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Effect of honey on performance and hematological parameters of broilers and Nigerian local chickens

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Abstract

A six week feeding trail was conducted to investigate the effect of honey on the performance and haematological parameters of broilers and Nigerian Local Chickens. The experiment was conducted at the Niger Delta University, Faculty of Agriculture Teaching and Research Farm. Sixty (60) day old chicks which consisted of three treatments, 20 broilers, 20 normal feather and 20 naked neck genotypes were used with each of the genotype having control. Feed and water were given ad-libitum. The experimental birds for the broiler and naked neck genotypes had the highest significant values compared to the control which had significant difference ($P<0.05$) in their performance, while the control of the normal feather genotype had the highest significant values compared to the experimental birds but there was no significant difference ($P>0.05$) in their performance. The broiler birds had the highest significant values compared to normal feather and naked neck genotypes and there was a significant difference ($P<0.05$) in their performance. The effect of honey on haematological parameters showed that there was a significant difference ($P<0.05$) in White blood cell, neutrophils, lymphocyte, monocyte, eosinophile and basophile of broiler birds, in normal feather, white blood cell, neutrophile and lymphocyte differed significantly ($P<0.05$) and there was a significant difference ($P<0.05$) in neutrophile and lymphocyte in the experimental and control for naked neck genotype. In conclusion, the study revealed that the inclusion of honey caused a positive effect on the performance of broilers and naked neck, but showed no effect or reduction in performance in normal feather genotype.

Keywords: Broiler chickens; Nigerian local chickens; Honey; Growth performance; Haematology

1. Introduction

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 (15). The country's standing poultry population is at present 180 million birds, a substantial increase from about 151 million birds (8,4) most of which are domiciled in the southern part of the country either in semi-intensive farms or intensive ones (4). Egg and meat production are the two major divisions of poultry production (8) although other divisions exists such as chick production, point of lay production, feed production, poultry tools and equipment production in addition to poultry processing and marketing (2).

Indigenous chicken constitutes 80% of the 120 million poultry type raised in the rural areas in Nigeria (11). Their products are preferred by the majority of Nigerian because of the pigmentation, taste, leanness and suitability for special dishes (5). The occurrence of major genes of feather type (frizzle- feathered) feather distribution (naked-neck) dwarf conditions and modifier effects in the Nigerian local chickens had also been observed (14).

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Broiler chickens are raised on concentrated energy diets to maximize growth rates and reduce the total number of days needed to reach market weight. (10) reported that the increase in growth rate of modern broiler chickens has been associated with increased fat deposition. This problem most commonly occurs in broiler chickens that are fed *ad-libitum* (9).

Honey is a natural substance produced, when the nectar and sweet deposits from plants are gathered, modified and stored in the honeycombs by honeybees of the genera *Apis* and *Meliponini* (7;1).

Haematology refers to the study of the numbers and morphology of the cellular elements of the blood the red cells (erythrocytes), white cells (leucocytes), and the platelets (thrombocytes) and the use of these results in the diagnosis and monitoring of disease (6).

2. Material and methods

The study was conducted at the Teaching and Research Farm of the Niger Delta University, Bayelsa State. The State is geographically located within latitude 4°15′N, 5°23′S and longitude 5°22′W and 6°45′E. The state lies in the forest zone of Nigeria. Sixty (60) day old chicks were used, twenty (20) Oba Marshall broiler birds and forty (40) Nigerian local chickens were used for the research. They were procured from Obasanjo Farm at Ibadan, Oyo State and Federal University of Agriculture (FUNAAB), Abeokuta, Ogun State respectively. Factorial design was used for this experiment and the birds were selected to three treatments (Broilers, Naked neck and Normal feather) 10 birds each. The birds were brooded for six (6) weeks before experiment was carried out. The birds were brooded at a temperature of 39°C. 20mls of honey was added to 1litre of water and administered to the birds in various treatments. The birds which served as control were given water. The weight gain was recording on a weekly basis. The honey administration lasted for 6 weeks. At the end of the experiment, 3 broilers, 3 normal feather, 3 nacked neck were randomly selected and blood samples were collected. The hairs around the neck and wing region were carefully removed to expose the jugular vein of the neck and the basilica vein of the wing, a 2ml syringe was used to collect the blood, and deposited into EDTA bottles for haematological analysis.Data collected were subjected to Analysis of variance (ANOVA) with the aid of Duncan Multiple Range test developed by (3).

