RELATIVE ORGAN WEIGHT OF BROILER FINISHER FED GINGER, GARLIC AND MIXTURE OF GINGER AND GARLIC POWDER

Adomeh. E. E
Department of Animal Science, Faculty of Agriculture, Ambrose Alli University, Ekpoma, Edo State, Nigeria.
Email:evaadomeh@aauekpoma.edu.ng. Phone No: 08056349610

ABSTRACT
This study was conducted to examine the relative organ weights of broiler finisher fed ginger root (GRP), garlic bulb (GBP) and mixture of ginger and garlic powder (MGGP). A total of 180 broiler chicks were randomly allocated to four experimental diets replicated 3 times with 15 chicks per replicate in a completely Randomized Design (CRD). Diet one (T1) served as control with no ginger or garlic bulb powder. Diet 2 (T2) had 2% GRP, diets 3 (T3) & 4 (T4) had 2% each GBP and MGGP respectively. At the end of the experiment, three (3) birds (one per replicate) were selected based on the average weight from each treatment group making a total of twelve birds. The birds were starved of feed overnight, but drinking water was provided. They were tagged, slaughtered, bled and defeathered. They were eviscerated and the eviscerated weights were recorded. The weight of the organs such as heart, kidney, lungs, liver, spleen, full gizzard and gastro-intestinal tract (GIT) were recorded and measured relative to the eviscerated weight. The result indicated that relative weights of heart, lungs, kidney, gizzard and GIT were significantly ($p<0.05$) highest in birds placed on T3 while relative weights of spleen and liver were highest in birds fed T2 and T4 respectively. The highest relative organ weights were recorded in broiler chickens on T3 and therefore garlic bulb powder could be used as additive to improve broiler chicken production.

Key words: Ginger root and garlic bulb, Broiler, Relative Organ weight.

INTRODUCTION

Human health is a major reflection of what is consumed and reflected on the lifestyle. It has also been noted that the use of antibiotics in broiler production has serious health implication because of their residual effects. In order to have a healthier broiler chicken according to researchers, the use of phytobiotic in broiler chicken production is one of the sure means of achieving this goal.

The potential of natural feed additives like ginger and garlic as replacement for synthetically produced antibiotics, growth promoters in broiler chicks diets was discovered to be the bioactive substances. Natural feed additives are known to contain bioactive substances like oleoresin which aid physiological performance of the body and organs of broiler chicks (Zhang *et al.,* 2009). Also contained in ginger and garlic roots are vitamins, minerals and enzymes which are capable of boosting immune system. It is envisaged in this study the use of ginger and garlic individually or as their mixture could lead to improved growth in broiler chickens.

MATERIALS AND METHODS

The experiment was conducted at the Poultry Unit, Teaching and Research Farm and Meat Science laboratory, Department of Animal Science, Ambrose Alli University, Ekpoma, Edo State. One hundred and eighty (180) Anak day-old broiler chicks used for the experiment were purchased from a reputable hatchery in Ibadan, Oyo State, Nigeria. The chicks were brooded and fed commercial broiler starter mash for three weeks (21 days) acclimatization period before allotting them to different treatment diets. After brooding, 180 of the broiler chicks were randomly allotted four experimental diets replicated 3 times with 15 chicks per replicate in a completely Randomized Design (CRD). Diet one (T_1) served as control with no ginger or garlic bulb powder. Diet 2 (T_2) had 2% ginger root powder (GRP), while diets 3 (T_3) & 4 (T_4) had 2% each of garlic bulb powder (GBP) and mixture of garlic and ginger powder (MGGP) respectively. The birds were allowed access to feed and water *ad libitum* throughout the duration of the experiment. The feeding trial lasted for a period of 8 weeks. At the end of the experiment, three (3) birds (one per replicate) were selected based on the average weight from each treatment group making a total of twelve birds. The birds were starved of feed overnight, but drinking water was provided. Each bird was tagged, slaughtered, bled and defeathered.

They were eviscerated and the eviscerated weights were recorded. The weight of the organs such as heart, kidney, lungs, liver, spleen, full gizzard and gastro-intestinal tract (GIT) were recorded and measured relative to the eviscerated weight.
Relative organ weight was calculated as:

$$\text{Relative organ weight} = \frac{\text{Weight of Organ}}{\text{Eviscerated weight}} \times \frac{100}{1}$$

RESULTS

The relative organ weight of broiler chickens (Table 1) fed the dietary treatment revealed that the relative weight of heart, lungs, kidney, spleen, liver and gizzard were all significantly ($P<0.05$) influenced by the dietary treatment. Relative weight of heart was significantly ($P<0.05$) highest among birds fed T_3 with mean value of 0.89% followed by similar value of 0.83 % in birds fed on T_1, 0.80 % from birds placed on T_4 while least value of 0.49% observed from birds fed T_2 .

Table 1: Relative Organ Weight of Broiler Finisher Fed Ginger, Garlic and Mixture of Ginger and Garlic Powder.

