucaena beans increased in the diets. They attributed the cost reduction to the availability and cheapness of these legume seeds. Feed cost was significantly ($p<0.05$) lower for the lablab diets than for the control. Infact there was a corresponding decrease in feed cost as the level of lablab in the diets increased. This is the major thrust of nutritionist, that is, to lower feed cost while not compromising on feed quality. Utilization of unconventional grain legumes in poultry feed have been known to lower feed cost because they are cheaper, as they are of less value for human consumption than the conventional vegetable protein sources such as soyabean and groundnut cakes (Etuk, 2001; Etuk *et al*., 2003). Abeke *et al*. (2003), Dada *et al*. (2000), Esonu (2001), Esonu *et al*. (2003) and Ogundipe *et al*. (2003) had reported that the solution to high cost of poultry feed is the discovery, processing and harnessing of unconventional sources of poultry ingredients for which there is little or no competition from humans. Currently, lablab is far cheaper than groundnut cake and their inclusion in poultry diets will definitely reduce feed cost. Therefore the main objective of this research, which was to find out how lablab beans, which is available and cheap in our locality, can be utilized in the diets of broilers, to reduce feed cost and ultimately cost of production has been realised.

On the other hand result obtained in this study showed a significant ($p>0.05$) reduction in weight gain and feed intake as the level of lablab beans increased in the diets (Table 4 and 5). Etuk (2001) and Esonu (2001) had reported reduction in weight gain and feed intake as the levels of velvet beans and pigeon pea increased in the diets of broiler chickens. They argued that poor palatability arising possibly from residual antinutritional factors present in the legume beans they tested might be responsible for reduced feed intake and consequently reduced weight gain. Weight gain in broilers is directly related to feed intake, the quality of the feed as well as how efficiently the birds utilize the feed (Dada *et al.* 2000). The reduction in feed intake observed in this study as the level of lablab beans increased in the diets could be attributed to poor palatability of the lablab seed meal. Also, the low efficiency of feed utilization of diets containing lablab seed meal may also be due to the presence of antinutritionl factors, which may still remain in the cooked beans. According to Bawa *et al.* (2003a) phytic acid and tannin content of lablab seeds are highly resistant to heat and only about 31 and 46% of phytic acid and tannin respectively are destroyed after boiling lablab beans for 30 min at 100°C. This means that a substantial amount of these antinutritional factors may still remain in the boiled lablab beans, which can still exert their negative influences on growth and feed utilization resulting in poor performance. It therefore becomes clear that with increase in the dietary levels of lablab, there was a corresponding negative effect. Akanji *et al.* (2003) and Balogun *et al.* (2001) have reported low feed intake in broilers and young pigs respectively when cooked Jackbean and full fat soyabean were fed as replacement for soyacake. According to the authors the nutritive value and aroma of soyabean cakes are far better than those of other legume seeds. This they believed has a direct impact on the performance of the animals. Najime (2003) reported that soyacake and groundnut cake rank top ahead of other grain legume seed meals in terms of nutritive value and consequently give better performance

Table 4: Response of broilers to graded levels of *Lablab purpureus* beans in broiler starter diets (0-4 weeks)

