EFFECTS OF GINGER POWDER ON HAEMATOLOGICAL INDICES OF THE BROILER BIRDS AND PROXIMATE COMPOSITION OF THE EXPERIMENTAL DIET

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ABSTRACT
Medicinal spices like ginger contain chemical substances that could be used to enhance the value of food of animal origin and these substances are responsible for some other Health benefits. This study investigated the effect of ginger on the Haematological Indices of broiler birds and proximate composition of the experimental diet using sixty (60) day old broilers in a 42 day feeding trials. Hybrid company commercial feed for broiler birds used for this experiment was purchased from the mega distribution unit and divided into four(4), such that the diets contained 0%, 0.5%, 1% and 1.5% of air dry and milled ginger. The diets were randomly assigned to four groups of fifteen (15) birds each replicated 3 times to give five (5) broilers birds in a complete randomized design. The experimental diet was subjected to proximate analysis using standard procedure of AOAC (1990).The result showed significant ($p < 0.05$) difference in PCV, HBG, MCHC, MCV, MON, RBC, RDWC, and WBC. However, no significant differences were observed in LYM, HCT and MCH. Result of the proximate analysis of experimental diet showed significant difference in the metabolizable energy content (ME), ether extract (EE) and crude fibre (CF) with no significant differences in crude protein (CP) content of the feed among the treatment groups ($P > 0.05$). The test ingredient significantly affected some of the blood parameters of the experimental birds even though the values were within the normal range and thus could be used as additive in broiler chickens without any detrimental effects.
Keywords: Ginger Powder, Broiler chickens, Feed Additives and Haematological indices

INTRODUCTION
A broiler bird is any chicken *(Gallus gallus domesticus*) that is bred and raised for meat production (Kruchten, 2002). Most commercial broilers reach slaughter weight at six (6) weeks of age (BESSEI, 2006); although the slower growing reach slaughter weight at fourteen weeks of age.
Ginger has been reported to enhance animal nutrient digestion and absorption because of the positive effect on gastric secretion, enterokinesia and digestive enzymes activities (Platel & Srinivasan, 2000). Chrubasik et al. (2005) was of the opinion that the preparation method of ginger product affected its clinical efficacy which will affect performance, antioxidant status, and serum metabolites of the animal.
Blood represents a means of assessing clinical and nutritional health status of animals in feeding trials and the haematological parameters most commonly used for assessment in nutritional studies include Packed Cell Volume (PCV), Red Blood Cell (RBC), Haemoglobin concentration, Mean Corpuscular Haemoglobin Concentration (MCHC), Mean Corpuscular Volume (MCV) and clotting time (Aletor and Egberongbe, 1992; Olorede and Longe, 2000; Adeyemi et al., 2000). Haematological variables, PCV and MCHC are very important in anemia diagnosis and also serve as a useful index of the capacity of the bone marrow to produce red blood cells. This research is aimed to examine the effect of Ginger powder as feed Additive and to assess the response of the chicks to the ginger powder in terms of haematological indices.

MATERIALS AND METHODS
This study was carried out at the Teaching and Research Farm of the Department pf Animal Science, Bayero University, Kano. The farm is located in the Sudan savannah zone of Nigeria between the latitude $10^0 33^1$and $12^0 27^1$ north of the equator, longitude $7^0 34^1$ and $9^0 29^1$ east of the GMT. The farm has an average annual rainfall that ranges between 787 and 960mm, and a temperature of 21^0C – 39^0C (KNARDA, 2001).
The experimental units for this research were sixty broiler birds (day-old-chicks), Chikun company sourced from Al'amin Agrovet Unguwa Uku, Kano State, they were raised under intensive management

system. Apart from the broiler birds, other experimental materials include ginger rhizomes, commercial feed, weighing balance, 5ml syringe, grinding mill, microscope, EDTA bottles, cotton wool, methylated sprit, burette, test tubes, distilled water, red blood cell (RBC) and white blood cell (WBC) diluting fluids.
Fresh ginger rhizomes for this study were purchased from Rijiyar Lemo market in Kano metropolis. The rhizomes were cleaned and initial weight was recorded. The rhizomes were sliced and subjected to air drying. After drying the weight was recorded again in order to determine moisture content. The sliced rhizomes was grounded to powder using a motor and pestle and stored in air-tight containers before incorporation into the experimental diets.
Commercial "Hybrid feed" was purchased from mega distribution unit located in Rijiyar Zaki closed to Kano Electrical Distribution Company (KEDCO) Kano state. The prepared ginger powder was incorporated into the formulated diets at 0, 0.5, 1 and 1.5% levels of inclusion. The diet was subjected to proximate analysis using standard method of AOAC (1990)
At 42nd day, 2.5ml blood samples were collected from one bird in each replicate using needle and syringe through wing veins directly into EDTA containing bottles and taken to the laboratory for the determination of haematological Indices, using standard procedure as described by Weiss and Wardrop (2010). During this research, the sample of the experimental diet was taken to the laboratory for proximate analysis as well. The data generated was subjected to one way analysis of variance (ANOVA) in a completely randomized design using GENSTAT, (2017).

