

# Effect of *Vernonia amygdalina* leaf extract on growth performance, carcass characteristics of pullet and broiler birds

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## Abstract

A six week experimental trial was conducted to determine “The effect of *Vernonia amygdalina* leaf extract on the growth performance, carcass characteristics of broilers and pullets birds”. The experiment was carried out at the poultry unit of the Teaching and Research Farm of the Niger Delta University, Wilberforce Island Bayelsa state. Forty (40) day old chicks were used for the experiment comprising of two genotypes, twenty broilers and twenty pullets. Each genotype was divided into treatment and control. The treatment was administered 50ml *V. amygdalina* leaf extract was diluted into 1 litre of drinking water except the control group. The result showed significant difference ( $P<0.05$ ) between the control group and the group administered *V. amygdalina* leaf extract as they were different in carcass, live weight, heart, liver and gizzard weight for broilers. The result also showed that the experimental group was significantly different ( $P<0.05$ ) from the control group in lungs weight. However, the result showed no significant difference ( $P>0.05$ ) for both kidney and spleen weights for both groups. The results also show no significant difference ( $P>0.05$ ) between the control and treatment group of pullets. The study recommends that the use of *V. amygdalina* up to the level used in this study is suitable for broiler production. It can also be used to enhance performance at the growing phase of pullet's birds.

**Keywords:** Broiler chickens; Pullet chickens; *Vernonia amygdalina* leaf; Growth performance

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## 1. Introduction

One of the profitable agro-industries which can effectively tackle the problems of unemployment in rural areas is the poultry sector (1). Poultry industry can be adopted under a wide range of climatic conditions and can generally be combined conveniently with other farm enterprises. The evolution of poultry production has resulted in broiler with high efficiency in converting different types of feed into animal protein. Chickens are largely dominated flocks composition and make up about 98 percent (2). Despite the low growth in the poultry sector for the past two decades, a huge gap exists between availability and requirement of poultry products (1).

It is a common knowledge that feed constitute the greatest and most costly input in any livestock farm; especially poultry. Thus, any significant reduction in the cost of feeds will significantly reduce the overall cost of production and increase the profit margin of the farm (3).

*Vernonia amygdalina* (VA) is a shrub or small tree that grows throughout tropical Africa. It is popularly called bitter leaf because of its abundant bitter principles (4). The findings by (5) reported that the young leaves often preferred for human consumption, contain high cyanide (60.1mg 100-1g DM) and tannin content (40.6mg 100-1g DM) than older ones. Proximate composition of *Vernonia amygdalina* leaf meal (VALM) shows a chemical composition of 527.83 ME kcal/ kg, 86.40% DM, 21.50% CP, 13.10% CF, 6.80% EE, 11.05% Ash, and the result on mineral composition indicate that *V. amygdalina* has 3.85% Calcium, 0.40% Magnesium, 0.03% Phosphorus, 0.006% Iron, 0.33% Potassium and

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0.05% Sodium (6). Furthermore, *Vernonia amygdalina* has also been fed to broilers, where it was able to replace 300g kg<sup>-1</sup> of maize-based diet without negative effect on feed intake, body weight gains and feed efficiency (7).

Research has shown that *V. amygdalina* have some beneficial effects in disease management of poultry (8), such as anti-coccidiosis, anti-bacterial and anti-parasitic (9) as an anti-oxidant (10), and as a growth promoter by enhancing the gastro intestinal enzymes thus increasing feed conversion efficiency (7). It is one of the most natural feed additive which can be of great productive and health performance in the poultry industries.

## 2. Material and methods

### 2.1. Experimental Site

The experiment was carried out at the Poultry unit of the Teaching and Research Farm of the Niger Delta University, Wilberforce Island Bayelsa State. Niger Delta University is located at about Latitude 5°N and Longitude 6.05°E in the tropics with an average temperature of 26°C – 30°C.