3. Results and Discussion

Table 1.0: Show's the effect of honey on the performance of broilers and Nigerian local chickens. Three genotype of chickens (Broilers, Normal feather and Naked neck) were investigated.

For broilers, the experimental birds has the highest values in weight gained compared to the control. There was no significant difference ($P>0.05$) in the Average initial weight at the first week, but differed significantly ($P<0.05$) from the second week to the sixth week. The normal feather genotype from control has the highest values in weight gained compared to the experimental birds. But there was no significant difference ($P>0.05$) in the weight gained. While for the naked neck, the experimental birds had the highest values in weight gained compared to the control and there was significant difference ($P<0.05$). The broiler and naked neck genotype which honey was administered to through drinking water had the best performance in weight gain while the normal feather genotype showed no positive effect to honey administration.

Table 2.0: Shows the effect of honey on the haematological parameters of three genotypes of chickens (Broilers, Normal feather and Naked neck).

For the broilers, the experimental birds had the highest values in white blood cell (WBC), Neutrophile and Eosinophil and lowest values in Haemoglobin, Pack cell volume (PCV), Red blood cell (RBC), Lymphocyte, Monocyte and Basophile. There was no significant difference ($P>0.05$) in Haemoglobin, pack cell volume, Red blood cell, but differed significantly ($P<0.05$) in White blood cell, Neutrophile, Lymphocyte, Monocyte, Eosinophil and Basophile. For Normal feather, the experimental birds has the highest values in white blood cell, Red blood cell, Neutrophile, Lymphocyte and Eosinophil and the lowest values in Haemoglobin, Pack cell volume, Monocyte and Basophile. There was no significant difference ($P>0.05$) in Haemoglobin, Pack cell volume, Red blood cell, Monocyte, Eosinophil and Basophile, but differed significantly ($P<0.05$) in White blood cell, Neutrophile and Lymphocyte.

Table 1 Mean ± SD of the effect of honey on live weight changes of broiler birds and Nigerian local chickens

Genotypes	**Average initial weight (kg)**	**Within Genotype**					
Weeks							
		1	2	3	4	5	6
Broiler birds							
Experimental =10	15.86±1.91	20.51±2.82	25.65±3.83[a]	30.05±4.29[a]	35.25±6.15[a]	37.59±4.64[a]	40.56±5.87[a]
Control =10	15.51±0.42	19.46±1.04	23.49±1.50[b]	26.69±1.52[b]	32.54±2.69[b]	32.54±0.00[b]	34.61±2.16[b]
Normal feather							
Experimental =10	7.40±2.87	10.01±4.15	13.47±5.66	16.04±6.14	19.04±8.95	21.00±9.78	22.92±10.22
Control =10	9.92±4.56	12.06±4.98	14.63±5.30	18.11±6.84	23.31±9.15	22.59±8.57	24.89±9.66
Naked neck							
Experimental =10	6.02±0.77[a]	8.99±0.09[a]	13.29±0.11[a]	14.60±3.02[a]	16.59±4.67[a]	20.75±0.67[a]	23.21±0.71[a]
Control =10	3.84±0.09[b]	5.88±0.20[b]	8.25±0.63[b]	9.39±0.77[b]	11.96±0.74[b]	14.37±1.11[b]	16.55±2.06[b]
Between Genotype							
Broiler birds							
Experimental =10	15.86±1.91	20.51±2.82	25.65±3.83[a]	30.05±4.29[a]	35.25±6.15[a]	37.59±4.64[a]	40.56±5.87[a]
Normal feather							
Experimental =10	7.40±2.87	10.01±4.15	13.47±5.66	16.04±6.14	19.04±8.95	21.00±9.78	22.92±10.22
Naked neck							
Experimental =10	6.02±0.77[a]	8.99±0.09[a]	13.29±0.11[a]	14.60±3.02[a]	16.59±4.67[a]	20.75±0.67[a]	23.21±0.71[a]

a,b, means with different superscript differs significantly (P<0.05)