Parameters	T_1 G/G (0%)	T_2 GRP (2%)	T_3 GBP (2%)	T_4 MGGP (1:1%)
Heart	0.83 ± 0.06^{a}	0.49 ± 0.15^{b}	0.89 ± 0.03^{a}	0.80 ± 0.04^{ab}
Lungs	0.64 ± 0.06^{b}	0.58 ± 0.03^{c}	0.69 ± 0.10^{a}	0.70 ± 0.13^{a}
Kidney	0.68 ± 0.038^{b}	0.69 ± 0.02^{b}	0.71 ± 0.03^{a}	0.65 ± 0.11^{c}
Spleen	0.19 ± 0.20^{c}	0.37 ± 0.21^{a}	0.17 ± 0.18^{c}	0.25 ± 0.06^{b}
Liver	3.66 ± 0.20^{bc}	3.55 ± 0.17^{c}	3.99 ± 0.22^{b}	4.24 ± 0.23^{a}
Gizzard	2.16 ± 0.25^{c}	2.71 ± 0.09^{b}	3.06 ± 0.23^{a}	2.24 ± 0.12^{c}
GIT	6.98 ± 0.3^{b}	6.55 ± 0.19^{b}	8.67 ± 0.46^{a}	8.00 ± 0.38^{a}

Mean on the same row with different superscripts are significantly different ($P<0.05$)
T_1 = G/G =Control,
T_2 = GRP = Ginger rhizome Powder,
T_3 = GBP = Garlic Bulb Powder,
T_4 = MGGP = Mixture of Ginger rhizome Powder and Garlic Bulb Powder.

Relative weight of lungs was highest ($P<0.05$) among birds fed T_4 with an average mean value of 0.70% followed by similar value of 0.69 % in birds fed T_3, 0.64 % from birds placed on T_1 while lowest value of 0.58 % was observed from birds fed T_2. kidney weight was also significantly ($P<0.05$) higher among birds fed T_3 with mean value of 0.71 % followed by similar values of 0.68 % for T_1 and 0.69 % in birds fed the control diet and T_2 while least mean value of 0.65 observed from birds fed T_4. Relative weight of spleen was significantly ($P<0.05$) highest among birds fed T_2 with mean value of 0.37 % followed by similar value of 0.25 % in birds fed T_4, 0.19 % from birds placed on T_1 while lowest value of 0.17 % observed from birds fed T_3 . Relative weight of liver also showed significant ($P<0.05$) variation with highest value among birds fed T_4 with mean value of 4.24 % followed by 3.99 % in birds fed T_3, 3.66 % from birds placed on T_1 while least value of 3.55% observed from birds fed T_2. Gizzard weight was significantly ($P<0.05$) higher among birds placed on T_3 with mean value of 3.06 % followed by 2.71 % in birds fed T_2, 2.24 % from birds placed on T_4 while least value of 2.16 observed from birds fed on T_1. Relative weight of Gastro Intestinal Tract (GIT) was significantly ($P<0.05$) highest among birds fed T_3 with mean value of 8.67 followed by similar value of 8.00 % in birds fed on T_4, followed by 6.98 among birds fed on T_1 while least value of 6.55% observed from birds

DISCUSSION

The relative weight of heart in this study showed significant variation with highest value recorded among broiler chickens placed on 2.0 % Garlic bulb powder comparable to those in control and T_4. This could be as a result of the presence of phytochemical components in garlic which enhanced heart functions and led to the increase in the size of the heart. Findings of present study corroborated with the results obtained by Tekeli *et al*. (2011) who concluded that dietary supplementation of ginger had

significant effects on the weight of visceral organs of broiler chickens. However, the finding negates the report of Botsoglou *et al.* (2002) who observed that supplementation of broiler feed with oregano essential oil for thirty eight days had no growth-promoting effects. This may be attributed to different sources of phytochemical applied in the two experiemnts.

The significantly higher values recorded for lungs and kidney is in line with the report of Tekeli *et al*. (2011) who found that dietary supplementation of ginger had significant effects on the weight of visceral organs of broiler chickens. The significant variation recorded for the relative weight of spleen is in consonance with the result from Aji *et al*. (2011) who found significant difference in the carcass yield obtained from broilers fed garlic and onion. Higher liver weight value recorded among birds on 2% ginger and garlic mixture indicated that birds on this feed additive had effective liver function as ginger and garlic is known to contain some aromatic compound capable of enhancing liver function. This agrees with the finding of Karangiya *et al.* (2016) who observed a significant effect in the liver weight of broiler chickens fed ginger and garlic as feed additives.

Birds on 2% Garlic bulb powder showed significant increase in the gizzard weight value. This also corroborates with the report of Karangiya *et al.* (2016) who observed a significant effect in the gizzard of broiler chickens fed ginger and garlic as feed additive. However the report did not agree with the finding of Dieumou *et al.* (2009) who reported a no significant difference in the gizzard weight of broiler chicken placed on ginger and garlic essential oil. The higher Gastro Intestinal Tract (GIT) weight recorded among birds fed 2% mixture of ginger and garlic powder may be due to the effective nutrient absorption that took place in the small intestine of the birds paced on T_4, as ginger and garlic is known to enhance effective nutrient absorption. This finding is in line with the report of Karangiya *et al.* (2016) who observed a significant effect in the GIT of broiler chickens fed ginger and garlic as feed additive.

CONCLUSION

It was therefore concluded that the relative organ weight of the heart, lungs, kidney and gizzard of broiler finisher were improved with supplementation of garlic bulb and ginger root powders in the diets of broiler chickens. However birds placed on garlic bulb powder showed highest relative weight of most of the organs considered. Therefore, the use of garlic bulb powder is advocated for improved relative weights of organs in broiler chicken production.

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