



## Effects of Feeding Graded Levels of Acid and Alkaline Treated *Lablab purpureus* on Organ Weight of Broiler Finisher

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### Abstract

Two different experiments were conducted and a total of 90-day-old broilers were used for each of the study to determine the organ weight of broiler finisher fed graded levels of lablab seed soaked in acidic and alkaline media. The experiment was carried out at the Teaching and Research Farm of Oyo State College of Agriculture and Technology, Igboora. The seeds used were purchased from Bodija Market in Ibadan. The raw seeds were first soaked at the rate of 1kg/3L of water for 12 hours, after which the pre-treated seed were soaked at the rate of 1kg/3L of pap water filtrate (acidic medium) for 24 hours and 0.5% wood ash solution (alkaline medium) separately, initial and final pH were taken, samples was sundried for 3days, milled and the included in the diet accordingly. Birds were randomly assigned into three (3) dietary treatments of 30 birds consisting of 3 replicate of (10) birds per replicate in a completely randomized design experiment. Birds on T1 received the control diet, T2 and T3 received 5% and 10% levels of acid and alkaline treated *Lablab purpureus* seed separately. The experiment lasted for eight (8) weeks. At the end of the 8weeks two (2) birds were slaughtered and the internal organs were assessed. Results showed there were significant ( $P<0.05$ ) differences in the values recorded for internal organs for birds fed lablab soaked in alkaline medium. The highest value of heart (0.41) was observed for birds fed (T3) while the lowest value (0.31) was observed for birds on (T1) for heart. Birds on T1 had the highest value (0.52) of proventriculus while birds in treatment T2 had the lowest value (0.43). However, there were statistical similarities in GIT weight value for birds in Treatment T2 and T3. Also, statistical similarities ( $P<0.05$ ) existed in Gizzard values for birds on T3 and treatment T1. Also, there were significant differences ( $P>0.05$ ) in liver, lungs, spleen, kidney, bile, GIT weight, open gizzard, empty gizzard, proventriculus and GIT length and heart for birds fed for acid treated *lablab purpureus*. Birds on T2 had the highest value of liver (1.76g), lungs (0.58g) while birds on T1 had the lowest value of liver. Birds on T2 had the lowest value of Kidney (0.24), GIT length (209.50), proventriculus (0.34g) and gizzard (1.76g) while the highest value of kidney, GIT length, (0.30) was observed for birds on T1. It could be concluded that lablab seed soaked in either alkaline or acidic medium can be fed to birds at 10% level of inclusion without any negative effects on internal organ of broiler finisher fed the diet.

### Introduction

One of the major problems of poultry producers is the high cost of feed, which arises mainly from the competition between man and poultry for conventional feedstuffs like maize, groundnut cake, soya bean meal and fish meal (Amaefule and Obioha, 2005). Hence there is need to search for alternative which can replace them. One of such alternative plant protein source capable of substitution expensive ones is *lablab purpureus* seed.

*Lablab purpureus* is a tropical leguminous plant with high seeds and foliage yield. The legume is potentially suitable for feeding with a protein content ranging between 25 and 26% was reported (Eneche, 2003). It is a perennial climbing bush 1 – 3m high generally grown annually, its leaves are trifoliate with

oval leaf lets (2.7 to 13cm long and 0.2 to 5.5cm broad). However, the nutritive value of *lablab* is masked by the occurrence of anti-nutritional factors such as tannins, trypsin inhibitors hydrogen cyanide, saponins and phytic acid (Akinmutin *et al.*, 2006). These ANFs inhibit the activities of digestive enzymes thereby causing digestive losses (Igene and Ekundayo, 2010) which exact a negative impact on the nutritional quality of the protein that could decrease the performance of poultry fed these ingredients (Olomu, 1995). Processing methods such as heating, soaking or fermentation Boiling, toasting and soaking can be used to reduce the anti-nutritional factors and improve the nutritional value and its by –products (Onyeike and Ayalogu, 1995).



## Materials and methods

### Experimental site

The experiment was carried out at the Teaching and Research farm, Oyo State College of Agriculture, Igboora in the derived Savannah zone of Nigeria. The experimental area lies in savannah forest zone on latitude 7°15'N and longitude 3°30'E, with an elevation 140m above sea level. The average minimum temperature is about 20.5°C and maximum average temperature of about 32.50°C. The average humidity in the study area is 58.0%. The double maximum rainfall is about 314.3mm in June and 165.2mm in September. (Sanusi, 2011).