RESULTS AND DISCUSSION

Table 3: Proximate Composition of Experimental Diets and Ginger Powder

COMPOSTION (%)	TREATMENTS				GINGER
	T1	T2	T3	T4	
Ash	6.40	4.28	8.85	5.80	5.85
Moisture	4.00	4.97	4.75	4.31	6.48
Dry natter	96.00	95.02	95.02	96.65	93.52
Nitrogen free extract (NFE)	37.89	42.28	40.75	39.91	69.99
Crude protein (CP)	37.18	38.26	36.64	39.91	7.93
Crude fibre (CF)	16.51	13.13	12.10	12.40	3.98
Ether extract (EE)	2.01	2.04	2.03	2.04	5.77
Metabolizable energy (Mj/kg)	2883.77	2966.00	3082.00	3058.92	3246.00

Field Survey, 2022

Table 4: Effects Of Feeding Broiler Chickens Diets Containing Ginger Powder As Additive

PARAMETRES	T1(0%)	T2(0.5%)	T3(1%)	T4(1.5%)	SED	p.value
PCV (%)	30.83^{b}	31.83^{a}	32.33^{b}	$32.82^{ab`}$	0.31	0.23
HBG (g/dl)	10.93^{a}	10.90^{a}	12.97^{b}	11.60^{ab}	0.452	0.012
LYM (%)	76.43	81.50	78.53	78.67	1.392	0.057
MCHC (g/dl)	30.70^{a}	31.50^{a}	32.90^{b}	31.17^{ab}	0.284	0.001
MCH (pg)	48.53	48.57	47.80	48.43	0.443	0.352
MCV (fLi)	135.10^{ab}	115.30^{a}	143.80^{b}	115.40^{a}	8.54	0.035
MON (%)	17.33^{b}	12.00^{a}	10.37^{a}	11.93^{a}	1.279	0.007
RBC (10^{6}/µl)	1.270^{b}	1.253^{b}	1.507^{a}	1.377^{ab}	0.101	0.141
RDW (%)	7.267^{a}	6.967^{a}	7.633^{ab}	8.133^{b}	0.217	0.08
WBC (10^{3}/µl))	107.30^{a}	111.80^{b}	107.70^{ab}	113.4^{b}	4.26	0.453

Field Survey, 2022
SED = Standard error of difference, ab = means on the same row with different superscript are significantly different ($p<0.05$), PCV = Packed cell volume, HBG = Hemoglobin, WBC = White Blood Cell, RBC = Red Blood Cell, MCV = Mean Corpuscular Volume, MCH = Mean Corpuscular Hemoglobin, MCHC = Mean Corpuscular Haemoglobin Concentration, LYM = Lymphocytes, RDWC = Red blood cell distribution, HCT = Haematocrit of red blood cells, MON = Monocytes

The result showed no significant difference in the ash content of the experimental diet. The moisture content values revealed significant ($p < 0.05$) difference among the treatment groups with those in diet containing 0.5% and 1% recording the highest value. Significant difference were also observed in Nitrogen Free Extract (NFE). Diets containing 0.5% and 1% of the experimental test material (ginger powder) recorded higher value while these 0% had the least. Similarly, the crude (CP) content of the test diet was not significantly affected by the various levels of the dietary treatments. Ether extract (EE) were significantly ($p < 0.05$) difference among the treatments with highest values recorded on 0.5%, 1% and 1.5% ginger powder level of inclusion. Finally, the significant ($p < 0.05$) difference were also observed in metabolizable energy content of the experimental test material (ginger powder). Diets containing 0.5%, 1% and 1.5% experimental test material (ginger powder) recorded higher value while this on 0% had the least.
The packed cell volume (PCV) showed significant ($p < 0.05$) difference across the treatments with birds T4 (1.5% ginger inclusion) having the highest value (32.82). Though significant ($p >0.05$) differences among treatment groups exist, significant ($p < 0.05$) difference were also observed in haemoglobin content. Birds fed 1% of the Experimental test material (ginger powder) recorded higher value while those on 0% and 0.5% had the least. No significant differences was observed in the Lymphocytes values . The MCHC values revealed significant ($p < 0.05$) differences among the treatment groups with those on diets containing 1% ginger powder recording the highest value. The values for Haematocrit did not reveal significant difference among the treatment groups. Similarly, the MCH was not significantly affected by the various levels of the dietary treatments.

CONCLUSION

From the above analysis, this study reveals that the various levels of inclusion of the ginger powder significantly affected some of the blood parameters of the experimental birds, the values were within the normal range. The 1% inclusion level shows one of the optimal haematological performance.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

5. Ginger powder could be used as additive in broiler chickens without any detrimental effects.
6. Natural feed additives could be used in diets for broiler chicken as replacement for synthetic ingredients that could have side effects on human health.

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