### 2.2. Experimental birds and management

Forty (40) day old chicks, twenty pullets and twenty broilers from Olusegun Obasanjo Farm at Otta, Ogun State, Nigeria were used for the experiments. The birds were acclimatized for two weeks in the process of brooding using kerosene stove and electric bulbs to provide required brooding temperature. The birds were weighed and randomly allocated to individual treatments each. The birds were designated into two treatments (T1-T2) and two controls. The experimental period lasted for six weeks. The day old chicks were electrically and manually brooded for a period of two weeks in which they were fed commercial broiler starter diet till a period of four weeks and grower feed was given for the fourth week to the sixth week for both broilers and pullets while finisher diet was given till the end of the experiment. Other poultry routine management practices in the tropics which include daily inspection of the birds for symptoms of disease, mortality, supply of feed and fresh water and cleaning of trough and feeder was maintained.

### 2.3. Housing and management

The birds were housed in a dwarf-walled building that is covered with wire gauze to allow free flow of air and protect the birds from predators. The floor which was Concrete was disinfected and covered with wood shavings two weeks prior to the arrival of the birds. The building was divided into twelve pens consisting of four treatments and three treatments each having five birds. Each pen measured 4m X 4m. Plastic flat tray feeders were used at starter stage and replaced with metal feeding trays at the growing and finishing stages. For their daily water consumption, small plastic drinkers were used to provide water ad libitum. The experiment lasted for six weeks.

### 2.4. Source and Preparation of *Vernonia amygdalina*

Fresh bitter leaves were purchased from Tombia Market, Okutukutu, Yenagoa, Bayelsa state, Nigeria. The leaves were dried under room temperature while retaining the greenish coloration, and then grounded into meal. The bitter leaf extract was prepared by soaking 50g of bitter leaf meal in 1 litre of boiled hot water for 12 hours. It is then filtered into a transparent bottle for daily usage. 50ml of the filtered extract is then added into one litre (1 litre) of pure drinking water and then given to the birds to drink. This treatment was made available on daily bases.

### 2.5. Data Collection

Data were collected on the following growth performance traits (weekly body weight, body weight gain) carcass quality (weight of carcass, weight of organs such as liver, kidney, heart, gizzard, lungs, spleen and empty gizzard).

### 2.6. Carcass Evaluation

During the completion of the experiment one bird from each treatment were randomly selected. The selected birds were weighed and deprived of food for 12 hours before the day of slaughtering. The birds were then slaughtered through cervical dislocation accompanied by exsanguinations. The live weight was taken and after removing the feathers, carcass weight and organ weights were collected using a digital scale.

### 2.7. Statistical Analysis

Data collected were subjected to one-way analysis of variance (ANOVA) using SPSS version 19 for windows and significant means were separated using F-LSD at 5% significant level.

### 3. Results and discussion

The result in Table 1: Showed significant difference ( $P>0.05$ ) between control group and the administered *V. amygdalina*. The group administered with *V. amygdalina* extract has the highest mean percentage value of  $1.798\pm0.006^a$  compared to that of the control which has  $1.623\pm0.001^b$ .

**Table 1** The effect of *V. amygdalina* extract on the performance of broiler birds

| Parameters (Kg)     | Control          | T1               |
|---------------------|------------------|------------------|
| Initial weight (Kg) | $1.142\pm0.02^b$ | $1.400\pm0.03^a$ |
| Final weight (Kg)   | $2.765\pm0.03^b$ | $3.198\pm0.01^a$ |
| Weight gain (Kg)    | $1.623\pm0.01^b$ | $1.798\pm0.06^a$ |

ab= means with different letters are significantly different ( $P<0.05$ )

**Table 2** The result for carcass and organ weight of Broiler birds administered *V. amygdalina* extract

| Parameters       | Control           | T1                |
|------------------|-------------------|-------------------|
| Carcass (Kg)     | $1.897\pm4.04^b$  | $2.420\pm11.50^a$ |
| Live weight (Kg) | $2.223\pm57.70^b$ | $2.839\pm63.50^a$ |
| Heart (Kg)       | $9.300\pm0.58^b$  | $11.100\pm0.58^a$ |
| Liver (Kg)       | $38.100\pm0.58^b$ | $44.100\pm0.58^a$ |
| Kidney (Kg)      | $2.700\pm0.56$    | $3.700\pm0.56$    |
| Spleen (Kg)      | $2.500\pm0.29$    | $1.900\pm0.58$    |
| Gizzard (Kg)     | $57.200\pm0.12^b$ | $71.7\pm0.98^a$   |
| Lungs (Kg)       | $11.500\pm0.87^a$ | $4.100\pm1.10^b$  |

ab=means with different letters are significantly different ( $P < 0.05$ )  
\*organ weights are calculated in the percentage of the carcass weight.

