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EFFECTS OF MOLASSES OR MOLAVIT SUPPLEMENTATION ON THE RECTAL TEMPERATURE, LIVE WEIGHT GAIN AND HAEMATOLOGY OF COCKERELS DURING THE HARMATTAN SEASON IN NOTHERN NIGERIA.

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SUMMARY

The effects of molasses or molavit supplementation on the rectal temperature, live weight gain and haematology of cockerels during the harmattan season in Northern Nigeria were investigated. A total of 120 hybrid cockerels aged 8 weeks old were used for the study. The cockerels were randomly divided into 3 treatment groups of 40 birds each, with each group having the same number of replicates. Group A was supplemented with 5mls/litre in drinking water; Group B with 5ml / litter also in drinking water, while group C was given only water and this served as the control. The molasses or molavit was administered for 5 days period after every 7 days for a period of 7 weeks. The experiment lasted for seven (7) weeks. The results obtained showed that the mean rectal temperature (RT) value of 41.3°C ± 0.12 recorded from group C cockerels was significantly (P <0.05) higher than the values of 40.9 ± 0.11 and 40.8 ± 0.11°C recorded from group A and B cockerels respectively. The haematological result showed significant (P<0.05) hemoglobin and leukocyte counts in control group C than the values recorded from groups A and B. Also, the percent live weight gain for groups A, B and C were 100 ± 1.5, 133 ± 2.8 and 79.7 ± 1.2%respectively from their initial weights. The result indicated that molasses or molavit ameliorated the effect of stressful harmattan season by reducing the RT and the haematological values of the cockerels. It is concluded that molavit or molasses increased the live weight gains of the cockerels and also combated the stressful effect of harmattan.

KEY WORDS: Effects, Molasses, Molavit, Cockerels, Haematology

INTRODUCTION

Poultry production is vital in the economy of Nigeria, especially now that the Federal Government of Nigeria has placed a ban on the importation of poultry meat and its products. Cockerels are important for meat production as well as fertilization of parent stock. The productions of cockerels and other poultry in Nigeria are hindered by factors, such as diseases, environmental, management and nutritional problems.

Supplementation of poultry feeds has been practiced for long with the aim of augmenting nutritional status, hence increasing the productivity and sustaining the health of birds (McKee and Harrison., 1995; Wong, 1985; Bilal and Cankutay, 2002). Over the years, molasses and molavit were known to be excellent feed supplements used in ruminants for the purpose of fattening (Dalille and Vailant, 1990), but their use in poultry has not gained wide publicity. Molasses in general can be defined as a thick, vicious, usually dark coloured liquid product containing a high concentration of soluble carbohydrates (43% sugar), minerals and certain other materials. Molavit on the other hand, is a combination of molasses and multivitamins (Dalille and Vailant, 1990).

The rectal temperature, live weight and haematological parameters are important parameters often used in evaluating the health

status, productivity and adaptability of animals (Ayo et al., 1998; Minka et al., 2004). The objective of this study was to investigate the effect of molasses or molavit supplementation on rectal temperature, live weight and haematology of cockerels reared during the harmattan season of the year in the Northern Guinea Savannah zone of Nigeria.

MATERIALS AND METHODS

The experiment was conducted at the farm of the College of Agriculture and Animal Science, Ahmadu Bello University, Mando, Kaduna, Nigeria, between December and February 2005. A total of 120 Shika brown hybrid cockerels aged 8 weeks old were used for the study. The cockerels were randomly selected from the main flock in the school farm, and were raised separately in standard deep litter houses.

The cockerels were randomly divided into 3 treatment groups of 40 birds each. Group A was supplemented with one teaspoonful (5ml) of molasses per litre of drinking water, group B, with one teaspoonful (5ml) of molavit per liter of drinking water (i.e. 0.125ml of molasses or molavit in 25ml of water per bird), while group C was not supplemented with anything in water. The molasses and molavit (Table III) were supplemented through the drinking water for 5 consecutive days, and thereafter withdrawn for one week, after which it was replaced again for 5 days. This procedure was maintained for 7 weeks of the experimental period. The standard commercial grower mash compounded by the College of Agriculture and Animal Science, Mando, Kaduna, Nigeria, was used as basal diet for all the birds (Table II).