	Treatments (levels of lablab)							
	1	2	3	4	5	6	7	
Parameters	0.00	5.00	10.00	15.00	20.00	25.00	30.00	SEM
Initial weight (g $bird^{-1}$)	42.17	42.18	42.18	42.18	42.18	42.18	42.18	0.020
Final weight (g $bird^{-1}$)	629.09^{a}	606.07^{a}	538.49^{b}	528.79^{b}	493.94^{c}	416.06^{d}	407.41^{d}	12.050
Weight.gain (g $bird^{-1}$)	586.92^{a}	563.89^{a}	496.31^{b}	486.61^{b}	451.76^{c}	373.83^{d}	365.22^{d}	12.050
Feed intake (g $bird^{-1}$)	1117.37^{a}	1079.84^{a}	1001.06^{b}	978.18^{b}	977.00^{b}	975.76^{b}	975.46^{b}	29.650
Feed intake (g $bird^{-1}$ day^{-1})	39.91^{a}	38.57^{a}	38.40^{b}	34.93^{b}	34.89^{b}	34.85^{b}	34.84^{b}	1.060
Feed efficiency	0.53^{a}	0.52^{a}	0.50^{ab}	0.50^{ab}	0.46^{b}	0.38^{c}	0.37^{c}	0.010
Feed-gain ratio	1.90^{a}	1.92^{a}	2.02^{b}	2.02bc	2.16^{c}	2.61^{d}	2.67^{d}	0.040
Feed cost (₦/kg)	41.24^{a}	39.23^{b}	38.99^{c}	38.96^{d}	38.02^{e}	33.83^{f}	32.13^{g}	0.004
Feed cost (₦/bird)	46.08^{g}	42.36^{f}	39.03^{e}	38.11^{d}	37.15^{c}	33.01^{b}	31.34^{a}	0.310
Feed cost/kg gain	78.51^{ab}	76.12^{a}	75.64^{a}	78.32^{ab}	82.23^{ab}	88.30^{b}	85.81^{ab}	2.540
Mort. (%)	3.03	0.00	0.00	3.03	0.00	0.00	0.00	1.520

Means within the same row with different superscripts are significantly ($p<0.05$) different. SEM = Standard Error of Means

Table 5: Response of broilers to graded dietary levels of *Lablab purpureus* beans (Finisher phase 5-8 weeks)

	Treatment (levels of lablab)							
Parameters	0.0	5.0	10.0	15.0	20.0	25.0	30.0	SEM
Initia lweight (g $bird^{-1}$)	629.00^{a}	606.00^{a}	538.00^{b}	529.00^{b}	494.00^{c}	416.00^{d}	407.00^{d}	12.050
Final.weight (g $bird^{-1}$)	2740.00^{a}	2673.00^{ab}	2583.00^{abc}	2523.00^{bc}	2470.00^{c}	2147.00^{d}	1707.00^{e}	40.070
Wt. g (g $bird^{-1}$)	2111.00^{a}	2067.00^{a}	2045.00^{a}	1995.00^{ab}	1976.00^{ab}	1731.00^{b}	1299.00^{c}	38.650
Feed intake (g b^{-1})	4002.00^{a}	3942.00^{a}	3919.00^{a}	3917.00^{a}	3848.00^{ab}	3842.00^{ab}	3809.00^{ab}	43.530
Feedintake (g $bird^{-1}$ day^{-1})	143.00^{a}	141.00^{a}	140.00^{a}	140.00^{a}	137.00^{ab}	137.00^{ab}	136.00^{ab}	1.550
Feed efficiency	0.53^{a}	0.52^{a}	0.52^{a}	0.51^{a}	0.51^{a}	0.45^{b}	0.34^{c}	0.009
Feed-gain ratio	1.90^{a}	1.91^{a}	1.92^{a}	1.96^{a}	1.95^{a}	2.22^{b}	2.93^{c}	0.050
Feed cost (₦/kg)	41.53^{a}	39.46^{b}	37.40^{c}	35.33^{d}	34.25^{e}	33.19^{f}	32.13^{g}	0.004
Feed cost (₦/bird)	166.19^{e}	155.55^{d}	146.56^{c}	138.38^{b}	131.81^{a}	127.50^{a}	122.37^{a}	2.610
Feed cost/kg gain	78.73^{b}	75.24^{b}	66.70^{a}	69.38^{ab}	71.67^{ab}	73.67^{b}	94.18^{c}	2.500
Mort. (%)	0.00	0.00	3.03	0.00	0.00	0.00	3.03	1.210

