

Effect of Supplemented Graded Levels of Clove Extract on Broilers Chick Performance

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Abstract

This study was conducted to evaluate the response of broiler chickens to adding graded levels (0% - 0.5% - 1% - 1.5%) of clove extract added in the chick's drinking water. The study measured included production performance. 200 chicks (one day old) were used from the Cobb strain. The experiment chicks were divided into four groups, each containing 50 chicks, distributed into four treatments. The experimental feed was formulated to be isocaloric and isonitrogenous to meet the nutritional requirements of broiler chickens. The experimental groups were fed for five weeks and at the end of the experiment period two birds from each group were taken for slaughtered measurements. The experiment data was analyzed using a completely randomized design. The adding of clove extract to chicks drinking water was revealed a highly significant improvement ($P < 0.01$) in the percentage of feed consumed, total body weight gained and carcass weight. The best chicks performance was obtained when adding 0.5% of clove extract.

Keywords: Broiler; Feed Conversion Ratio; Feed Intake; Weight Gain

Introduction

World poultry production has been steadily rising at the rate of 4% annually has become one of the most popular and visible enterprises in Sudan. The profitable poultry industry is always characterized by quick body gain and high egg production with less utilization of feed, according to the records in the Ministry of Animal Resources and Fisheries [1] poultry production was estimated to 45.6 million, reported that the modern commercial poultry industry in Sudan was started by the establishment of the Sudanese Kuwaiti Company 1979 and the Arab Sudanese Poultry Company in 1982 - 1985 both were centered Khartoum. Then the poultry industry started to grow gradually around Khartoum and other towns in Sudan due to the rising demand for poultry products and the concurrent progress of the animal feed industry and the activity of veterinary services.

The global poultry sector and future trends, and discusses the challenges the sector is facing, with particular emphasis on four areas: food security social challenges (poverty alleviation and equity), health (animal and human) and environment (natural resources and climate change). Poultry makes a substantial contribution to food security and nutrition, providing energy, protein, and essential micro-nutrients to humans, with short production cycles and the ability to convert a wide range of agro-food by-products and wastes into meat and eggs edible by humans. Poultry is the fastest growing agricultural sub-sector, especially in developing countries [2]. As a result, the goal of this study was to investigate how supplemented graded levels of clove extract affected broiler chick performance.

Materials and Methods

This experiment was conducted at the Animal Production research center, Kuku to evaluate the effect of adding graded levels of clove extract on the performance of broiler chicks.

This experiment was carried out during the autumn season (23 January - 5 March 2019). The ambient temperature (20 - 37°C).

Preparation of clove extraction

The cloves were prepared, cleaned, and an amount of 1500 grams of a good quality clove were purchased, cleaned and prepared for the next use. Weighted (0g - 250g - 500g and 750g) cloves were packing to adding in water through 5 weeks for groups A, B, C and D, respectively. The daily amount of clove was crushed by the grinder and put in a glass and add boiling water to soak for 24 hours at a temperature of 40 - 50 degrees for 20 - 30 minutes and leave to be cool down, then add it to drinking water.

Experimental diets

The broiler chicks were fed the starter diets which were formulated to be iso-nitrogenous (24%) CP and semi iso-caloric (3100 Mcal/kg) After 22 days finisher a diet was formulated to be iso-nitrogenous (20%) CP and semi iso-caloric (3200 Mcal/kg) being adequate in all nutrients matching broiler chicks requirements [3] was offered to the chicks as finisher diets. Ration ingredients were sorghum, ground-nut cake, concentrate methionine, lysine, salt, limestone and vegetable oil.

Ingredient	Starter 7 - 21 days	Finisher 22 - 42 days
Sorghum	63	70
GNC	30	24.2
Limestone	0.75	0.1
DCP	0.6	0.15
Lysine	0.2	0.1
Methionine	0.15	0.15
Concentrate	5	5
Salt	0.2	0.2
Antifung	0.1	0.1
Blackberry ingredients	Starter	Finisher
Energy Mg/Kg	12.97	13.39
Protein	23	19
Ca	1.1	1
P	0.5	0.5
Ly	1.12	1.12

Table 1: Percent inclusion rates (as fed basis) and calculated analysis (dry matter basis) composition of experimental diets.

Housing

Semi closed wire mesh side poultry house was used. That was designed up to 5m in width and 15m in length with a height 3m from the foundation to roof line. The house was constructed from corrugated metal sheets roof with law masonry walls set on a concrete floor

and wire mesh on the upper part of the walls providing good ventilation, with a solid brick western eastern wall. The house was contained 20 pens partitioned with wire mesh 1m of each. Feed and water were provided *ad libitum* consumption during the whole experimental period.

The light was provided approximately 24 hours light (natural/artificial) for increasing feeding time 60 - 100 watt bulbs were used according to requirement. The density of birds was 10 birds/m².