Table 2 Mean ± SD of the effect of honey on the haematology of broiler birds and Nigerian local chickens

Genotype				**Within Genotype**					
	Haemoglobin (g/L)	**PCV (%)**	**WBC (x10⁶/L)**	**RBC (x10⁶/L)**	**Neutrophile (%)**	**Lymphocyte (%)**	**Monocyte (%)**	**Eosinophil (%)**	**Basophile (%)**
Broiler birds									
Experimental=10	3.87±0.98	27.00±2.65	3.03±13.08^{a}	5.08±0.91	39.00±13.08^{a}	50.00±12.17^{b}	3.33±1.15^{b}	4.00±0.00^{a}	3.67±0.57^{b}
Control =10	9.20±0.85	27.67±2.52	1.73±0.49^{b}	5.31±0.85	25.00±1.00^{b}	62.00±2.00^{a}	5.33±2.31^{a}	3.67±0.58^{b}	4.00±0.00^{a}
Normal feather									
Experimental =10	9.13±0.85	27.33±2.31	2.60±0.17^{a}	5.24±0.75	34.67±8.33^{a}	56.00±10.85^{a}	2.67±4.62	6.67±4.62	3.33±2.31
Control =10	9.57±0.75	28.67±1.33	2.10±0.79^{b}	5.07±1.06	27.67±3.21^{b}	45.67±5.86^{b}	4.33±6.65	4.67±1.15	4.00±6.93
Naked neck									
Experimental =10	9.73±1.27	29.00±3.61	2.23±0.83	5.07±0.91	27.67±0.58^{a}	60.00±2.00^{b}	4.67±1.15	4.33±0.58	3.67±1.53
Control =10	9.00±1.00	28.00±1.00	2.20±0.72	4.87±2.23	22.33±4.93^{b}	65.00±7.00^{a}	5.00±1.00	4.33±1.52	4.00±1.00
Between Genotype									
Broiler birds									
Experimental =10	3.87±0.98^{b}	27.00±2.63	3.03±13.08^{a}	5.08±0.91	39.00±13.08^{a}	50.00±12.17	3.33±1.15^{b}	4.00±0.00^{b}	3.67±0.57
Normal feather									
Experimental =10	9.13±0.85^{a}	27.33±2.31	2.60±0.17^{b}	5.24±0.75	34.67±8.33^{a}	56.00±10.85	2.67±4.62^{c}	6.67±4.62^{a}	3.33±2.31
Naked neck									
Experimental =10	9.73±1.27^{a}	29.00±3.61	2.23±0.83^{c}	5.07±0.91	27.67±0.58^{b}	60.00±2.00	4.67±1.15^{a}	4.33±0.58^{b}	3.67±0.54

a,b,c means with different superscript differs significantly (P<00.05)

While for the Naked neck genotype the experimental birds had the highest values in Haemoglobin, Pack cell volume, White blood cell, Red blood cell and Neutrophile and had the lowest values in Lymphocyte, Monocyte, Eosinophil and Basophile. There was a significant difference ($P<0.05$) in Neutrophile and Lymphocyte, but do not differ significantly ($P>0.05$) in Haemoglobin, Pack cell volume, White blood cell, Red blood cell, Monocyte, Eosinophil and Basophile

4. Conclusion

This study revealed that the administration of honey caused a positive effect on the performance of broilers and naked neck genotype, but shows no effect on normal feather genotype. For haematological parameters, the result showed that naked neck genotype had the highest values in Haemoglobin, pack cell volume, lymphocyte and monocyte, broilers had the highest values in white blood cell, Neutrophile, and Basophile while the normal feather had the highest values in Red blood cell and Eosinophil. Naked neck genotype shows better adaptability to honey and also the inclusion of honey was not harmful to the health of the three genotypes

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict.

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