**Procurement of sample:** *Lablab purpureus* seed was purchased from Bodija market, Ibadan. The pap water filtrate and wood ash used for the study were prepared

**Pre-treatment of seed:** The lablab seeds were soaked at the rate of 1kg/3L of water for 12 hours after which the water was decanted

**Treatment of sample:** The pre-treated seeds were soaked at the rate of 1kg/3L of raw pap water filtrate (acidic medium) for 24 hours and 0.5% wood ash solution (alkaline medium) separately. Initial and final pH was taken. The samples were sundried for 3days, milled and then included in the diet accordingly

### Experimental diets

Two different experiments were conducted and a total of 90-day-old broilers each were used for the study. The birds were randomly assigned into 3 dietary treatments of 30 birds consisting of 3 replicates of ten (10) birds per replicates in a completely randomized design experiment respectively. Birds on T<sub>1</sub> received the control diets, T<sub>2</sub> and T<sub>3</sub> received 5% and 10% levels of acid and alkaline treated *Lablab purpureus* separately for each of the media. The experiment lasted for eight weeks

**Table 1: Gross composition of experimental diets (acid treated)**

| INGREDIENT          | T1 (0%) | T2 (5%) | T3 (10%) |
|---------------------|---------|---------|----------|
| Maize               | 58.00   | 56.24   | 54.50    |
| SBM                 | 27.00   | 25.64   | 24.29    |
| Lablab              | 0.00    | 3.12    | 6.21     |
| Wheat offal         | 10.00   | 10.00   | 10.00    |
| Limestone           | 2.00    | 2.00    | 2.00     |
| Bonemeal            | 2.00    | 2.00    | 2.00     |
| Lysine              | 0.25    | 0.25    | 0.25     |
| Methionine          | 0.25    | 0.25    | 0.25     |
| Salt                | 0.25    | 0.25    | 0.25     |
| Broiler Premix      | 0.25    | 0.25    | 0.25     |
| TOTAL               | 100.00  | 100.00  | 100.00   |
| Calculated Analysis |         |         |          |
| Crude protein (%)   | 19.65   | 19.47   | 19.29    |
| ME (kcal/kg)        | 2908.22 | 2904.50 | 2901.99  |

ME: Metabolizable Energy, SBM: Soyabean meal

T<sub>1</sub>= Control, T<sub>2</sub>= 5% level of inclusion, T<sub>3</sub>= 10% level of inclusion

**Table 2: Gross composition of experimental diets of Broiler Finisher (Alkaline treated)**

| Ingredient          | T1 (0%) | T2 (5%) | T3 (10%) |
|---------------------|---------|---------|----------|
| Maize               | 58.00   | 56.24   | 54.50    |
| SBM                 | 27.00   | 25.64   | 24.29    |
| Lablab              | 0.00    | 3.12    | 6.21     |
| Wheat offal         | 10.00   | 10.00   | 10.00    |
| Limestone           | 2.00    | 2.00    | 2.00     |
| Bonemeal            | 2.00    | 2.00    | 2.00     |
| Lysine              | 0.25    | 0.25    | 0.25     |
| Methionine          | 0.25    | 0.25    | 0.25     |
| Salt                | 0.25    | 0.25    | 0.25     |
| Broiler Premix      | 0.25    | 0.25    | 0.25     |
| TOTAL               | 100.00  | 100.00  | 100.00   |
| Calculated Analysis |         |         |          |
| Crude protein (%)   | 19.65   | 19.47   | 19.29    |
| ME (kcal/kg)        | 2908.22 | 2904.50 | 2901.99  |

ME: Metabolizable Energy, SBM – Soya bean meal

T<sub>1</sub>= Control, T<sub>2</sub>= 5% level of inclusion, T<sub>3</sub>= 10% level of inclusion.



**Data collection:** At the end of the experiment, two birds per treatment were selected and slaughtered from each of the experiment. The internal organs like lungs, heart, proventriculus, liver, kidney, GIT length and GIT weight were removed and weighed.

**Statistical analysis:** Following the experimental design, all data collected were subjected to statistical analysis of variance (ANOVA) using SPSS 2003 version and means separated by Duncan Multiple Range Test.

## Result and discussion

### Result

Table 3 showed the proximate composition of experimental diet acidic medium. Diet 1 had the highest value of dry matter (95.19%), crude protein (5.30%), crude fibre (5.30%) and ash (5.60%) while diet 2 had the highest value of ether extract (3.00%).