Table 2: shows the result for carcass and organ weight of broiler birds administered *V. amygdalina* extract. The result showed significant difference ( $P<0.05$ ) between the control group and the group administered *V. amygdalina* extract as they were different in carcass, live weight, heart, liver and gizzard weight. Results shows that the gizzard of the group administered *V. amygdalina* leaf extract has a higher mean value of  $71.7\pm0.098^a$  compared to that of the control group  $57.20\pm0.0125^b$ . However, results show no significant difference ( $P> 0.05$ ) for kidney and spleen in both groups.

**Table 3** The effect of *V. amygdalina* extract on the performance of Pullets birds

| Parameters (Kg)     | Control          | T2               |
|---------------------|------------------|------------------|
| Initial weight (Kg) | $0.309\pm0.01$   | $0.351\pm0.03$   |
| Final weight (Kg)   | $0.827\pm0.01$   | $0.826\pm0.02$   |
| Weight gain (Kg)    | $0.518\pm0.00^a$ | $0.468\pm0.00^b$ |

ab=means with different letters are significantly different ( $P<0.05$ )

Table 3 shows the result of pullet birds administered *V. amygdalina* extract. The result showed no statistical difference ( $P>0.05$ ) for initial and final weight. For final weight gained, the control group had the highest mean value  $0.518 \pm 0.00^a$  and the group administered *V. amygdalina* leaf extract had  $0.468\pm0.00^b$ .

**Table 4** The result for carcass and organ weight of pullets birds administered *V. amygdalina* extract

| Parameters       | Control                  | T2                       |
|------------------|--------------------------|--------------------------|
| Carcass (Kg)     | 0.682±10.40 <sup>a</sup> | 0.594±2.31 <sup>b</sup>  |
| Live weight (Kg) | 0.856±57.70              | 0.725±57.7               |
| Heart (Kg)       | 2.900±0.58               | 3.100±0.58               |
| Liver (Kg)       | 14.600±0.57              | 16.500±0.57              |
| Kidney (Kg)      | 3.300±0.58               | 4.600±0.58               |
| Spleen (Kg)      | 2.100±0.58               | 1.400±0.58               |
| Gizzard (Kg)     | 30.300±0.17 <sup>b</sup> | 34.400±0.81 <sup>a</sup> |
| Lungs (Kg)       | 4.100±1.10               | 5.470±1.29               |

ab=means with different letters are significantly different ( $P < 0.05$ )  
 \*organ weights are calculated in the percentage of the carcass weight.

Table 4 showed the result for carcass, live and organ weight of Layers birds administered *V. amygdalina* extract. The result showed significant difference ( $P < 0.05$ ) between the group administered *V. amygdalina* extract and the control group for carcass weight. The result also showed that the control group was significantly different ( $P < 0.05$ ) from the group administered *V. amygdalina* extract in gizzard weight.

The control group had the highest mean value in carcass weight  $0.682 \pm 10.40^a$  while a reduced mean value was record for the group administered *V. amygdalina* leaf extract  $0.594 \pm 2.31^b$ .

However, the result showed no significant difference ( $P > 0.05$ ) for live weight, heart, liver, kidney, spleen and lungs weight for both the control group and the group administered *V. amygdalina* extract.

#### 4. Conclusion

From the study it was observed the *V. amygdalina* had a positive effect in the production of broilers in terms of performance, carcass weight and organ weight which may be as a result of the concentration used in this study or the method of extraction as several studies have also recorded the same. However, the effect on the performance, carcass weight and organ weight for layers showed negative effect as it led to a decrease in weight gain and carcass weight which agrees with so many results published for broilers as most study done with layers mostly focused on egg production and quality rather than organ weight or carcass weight.

From the result obtained in this study, it is recommended that the use of *V. amygdalina* up to the level administered in this study is suitable for broiler production. It can also be used to enhance performance at the growing phase of pullet birds. Since there are dual purpose layers, more research should be done to see the effect of plant extract on performance and organ weight of layer birds. Also lower concentration and other means of extraction can be done to ascertain the best quantity to administer broiler birds and pullets.

#### Compliance with ethical standards

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##### Disclosure of conflict of interest

No conflict.

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