The meteorological data of the study area were obtained at the meteorological station of the College farm. The rectal temperatures (RT) of forty cockerels per treatment selected randomly were recorded at 06:00, 13:00 and 18:00hrs. The meteorological data were recorded by the aid of a wet and dry-bulb thermometer. The RT was recorded by the aid of a digital clinical thermometer inserted into the rectum through the anus and kept there until the sound of an alarm was heard.

The live weight and blood samples were taken once every week. The live weight was recorded using a standard digital weighing scale, while 2ml of blood samples of 20 cockerels selected randomly from each group were collected through the wing vein into a sterile test tube containing EDTA. At the same time, blood smears were made on glass slides and later stained in the laboratory using Leishman stain. The collected blood sample was analyzed in the College laboratory. Whole blood Packed Cell Volume (PCV) was determined directly after sampling using a microhematocrit centrifuge and reader manufactured by Hawsksley, West Sussex, UK. Hemoglobin (Hb) was determined by the met Hb techniques, (Schalm et al., 1975), while the stained slides were analyzed for differential leukocytes counts which comprised of heterophils, lymphocytes, monocytes, basophils and eosinophils. These were carried out under the microscope oil-immersion objective and 100 cells per slide were counted using the straight edge method as described by Schalm et al., (1975).

The feed consumed by each bird during the experimental period was recorded. The values obtained were subjected to Student's t-test. Data were expressed as mean + standard error of the mean (mean + SEM). Values of $P<0.05$ were considered significant.

RESULTS

The meteorological data (Table I) showed that the minimum ambient temperature of 13.0oC was recorded at 06:00h, while the maximum value of 26.0oC was recorded at 13:00h. The overall mean ambient temperature value was 18.8 ± 1.2oC. The mean relative humidity was 43.3 ± 3.5%. The overall mean result of the RT values recorded in groups A, B and C during the experimental period is shown in Table IV. The RT values recorded before the supplementation of feeds were not significantly (P>0.05) different between the groups. However, during the experimental period, the RT values of 41.1 ± 0.10oC recorded in group C was significantly (P<0.05) higher than the values of 40.9 ± 0.11oC and 40.8 ± 0.11oC recorded in groups A and B, respectively.

The overall results of the percentage live weight gain recorded during the experimental period are shown in Table V. Cockerels in group A gained 100% of their initial live weight, while group B gained 133%, cockerels in group C gained 79.7% of their initial live weights.

The overall results of haematological parameters are shown in Table VI. In group C, with the exception of PCV and RBC, all other values were significantly (P<0.05) higher than the values in groups A and B. The H/L ratio was significantly (P<0.01) higher in group C, with the value of 0.76 ± 0.4 compared to the values of 0.60 ± 0.3 and 0.59 ± 0.3 recorded in groups A and B, respectively.

TABLE I: Ambient temperature and relative humidity during the experimental period.

	Ambient Temperature			
Hour of the day	Mean ± SEM	Maximum	Minimum	Relative humidity (%)
06.00	17.1± 0.4	8.7	13.0	40.7
13.00	24.0 ± 0.2	26.0°C	20.1	48.8
18.00	15.3 ± 0.1	16.0°C	14.5	40.4
Mean SEM	18.8 ± 1.2	20.2 ± 1.4	15.7 ± 1.7	43.3 ± 3.5

TABLE II: Composition of basal diet fed to the cockerels

Ingredient	%
Maize	25.0
Maize offal	39.3
Palm Kernel cake	10.0
Rice offal	10.0
Blood meal	1.0
Fish meal	1.0
Bone meal	3.0
Salt	0.30
Methionine	0.2
Premix	0.25
Groundnut cake	10.0

Source: College of Agriculture & Animal Science, (Feed mill), Mando, Kaduna, Nigeria.