Means within the same row with different superscripts are significantly ($p<0.05$) different. SEM = Standard Error of Means

when fed in poultry diets as compared to when unconventional legume seeds such as lablab beans is fed. This shows that soyacake and groundnut cake are better than lablab in supplying necessary nutrients for growth. This is because the nutrient profiles especially for the crude protein content and the essential amino acid composition of soyacake and groundnut cake are better than that in lablab seeds. The nutrients in groundnut cakes can easily be made available to the birds because of little or no antinutritional factors as opposed to the negative interference of the residual trypsin inhibitor and other antinutritional factors that may be present in the lablab beans. According to Balogun *et al*. (2001), unconventional grain legume proteins are of poor quality in terms of poor level of essential amino acids such as methionine and lysine. The authors argued that proper processing such as converting them to their cake forms could enhance the quality of protein of these legumes. Etuk *et al*. (2003) suggested that for optimum performance to be obtained in broilers fed unconventional grain legume seed meal in their diets, such diets should be fortified with the necessary essential amino acids. It becomes clear therefore that although lablab beans used in its present cooked form reduces feed cost, it does not necessarily translate to better profit margin if the required market weight of the broilers is not attained at the right time.

This means that although it is generally agreed and has been proved by this study that the utilization of unconventional grain legumes can lower feed cost, these legumes need to be further processed possibly into the form of cakes to reduce to the barest minimum the influence of antinutritional factors and then fortified with necessary amino acids before they can be properly utilized by broiler chickens. This calls for further investigation.

Percent mortality was not significantly (p<0.05) affected by feeding the lablab seed meal in broiler diets. This is an indication that the lablab cooked for 30 min is safe for incorporation in poultry diets. Similar result was reported by Akinmutimi (2003) who observed reduced mortality in broilers fed well-cooked sword beans as opposed to high mortality in birds fed on diets containing raw sword beans. This may be related to the destruction of antinutritional factors present in the legume as a result of heat treatment.

The result of the carcass analysis shows significant (p<0.05) difference between treatments means (Table 6). The values obtained indicate significant (p>0.05) decreases in the percentages of body parts in relation to live weight as the level of the lablab in the diet increased. This may indicate a proper development of the various body parts in those birds on lower lablab dietary levels because of the possibility of better nutrient intake and utilization permitted by higher levels of ground nut cake in the diets. However, the values obtained for the liver and the pancreas indicate that there was a significant (p<0.05) increase in the weight of these organs as the level of lablab increased in their diets. This may be due to higher concentrations of certain residual anti-nutrient factors in the cooked lablab beans. The hypertrophy of the pancreas may have resulted from their increased activities to produce more trypsin. However the weight of the gizzard, spleen and the heart decreased as the dietary levels of lablab beans increased (Table 6). This could be as a result of the weight of the birds, which decreased as the dietary level of lablab beans increased. The result is however is similar to that obtained by Ani and Okeke (2003), Amaefule and Onwudike (2000), Amaefule and Obioha (2001) and Akpodiete *et al*. (2001). These authors reported increases in the weights of the liver and pancreas in broilers fed diets containing unconventional grain legume beans processed by cooking, roasting and by fermentation. They reasoned that certain antinutritional factors, which may have not been destroyed by the various treatments applied on these legumes, might be responsible for the hypertrophy of some of the organs like the liver and the pancreas. This buttresses the need for better processing techniques that will eliminate the problem of antinutritional factors in grain legumes fed to broilers.

The result of the haematological profile presented in Table 7 indicates a higher level of Packed Cell Volume, (PCV) Total Protein (TP) and Haemoglobin (Hb) contents in birds fed the control diet. The values of these parameters decreased insignificantly (p<0.05) as the level of lablab in the diets increased. However these values falls within the range of PCV, TP and Hb reported by Oladele (2000)

Table 6: Response of broilers to graded dietary levels of *Lablab purpureus* beans. (Carcass analysis)