Table 4 also showed the proximate composition of experimental diet alkaline medium. Diet 1 had the highest value of dry matter (94.85%), crude fibre (5.50%), while diet 3 had the highest value of ash (6.80%) and ether extract 7.30%

Table 5 showed the Results of feeding graded levels of alkaline treated lablab seed on organ weight of broiler finisher, Result showed there were significant ( $P < 0.05$ ) difference in the values recorded for internal organs. The highest value of heart (0.41g) was observed for birds fed (T3) while the lowest value (0.31g) was observed for birds on (T1) for heart. Birds on T1 had the highest value

(0.52g) of proventriculus while birds in treatment T2 had the lowest value (0.43g). However, there were statistical similarities in GIT weight value for birds in Treatment T2 and T3. Also, statistical similarities ( $P < 0.05$ ) existed in Gizzard value for birds on T3 and treatment.

In addition, Table 6 showed the organ weight changes of broiler finisher fed acid treated *Lablab purpureus*. Results showed that there were significant differences ( $P > 0.05$ ) in liver, lungs, spleen, kidney, bile, GIT weight, open gizzard, empty gizzard, proventriculus and GIT length and heart. Birds on T2 had the highest value of liver (1.76g), lungs (0.58g) while birds on T1 had the lowest value of liver. Birds on T2 had the lowest value of Kidney (0.24g), GIT length (209.50), proventriculus (0.34g) and gizzard (1.76g) while the highest value of kidney, GIT length, (0.30) was observed for birds on T1.

Table 7 showed the anti-nutritional factor content of both raw and processed *lablab purpureus* seed. Analysis showed that the raw seed had the highest value of oxalate (3.96mg/100g) and saponin (250.72 mg/100g) followed by lablab seeds soaked in ash solution. The least value of oxalate (2.53 mg/100g) and saponin (141.39mg/100g) was obtained for lablab seeds soaked in pap water filtrate. However, there was 37.45% and 37.30% reduction in oxalate and saponin respectively for lablab seed soaked in ash solution, and there was about 36.1% and 43.63% reduction in oxalate and saponin for lablab seeds soaked in pap water filtrate.

**Table 3: Proximate composition of experimental diet (acid treated)**

| Treatments    | T1    | T2    | T3    |
|---------------|-------|-------|-------|
| Dry matter    | 95.19 | 94.10 | 95.25 |
| Ash           | 5.60  | 5.10  | 5.00  |
| Ether extract | 6.65  | 7.00  | 6.80  |
| Crude fibre   | 5.30  | 4.10  | 4.60  |
| Crude protein | 5.30  | 4.10  | 4.60  |

**Table 4: Proximate composition of experimental diet (alkaline treated)**

| Treatment     | T1    | T2    | T3    |
|---------------|-------|-------|-------|
| Dry matter    | 94.85 | 94.35 | 94.60 |
| Ash           | 4.45  | 5.75  | 6.80  |
| Ether extract | 7.00  | 6.60  | 7.30  |
| Crude fibre   | 5.50  | 3.90  | 5.45  |
| Crude protein | 21.00 | 20.93 | 21.19 |



**Table 5: Effect of feeding graded levels of Alkaline-treated *lablab purpureus* seed on organ weight of broiler finisher.**

| Parameters         | T1(0%)             | T2(5%)              | T3(10%)             | SEM+/- |
|--------------------|--------------------|---------------------|---------------------|--------|
| Heart (g)          | 0.31 <sup>c</sup>  | 0.38 <sup>b</sup>   | 0.41 <sup>a</sup>   | 0.02   |
| Kidney (g)         | 0.26 <sup>b</sup>  | 0.26 <sup>b</sup>   | 0.28 <sup>a</sup>   | 0.01   |
| GIT weight         | 4.02 <sup>b</sup>  | 4.27 <sup>ab</sup>  | 4.35 <sup>a</sup>   | 0.08   |
| GIT length         | 239 <sup>a</sup>   | 209.50 <sup>c</sup> | 218.50 <sup>b</sup> | 7.13   |
| Proventriculus (g) | 0.52 <sup>a</sup>  | 0.43 <sup>c</sup>   | 0.46 <sup>b</sup>   | 0.02   |
| Bile (g)           | 0.11 <sup>ab</sup> | 0.13 <sup>a</sup>   | 0.05 <sup>c</sup>   | 0.02   |
| Gizzard (g)        | 2.38 <sup>ab</sup> | 1.76 <sup>c</sup>   | 2.47 <sup>a</sup>   | 0.18   |
| Liver (g)          | 1.70 <sup>a</sup>  | 1.53 <sup>c</sup>   | 1.63 <sup>b</sup>   | 0.04   |
| Lung (g)           | 0.46 <sup>c</sup>  | 0.66 <sup>a</sup>   | 0.56 <sup>b</sup>   | 0.05   |

abc- means on the same rows having superscripts are significantly different (P<0.05) SEM +/-: Standard Error of Mean