TABLE III: Chemical Composition of Molasses and Molavit

Ingredient	Molasses	Molavit
Moisture (%)	22.6	22.6
Crude Protein (%)	4.8	4.8
Ash (%)	12.4	12.433.0
Sucrose (%)	33.0	52.0
Total Sugar (%)	52.0	0.7
Calcium (%)	0.7	3.7
Potassium (%)	3.7	17.9
Panthotetic acid (Mg/lb)	17.9	0.4
Thiamine (Mg/lb)	-	1.1
Riboflavin (Mg/lb)	-	20.9
Niacin (Mg/lb)	-	0.1
Vit. B12 (Mg/lb)	-	8.6
Choline (Mg/lb)	-	-
Invent sugar (%)	19	-
NFF (%)	60.19	-
Magnesium (%)	0.4	-
Silica (%)	3.4	

Source: Balastrul *et al;* (1992)

TABLE IV: Overall mean rectal temperature (°C) of cockerels in groups supplemented with molasses, molavit and control

	Weeks							
Group	1	2	3	4	5	6	7	Mean ± SEM
A	41.2± 0.10	40.8 ± 0.10	40.8± 0.11	40.8±0.010	40.9±0.10	40.8±0.10	40.9±0.09	40.9±0.11
B	41.1 ± 0.10	40.7± 0.10	40.8± 0.10	40.8±0.10	40.8±0.10	40.7±0.09	40.9±0.10	40.8±0.11
C	41.2 ± 1.10	41.0± 0.10*	41.1±0.12	41.1±0.11*	41.1±0.08	41.2±0.10	41.1±0.12	41.1±0.10

* P<0.05

TABLE V: Effects of molasses or molavit supplementation on live weight gain (g), percentage live weight gain (%) and feed consumed by the cockerels during the experimental period

	GROUPS		
Live Weight	**Molasses (A)**	**Molavit (B)**	**Control (C)**
Initial live weight (kg)	0.64±0.8	0.60±0.7	0.64±0.2
Final live weight (kg)	1.28±0.6	1.39±0.4	1.15±0.5
Live weight gain (%)	100.0±1.2**	133.0±1.0**	79.7±1.0*
Average daily feed intake (g/bird)	71.0 ± 1.23	72.1 ±4.5	60.5±1.3

* =P<0.05; ** = P<0.01; *** =P<0.001

TABLE VI: Haematological parameters of cockerels supplemented with molasses or molavit

Ingredient	%
Maize	25.0
Maize offal	39.3
Palm Kernel cake	10.0
Rice offal	10.0
Blood meal	1.0
Fish meal	1.0
Bone meal	3.0
Salt	0.30
Methionine	0.2
Premix	0.25
Groundnut cake	10.0

Source: College of Agriculture & Animal Science, (Feed mill), Mando, Kaduna, Nigeria.

DISCUSSION

The result of the meteorological data obtained during the study period was outside the thermoneutral zone of 22-28°C established for birds (Leeson, 2000; Jackie, 2004). The result showed that the harmattan season was thermally stressful for the cockerels and could affect their health and productivity. During the period, the cockerels were observed to curdle together in groups in an attempt to keep warm. There were also fewer activities especially in group C. Similar observation that the cold-dry harmattan was stressful to animals was made by Ayo *et al.*, (1998) and Fayomi *et al.*, (2003).

The values recorded in all the groups before and during the experimental period fell within the normal range value of 40-42°C established for poultry (Lesson, 2000). However, the RT values in group A and B showed that molasses and molavit reduced significantly ($P<0.05$) the RT values, thereby stabilizing the homeostatic mechanism of the birds. The result further showed that molasses and molavit were able to reduce to the barest minimum the negative effect of cold harmattan stress acting on the birds, as evidenced in the increased activities of cockerels in groups A and B.

There was no significant ($P>0.05$) difference between the effect of molasses and molavit on RT of the cockerels. The result clearly showed that supplementation of molasses or molavit has significantly ($P<0.01$) increased the live weight gain of the cockerels. This was due to soluble carbohydrates in molasses and molavit known to improve feed quality, acceptability and appetite of the birds (Dalille and Vailant, 1990; Balastral *et al.*, 1992), thereby increasing their feed intake and live weight gain. The increase was more pronounced in cockerels fed with molavit. This

showed that molavit was better than molasses in improving live weight gains in cockerels. This may be due to the high nutritive value of molavit. This is in agreement with the findings of Cullison (1987) that molavit supplementation has significant effects on live weight of livestock.