Parameters	Treatment (levels of lablab) 0.0	5.0	10.0	15.0	20.0	25.0	30.0	SEM
Live wt. g/b	2735.00^{a}	2668.33^{ab}	2578.33^{abc}	2518.33^{bc}	2465.00^{c}	2141.67^{d}	1701.67^{e}	39.980
Sl.wt. (LW%)	97.35	97.24	97.13	97.02	96.95	96.88	96.37	0.540
Df.wt. (LW%)	90.04	89.71	89.64	89.47	89.35	89.06	88.84	1.020
Dr. wt. (LW%)	82.59	82.20	81.57	81.10	80.71	80.01	78.42	2.600
Breast wt (% LW)	19.43^{a}	19.22^{ab}	18.81^{abc}	17.89^{abcd}	17.52^{bcd}	17.06^{cd}	16.27^{d}	0.350
Thigh (LW%)	20.20^{a}	20.10^{a}	19.55^{ab}	19.41^{ab}	19.21^{ab}	18.78^{b}	18.52^{b}	0.250
Wing wt. (LW%)	8.10^{a}	8.03^{ab}	7.84^{abc}	7.54^{abcd}	7.38^{bcd}	7.20^{cd}	7.01^{d}	0.130
Back wt. (LW%)	17.19	17.17	16.81	15.78	15.52	16.22	16.40	1.310
Neck wt. (LW%)	3.40^{a}	3.33^{a}	3.24^{a}	3.19^{a}	3.17^{a}	2.92^{b}	2.81^{b}	0.120
Legs wt. (LW%)	4.28	4.23	4.22	4.17	4.17	3.99	3.91	0.380
Head wt. (LW%)	3.33^{a}	3.28^{ab}	3.11^{abc}	3.05^{bcd}	2.99^{cde}	2.80^{de}	2.78^{e}	0.050
Liver wt. (LW%)	1.47^{c}	1.51^{bc}	1.55^{bc}	1.60^{abc}	1.60^{abc}	1.61^{ab}	1.70^{a}	0.070
Gizzard wt. (LW%)	2.51^{a}	2.35^{ab}	2.33^{ab}	2.24^{bc}	2.11^{c}	2.09^{c}	2.07^{c}	0.030
Pancreas wt. (LW%)	0.52	0.52	0.53	0.54	0.54	0.54	0.53	0.040
Spleen wt. (LW%)	0.22^{a}	0.19^{b}	0.19^{b}	0.18^{bc}	0.16^{cd}	0.15^{de}	0.14^{e}	0.003
Heart wt. (LW%)	0.58^{a}	0.55^{ab}	0.53^{b}	0.51^{b}	0.50^{b}	0.47^{bc}	0.43^{c}	0.002

Means within the same column with different superscripts are significantly (p<0.05) different. SEM = Standard Error of Means. LW = Live Weight. Sl. wt = Slaughter weight. Df. wt = Deafeathered weight. Dr. wt = Dressed weight

Table 7: Response of broilers to graded dietary levels of *Lablab purpureus* beans (Haematological parameters)

Parameters	Treatment (levels of lablab) 1	2	3	4	5	6	7	SEM
	0.00	5.00	10.00	15.00	20.00	25.00	30.00	
PCV (%)	27.39	27.17	26.67	26.44	26.00	25.27	23.58	2.48
TP (g dL^{-1})	5.27	5.24	5.20	4.91	4.81	4.79	4.68	0.48
Hb (%)	9.13	9.06	8.89	8.81	8.67	8.42	7.86	1.24

SEM = Standard Error of the Means. PCV = Packed Cell Volume. TP = Total Protein. Hb = Haemoglobin

for healthy birds. According to the author, the level of PCV, TP and Hb content of the blood of chickens are a factor of their health status and nutrient intake. The author stated that adequately fed birds in good health are likely to have higher levels of blood protein and packed cell volume as opposed to inadequately fed or under-nourished birds. The higher levels of these blood parameters obtained for birds in the control diet may indicate better nutrient availability and utilization by the birds.

CONCLUSIONS

Results obtained from this study indicate reduction in feed cost per kilogramme feed and feed cost per bird by feeding graded dietary levels of lablab beans in the diets of broiler chickens. However production parameters such as final weight, weight gain and feed conversion efficiency decreased as the level of lablab beans in the diets increased. This indicates that further processing is needed to reduce the antinutritional factors in lablab beans so that broiler chickens can fully utilize the nutrient content therein.

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