**Table 6. Effect of feeding graded levels of acid treated *Lablab purpureus* seeds on organ weight of broiler finisher.**

| Parameters         | T1(0%)              | T2(5%)              | T3(10%)             | SEM+/- |
|--------------------|---------------------|---------------------|---------------------|--------|
| Heart (g)          | 0.43 <sup>a</sup>   | 0.36 <sup>bc</sup>  | 0.38 <sup>b</sup>   | 0.02   |
| Kidney (g)         | 0.30 <sup>a</sup>   | 0.24 <sup>c</sup>   | 0.26 <sup>b</sup>   | 0.01   |
| GIT weight (g)     | 4.70 <sup>a</sup>   | 4.03 <sup>b</sup>   | 4.02 <sup>bc</sup>  | 0.08   |
| GIT length         | 239.00 <sup>a</sup> | 209.50 <sup>c</sup> | 218.50 <sup>b</sup> | 7.13   |
| Proventriculus (g) | 0.45 <sup>b</sup>   | 0.34 <sup>c</sup>   | 0.52 <sup>a</sup>   | 0.02   |
| Bile (g )          | 0.05 <sup>bc</sup>  | 0.07 <sup>b</sup>   | 0.12 <sup>a</sup>   | 0.02   |
| Gizzard (g)        | 2.04 <sup>ab</sup>  | 1.76 <sup>a</sup>   | 2.09 <sup>a</sup>   | 0.18   |
| Liver (g)          | 1.62 <sup>c</sup>   | 1.76 <sup>a</sup>   | 1.69 <sup>b</sup>   | 0.04   |
| Lung (g)           | 0.53 <sup>b</sup>   | 0.58 <sup>a</sup>   | 0.49 <sup>c</sup>   | 0.05   |

Abc-means on the same rows having superscripts are significantly different (P<0.05) SEM +/-: Standard Error of Mean

**Table 7: Antinutritional factor content of raw and processed *Lablab purpureus* seed**

| Parameters      | RAW    | AKSLLP | ASLLP  |
|-----------------|--------|--------|--------|
| Oxalate mg/100g | 3.96   | 2.67   | 2.53   |
| Saponin mg/100g | 250.72 | 157.18 | 141.31 |
| Phenols g/100g  | 0.91   | 0.84   | 0.68   |
| Tannin g/100g   | 0.29   | 0.20   | 0.17   |

AKSLLP- Alkaline-soaked *lablab purpureus*, ASLLP- Acid-soaked *lablab purpureus*

## Discussion

It was observed that birds on T1 had the highest value of liver for birds fed alkaline soaked *Lablab purpureus* seed, this indicated that birds fed the tested diets compare favourably with the control, however, however, birds on T2 recorded the highest value of liver followed by birds on T3 which could be as a result of the increase metabolic activities of the liver trying to get rid of any toxic material in the feed. The result of the study negates the findings of Oluokun and Olaolu (1999) who reported that increase in liver weight of rabbit fed 10% cashew nut meal residue based diet was an indirectly due to the increased metabolic activities of liver. It was observed from the result of this study that

the value recorded for the kidney was high for birds on T1, whereas the kidney value for birds on T2 and T 3 are lower compared with the control for birds fed acid soaked *lablab purpureus* seed. However, for birds fed alkaline soaked *lablab purpureus* seed, birds on control diets T1 and birds T2 had a lower kidney value to those on T3. This can be attributed to the fact that the diet 3 was toxic as anti-nutritional factor were present in the text ingredients. It could be concluded that *lablab* seed soaked in either alkaline or acidic medium can be fed to birds at 10% level of inclusion without any negative effects on internal organ of broiler finisher fed the diet.



## Conclusion and recommendation

### Conclusion

It could be concluded that lablab seed soaked in either alkaline or acidic medium can be fed to birds at 10% level of inclusion without any negative effects on internal organ of broiler finisher fed the diet.

### Recommendation

Feeding up to 10% level of inclusion showed good results, further experiment can be conducted and the level of inclusion can be increased to 20

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