The haematological values recorded in group A cockerels were not significantly ($P>0.05$) different from those in group B. The result of haematological parameters especially the H/L ratio recorded in group C showed that the harmattan season was stressful to the birds as evidenced by an increase in H/L ratio. H/L ratio has been used as a physiological index of stress (Gross and Siegel, 1983, Pardue et al., 1985, Altan et al., 2003). During stressful period, the value of heterophil is known to increase in number while the lymphocyte reduces in number. The values of H/L ratio obtained in groups A and B showed that molasses and molavit were able to stabilize the haematological parameters within the normal range values of 0.35 to 0.60 established for poultry (Mckee and Harrison, 1995). This showed that molasses and molavit had ameliorated the negative effect of cold stress acting on the birds during the harmattan season, and as such could be used in reducing the effect of cold stress.

CONCLUSION

In conclusion, molasses or molavit supplementation for cockerels was able to increase the live weight gain of the birds and also combated the stressful effect of the harmattan season.

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REFERENCES

ALTAN, O. PABUCCUOGLU, A., ALTAN, A., KONYALIGU, S. and BAYRAKTA, H. (2003). Effect of heat stress on oxidative stress, lipid peroxidation and some stress parameters in broilers. Bri. Poult. Sci., 44:545-550.

AYO, J.O., OLADELE, S. B. FAYOMI, A. JUMBO, S. D. and HAMBOLU, J. O. (1998). Body temperature, respiration and heart rate in the Red Sokoto goat during the harmattan season. Bulletin of Animal Health and Production in Africa., 46: 161-166.

BALASTRAL G.F. AMINU, G. and MACHI, D. (1992). Initial studies on the production and uses of molasses in the feeding of rabbits. J. Applied Rabbit Res., 12(3): 87-92.

BILAL, T. and CANKUTAY, H. (2002). The effect of Vitamin E supplementation on Chromic No2 Toxication in broiler chicken. Indian Vet., J. 79: 126-130.

CULLISON, E. and ROBERT, S.L., (1987). Feed and Feeding, 4th Ed. Faber and Faber London; 212-230.

DALILLA. D. VALIANT, N. (1990). The influence of Molasses and Molavit on the growth of tropical Rabbits. Antarctic Sci., 2(2): 123-127.

FAYOMI, A. AYO, J.O. and OLANIYAN, O. (2003). Diurnal variation in rectal temperature of the West African Dwarf goat during the harmattan season. Proceedings of the 28th Annual Conference of Nigerian Society for Animal Production held at Ibadan, Nigeria, 16-20th March; 34-36.

GROSS, W.B. and SIEGEL, (1983) Evaluation of the heterophil/ lymphocyte ratio as a measure of stress in chicken. Avian Dis., 27: 972-979.

JACKIE, F. (2004). Heat stress in poultry, 1st Ed. Canadian Poultry Consultants, Canada; 5-12.

LEESON, S. (2000). Broiler Feed Management during heat stress period. Dept. of Ani. and Poultry Sci. Geulph, Ontario.

MCKEE, J.S. and HARRISON, P.C. (1995). Effects of supplemental ascorbic acid on the performance of Broiler chickens exposed to multiple concurrent stressors. Poultry Sci., 74: 1772-1985.

MINKA, N.S., FAYOMI, A., and AYO J.O. (2004). Effect of road transportation and ascorbic acids on haematological parameters of pullets during the hot dry season. Proceedings of the 38th Conference of the Nigeria Society of Agriculture, Lafia, Nigeria., 38:655-659.

PARDUE, S. L., THAXTON, J.P. and BRAKE, J. (1985). The role of Ascorbic acid in chickens exposed to high environmental temperature. J. Applied Phy., 58:1511-1517.

SCHALM, O.W. JAIN, N.C., CARROLL, E.J (1975). Veterinary Haematology, 3rd Ed. Lea and Febiger, Philadelphia.

WONG, R. (1985). Supplemental Feed of tropical Africa. Anim. Res., 5(3); 2002-2008.