EFFECTS OF SODIUM BICARBONATE SALT AND TURMERIC POWDER ON PERFORMANCE AND HAEMATOLOGICAL PARAMETERS OF ISA BROWN HENS

*** Hirdima L.D., Y.P Mancha & D.J.U. Kalla**

Department of Animal Production Abubakar Tafawa Balewa University Bauchi, Bauchi State Nigeria

**Corresponding author: ihirdima@gmail.com mobile No: 07032892843*

ABSTRACT

The study was carried out to determine the effects of sodium bicarbonate salt and turmeric powder on performance and haematological parameters of Isa brown hens. The experiment was conducted at the poultry unit of the Department of Animal Production Abubukar Tafawa Balewa University located in Gubi, Bauchi. A total of one hundred and eighty four (184) Isa Brown layers at 51 weeks of age were used for the study, which was conducted during the rainy season (July-October). The hens were kept in deep litter system during the experiment. The control birds were administered feed without sodium bicarbonate salt and turmeric powder while the other treatments received diet supplemented with bicarbonate salt supplemented at the level of 0.30 g and 0.70 g, turmeric powder at the level of 0.30g and 0.70g, and the combinations S30T30, S30T70, S70T30 and S70T70. During lay, the birds were fed once daily with compounded ration containing 16% crude protein, other constituents of the feed includes vitamins, minerals and amino acid. Water was ad libitum. The result revealed that the supplementation of sodium bicarbonate salt and turmeric powder did not affect the feed conversion ratio (FCR). However, significant ($P< 0.001$) differences were in feed per egg and the hen day production (%HDP). It was observed that birds on inclusion level of 0.70g sodium bicarbonate salt (116.74±0.05) increased feed per egg while the least values was obtained on birds fed with 0.30g sodium bicarbonate salt inclusion which decreased feed per egg. It was also observed that sodium bicarbonate salt and turmeric powder did not affect haematological parameters thereby making it safe for the birds. From the finding of this research it is concluded that sodium bicarbonate salt and turmeric powder significantly improved performance and is therefore recommended for Isa brown hens.

Keywords: Isa Brown, Turmeric, Sodium Bicarbonate

INTRODUCTION

Domestic poultry is an important sector of livestock keeping worldwide, the production of meat and egg being the major contribution to human nutrition. Taking into account the economic, social and cultural aspect of poultry keeping underlines the huge significance of this sector. There are about 17 billion domestic chickens worldwide (Defra, 2010). Poultry production is one of the best available sources for the production of high biological value animal protein in terms of egg and meat. Commercial hybrids both broilers and layers are being propagated for egg and meat production throughout the world (Ahmad *et al.,* 2010). However there is need to improve the output of the poultry industry through improved performance of the birds. Supplementation of sodium bicarbonate may help to maintain proper pH balance, eliminate acidosis and facilitate metabolic process, ensuring maximum growth and productivity (Abbas *et al*., 2017; Naseem *et al.*, 2005). Moreover, its use as dietary supplement may help rise in blood bicarbonate ion concentration, which can favour better performance of birds (Kaya *et al.,* 2004; Naseem *et al.,* 2005).Turmeric (*Curcuma longa*) is found to be one of such perennial herbs that are used as alternatives to antibiotics and is also found to have anti-oxidative value and certain beneficial pharmacological activities like hypolipidaemic effects. This study was designed to investigate the effects of sodium bicarbonate and turmeric powder on performance and haematological parameters of Isa brown hens.

MATERIALS AND METHODS

The experiment was conducted at the poultry house of Department of Animal Production Abubukar Tafawa Balewa University located in Gubi Village, Bauchi. A total of one hundred and eighty four (184) Isa Brown layers at 51 weeks of age were used for the study, which was conducted during the rainy season (July-October). The hens were kept in deep litter system during the experiment. The control birds were administered feed without sodium hydrogen carbonate salt ($NaHCO_3$) and turmeric powder while the other treatments received diet supplemented with $NaHCO_3$ salt at the level of 0.30 g and 0.70 g, turmeric powder at the level of 0.30g and 0.70g, and the combinations S3OT30, S30T70,

S70T30 and S70T70. During lay, the birds were fed once daily with compounded ration containing 16% crude protein with other constituents of the feed ehich includes vitamins, minerals and amino acid. Water was ad libitum.

Haematological Parameters

At the end of the experiment, six hens were randomly selected from each group and bleed using 2ml syringe at the wing. The blood is collected into collection bottle containing EDTA (ethylene diamine tetra acetic acid) as anticoagulant. Samples were taken thereafter to National Veterinary Research Institute, Vom to determine the packed cell volume (PCV), hemoglobin count (Hb), the red blood (RBC) and white blood counts (WBC).

Data Analysis

Data collected were subjected to analysis of variance using statistical package for social science (SPSS) version 26. Significant means were separated using Ryan Einot Gebriel Welsh (REGW) procedure.

RESULTS AND DISCUSSION

Table 1: Effects of Sodium Bicarbonate salt and Turmeric powder on Performance.