Experimental chicks

A total number of 200 birds (one day old) commercial unsexed broiler of Cobb500 bird were purchased from (Mico poultry company) and transported to the Animal Production Research Center. The live body weight of the chick upon receipt was 45g.

The chicks were adopted to the premises and feed over 7 days before the start of experiment. At the end of the adaptation period, all chicks were weighted with an average initial weight of 135g. The chicks were then allotted randomly in to four treatments groups (A, B, C and D) in Completely Randomized Design (CRD), each group was divided into five replicates, each of 10 chicks. Ground brooding rearing system was adopted for 5 weeks experimental period chicks were bought vaccinated against (IB) and New Castle diseases (ND) at three days of age through spraying, Gambaro disease at 14 days of age through drinking water, retard Gambaro disease at 21 days of age through drinking water and Newcastle disease at 28 days of age soluble multi vitamin compounds (supper san) were given during after vaccinated.

Statistical analysis

The experimental design was completely randomized. Data generated from the experiment were subjected to analysis of variance (One-way-ANOVA) and the mean was tested for significance by least significant (LSD) using the statistical package of social science (SPSS) computer program [4].

Results

Response of broiler chicks to clove extract

Performance

Table 2 showed the overall performance of broilers Supplementing clove extract showed highly significant differences (P < 0.01) for feed intake, weight gain and final body weight. On the other hand, feed conversion ratio (FCR) and mortality, birds had not been affected by adding clove. Birds drinking concentration of clove 0.5% were showed higher values of most performance parameters followed by other concentrations which recorded high values than control groups.

Item	Clove level (%)				Significant
	0%	0.5%	1%	1.5%	
Number of chicks	50	50	50	50	
Experimental period	35	35	35	35	
Initial Wt	131.8 ± 26.6	133.1 ± 16.7	132.5 ± 21.5	132.1 ± 18.5	NS
Feed intake(g/bird/day)	101.62 ^d ± 4.9	105.49 ^a ± 4.7	102.42 ^c ± 5.9	104.48 ^b ± 3.9	*
Weight gain(g/bird/day)	58.9 ^d ± 2.8	61.83 ^a ± 2.9	59.14 ^c ± 2.9	60.44 ^b ± 2.9	*
Feed intake(g/bird/week)	3556.7 ^d ± 172.0	3692.3 ^a ± 167.63	3584.7 ^c ± 206.7	3656.8 ^b ± 136.4	**
Weight gain(g/bird/week)	2062 ^c ± 100.4	2164.10 ^a ± 103.9	2070.20 ^{ab} ± 103.7	2115.40 ^a ± 104.1	**
F C R (g feed/g gain)	1.72 ± 1.7	1.70 ± 1.6	1.73 ± 1.9	1.72 ± 1.3	NS
Final body weight (g/bird)	2090.30 ^b ± 111.2	2204.80 ^a ± 62.4	2159 ^a ± 64.8	2169.30 ^a ± 54.7	**
Mortality%	0%	0.1%	0.1%	0.1%	NS
Profitability Ratio	0.90 ^d	0.95 ^c	0.98 ^b	1.00 ^a	**

Table 2: Effect of supplementing clove extract on the overall performance of broiler chicks.

Means in the same row with different superscripts differ significantly.

NS: No significant different. *: Significant different (P < 0.05). **: Highly significant different (P < 0.01).

Discussion

Natural medicinal products originating from herbs, species and their extract products have been used as feed additives in poultry production [5,6].

The current study was conducted to investigate the influence of using clove extract added to drinking water on broiler chicks on the overall performance, blood chemistry and hematology. The results showed that feeding broiler chickens with different concentration levels of clove extract numerically consumed more feed than the control group. Impact of experimental treatments on the performance of broiler chicks up to five weeks of age revealed that supplementing clove extract significantly ($p < 0.01$) increased feed intake and weight gain compared with clove extract and the control treatment respectively. This result agrees Heba [7] and Weerasing [8] using clove extract showed no significant feed conversion ratio (FCR) of broilers was not affected experimental treatments compared with groups, this result agree with finding Heba [7]. The clove extract could act on antibiotics Bestami [9]. This can result in higher efficiency in the feed utilization, and it can lead to a higher weight gain and better feed efficiency. According to improvement broiler performance by clove extract probably is due to antibacterial and antifungal effects originated and improve the healthy level. It may be the reason that spices and herbs will positively affect food digestion. Body weight and other organs can increase by improving nutrient absorption. Also, as mentioned the use of clove extract resulted in increasing in feed intake, the positive influence in BW, FCR and feed intake of broilers by adding clove extract compared with broiler without any clove Bestami [9].

Conclusion

The addition of clove extract to the drinking water of chicks was significantly increasing body weight gain and feed intake, However the feed conversion ratio was not improved, the addition of (0.5%) concentration of clove extract give the best performance compared to other groups. The result obtained from this study demonstrated that clove can be used in broiler rations at level 0.5% to give a positive response in broiler performance, from previous studies and above results obtained in this research, clove can be considered as a medicinal plant.

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