Variable (%)	N	Feed/egg (g)	Feed conversion ratio(g)	(%)Hen day production
Overall		107.87±0.35	71.45±1.03	86.23±0.28
Treatment		***	NS	***
Control	67	107.28 ± 2.45^{bc}	71.52±3.26	85.79 ± 1.96^{bc}
S30	99	102.85 ± 2.35^{de}	65.32±3.26	82.18 ± 1.88^{de}
S70	124	113.08 ± 2.12^{a}	72.63±3.26	90.59 ± 1.70^{a}
T30	115	100.92 ± 2.32^{e}	70.55±3.26	80.62 ± 1.86^{e}
T70	119	109.74 ± 2.29^{bcd}	74.13±3,26	87.79 ± 1.83^{bcd}
S30T30	108	110.61 ± 2.31^{bc}	64.88±3.26	88.40 ± 1.85^{bc}
S30T70	107	113.24 ± 2.31^{ab}	70.03±3.26	90.56 ± 1.85^{b}
S70T30	116	108.39 ± 2.32^{bc}	72.82±3.26	86.62 ± 1.85^{bc}
S70T70	121	105.25 ± 2.29^{e}	81.03±3.26	84.14 ± 1.83^{e}
Month		***		***
July	492	115.35 ± 0.46^{a}		92.14 ± 0.37^{a}
August	205	109.44 ± 0.71^{b}		87.49 ± 0.57^{b}
September	194	101.38 ± 0.73^{d}		80.99 ± 0.58^{d}
October	152	105.28 ± 0.82^{c}		84.28 ± 0.65^{c}

*** =P<0.001, NS=Not Significant

Means for groups with the same are statistically similar

S30 =0.30g, S70=0.70g$NaHCO_3$ salt, T30 =30g, T70= 0.70g turmeric powder inclusion in the diet;

N= Overall 1043

Table 2: Effects of sodium bicarbonate salt and turmeric powder on hematological parameters

Variable Reference values.	N	Packed cell volume 27-42%	White blood cell $1.02\text{-}9.5x10^{9}$ g/l	Red blood cell $2.2\text{-}4.0x10^{12}$ g/l	Hemoglobin Hb 9.5-11.7g/dl
Overall		26.93±0.59	6.33±0.21	1.61±0.15	8.97±0.28
Treatment		NS	NS	NS	NS
S30	6	28.50±1.82	7.72±0.65	2.78±0.46	8.77±0.87
S70	6	25.00±1.82	5.15±0.65	1,23±0.46	10.03±.87
T30	6	25.67±1.82	1.27±0.46	1.27±0.46	8.43±0.87
T70	6	25.00±1.82	1.27±0.50	1.74±0.50	9.72±0.95
S30T30	6	27.50±1.82	1.35±0.46	1.50±0.46	9.13±0.87
S30T70	6	25.33±1.82	1.50±0.46	1.50±0.46	6.92±0.87
S70T30	6	25.00±1.82	1.52±0.46	1.52±0.46	8.48±0.87
S70T70	6	28.00±1.82	1.65±0.46	1.65±0.46	9.33±0.87
Control	6	28.40±1.91	6.14±0.68	1.55±0.48	9.45±0.91

***=P<0.001, NS=Not Significant
Means for groups with the same subsets are similar
S30 =0.30g, T70=0.70g $NaHCO_3$ salt, T30 =0.30g, T70=0.70g turmeric powder inclusion in the diet;
N= overall 60

Table 1 shows the results for effects of sodium bicarbonate salt and turmeric powder on performance. The results revealed that the supplementation of sodium bicarbonate salt and turmeric powder could not affect the feed conversion ratio (FCR). However, significant (P< 0.001) differences were in feed per egg and the hen day production (%HDP). It was observed that birds on inclusion level of 0.70g sodium bicarbonate salt (116.74±0.05) increased feed per egg and decreased hen day production while the least values was obtained on birds fed with 0.30g sodium bicarbonate salt inclusion which decreased feed per egg and increased hen day production. This result disagrees with the findings (Yoruk *et al*., 2004) who reported that feed consumption increased with increasing level of dietary sodium bicarbonate salt supplementation. Hen's diet supplemented with 1.5% $NaHCO_3$ consumed greatest amount of feed. Supplementation of turmeric at inclusion level of 0.70g had a significant (P<0.001) effect on feed per egg which was higher (109.74±2.29) than 0.30g turmeric powder inclusion. More so, birds with 0.70g turmeric supplementation tended to have higher (87.79±1.83) percentage of HDP and the lowest value was recorded on birds fed 0.30g turmeric powder. Yoruk *et al.*, (2004) also reported that hens on supplemented sodium bicarbonate diet produced more eggs than hens that are not on sodium bicarbonate supplemented diet. Monthly feed consumption and %HDP significantly (P<0.01) differ in the month of July (115.35± 0.46 and 92.14±0.37) has the highest

values for feed consumption and %HDP respectively. The lowest were recorded in the month of September (101.38±0.73 and 80.99±0.58) for feed consumption and HDP, respectively.

Table 2 shows the results for effects of sodium bicarbonate salt and turmeric powder on haematological parameters. The results slowed that packed cell volume (PCV), white blood cell (WBC), RBC blood cell (RBC) and Haemoglobin (HB) were not significantly (P>0.05) affected by various levels of sodium bicarbonate salt and turmeric powder.

CONCLUSION AND RECOMMENDATION

From the finding of this research it is concluded that sodium bicarbonate salt and turmeric powder significantly improved performance. It was also concluded that sodium bicarbonate salt and turmeric powder did not affect haematological parameters thereby making it safe for the birds and is therefore recommended for Isa brown hens.

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