RUN -11

Blood Metabolites and Carcass Characteristics of West African Dwarf (Wad) Goats Fed Bread Waste and M*oringa oleifera* Leaf

S.K. Ayandiran, S.M. Odeyinka, and J.A. Odedire,
Department of Animal Sciences, Obafemi Awolowo University, A234, Ile-Ife, Osun State. Nigeria.
Corresponding author: S.K. Ayandiran; E-mail: skayandiran@gmail.com

Abstract
The study evaluated the blood metabolites and carcass quality of twenty WAD goats fed bread waste and *Moringa oleifera* leaf. The goats, 6-7 months old were allotted to four treatments (5 goats per treatment) in a completely randomized design. The experiment lasted for twenty weeks. Four concentrate diets (T1, T2, T3 and T4) were compounded by the inclusion of bread waste and *Moringa oleifera* leaf at 0, 25, 50 and 100% respectively. The goats fed diets T2, T3 and T4 had significantly lower ($p<0.05$) cholesterol levels (52.83, 45.11, and 33.69 mg/dl respectively) than T1 (54.89 mg/dl). There was no significant difference ($p>0.05$) among the means of the hematological indices across the treatments. However, the total protein of goats fed diets T2, T3 and T4 were significantly higher ($p<0.05$) than T1. The hot carcass weights of goats fed diets T4 (4.56 kg) and T3 (4.45 kg) were significantly higher than those on diets T2 (4.21 kg) and T1 (4.01kg). The animals fed diet T1 had significant highest ($p<0.05$) value for the lungs, kidney and spleen weight compared to diets T2, T3 and T4. It could be concluded that inclusion of bread waste and *Moringa oleifera* leaf in the diet of WAD goats reduced blood cholesterol level, enhanced flesh deposition in the carcass and no visible abnormalities were observed on the visceral organs.

Keywords: Blood, carcass, WAD goats, Bread waste, *Moringa oleifera*

Introduction

Goat production constitutes very important part of ruminant livestock sub-sector in the Nigerian agricultural economy. They are one of the most important domesticated small ruminants with a population of 29.2 million in Nigeria (Ukanwoko *et al*., 2009). Goats also play a significant role in the nutrition of most Nigerians, as they offer the cheapest sources of meat. Thus, the potential of goat production in alleviating low animal protein intake by man in developing nation needs no emphasis (Ilori *et al*., 2013). The high cost of conventional feedstuffs as well as rapid decline in quality of forages especially during the dry season led to the development of alternative feedstuffs in goat nutrition. Hence, it is necessary to turn attention to the utilization of agro-industrial by-products and forage legumes particularly those that are inexpensive and are locally available all year round as livestock feeds. The plane of nutrition has measurable effect on blood biochemistry and may be used to assess the health status of animals (Ayandiran *et al*., 2016).

Therefore the study examined the blood metabolites and carcass quality of WAD goats fed bread waste and *Moringa oleifera* leaf.

Materials and Methods

Twenty West African Dwarf (WAD) goats (6–7 weeks old) of both sexes were used in this experiment. They were randomly allotted to four treatments in a Completely Randomized Design. The goats in each treatment (five goats) were housed together in a slated floor pens at the Sheep and Goat Unit. Bread waste was collected, oven dried, packaged and stored for subsequent use. Fresh *Moringa oleifera* leaves were obtained from Sheep and Goat Unit, Obafemi Awolowo University Teaching and Research Farm, Ile Ife, Nigeria and air dried for four days. Four concentrate diets (T1, T2, T3 and T4) were compounded with the inclusion of bread waste and Moringa leaf at 0, 25, 50 and 100% respectively which were fed to the goats at 3% of their body weights. On the last day of the experiment, blood samples were taken from the goats using 5 ml syringe. One ml blood sample was collected into labeled sterile bottles containing anticoagulant free bottles, allowed to coagulate at room temperature and centrifuged at 3000 rpm for 10 minutes. The serum concentration of cholesterol, aspartate aminotransferase (AST), alkaline phosphate (ALP) and albumin were determined using commercial laboratory kit (Randox Laboratories Ltd, U.K). The red blood cell (RBC), white blood cell (WBC) and the packed cell volume (PCV) were determined using the method of Adedapo *et al*. (2007). Two goats per treatment were slaughtered by severing both the jugular veins and carotid arteries at the atlanto-occipital arhuculation as reported by Okah, 2006.

Data obtained were subjected to one-way analysis of variance procedure of General Linear Model and the Duncan's New Multiple Range Test option of SAS (2008) was used for mean separation.

Table 1: Gross composition of the experimental diets

Ingredient (%)	T1	T2	T3	T4
Corn bran	40.00	30.00	20.00	-
Brewer's dried grain	40.00	30.00	20.00	-
Bread waste	-	10.00	20.00	40.00
Moringa oleifera	-	10.00	20.00	40.00
Palm kernel cake	16.00	16.00	16.00	16.00
Bone meal	3.00	3.00	3.00	3.00
Vitamin/mineral premix	0.50	0.50	0.50	0.50
Salt	0.5	0.5	0.5	0.5

Results and Discussion

Cholesterol is conventionally used for diagnosing animal's hepatic damage. It was observed that the blood cholesterol level of the animals fed diets containing bread waste and *M. oleifera* was far below the blood cholesterol values reported by Merck (2011) hence confirming *M. oleifera* as a potent hypocholesterolemic agent. Also hematological indices in this study were within normal physiological ranges reported by Jain (1993). The serum metabolites in this study were within the range reported by Merck (2011). There was no significant difference in the means of the dressing percentage of animals in this study. The loin percentage was comparable to 8.05 – 13.15% obtained by Okah *et al.* (2014). The relative internal organ weights (liver, lungs, kidney and spleen) were significantly higher in the control diet (T1). This shows that bread waste and *M. oleifera* leaf in the diets of WAD goats promoted the growth of somatic cells for flesh deposition, but discouraged the growth of visceral organs

Table 2: Hematological and serum metabolites of the WAD goats

Parameter	T1	T2	T3	T4	SEM	PROB.
Cholesterol (mg/dl)	54.89^{a}	52.83^{a}	45.11^{b}	33.69^{c}	5.01	0.04
Packed cell volume (%)	35.33	31.83	32.67	33.67	3.16	0.38
Red blood cell (10^6)	13.47	12.80	12.20	12.47	1.08	0.73
White blood cell (10^3)	10.07	10.00	11.13	11.33	0.56	0.20
Total protein (g/dl)	4.66^{b}	6.37^{a}	6.39^{a}	6.53^{b}	0.26	0.02
Albumin (g/dl)	2.96	2.65	2.72	3.07	0.09	0.52
Globulin (g/dl)	1.70^{b}	3.72^{a}	3.28^{a}	3.46^{a}	0.35	0.05
AST (g/dl)	17.73	17.41	17.34	18.09	1.22	0.21
ALP (g/dl)	4.02	3.92	3.76	4.10	0.32	0.51

Table 3: Carcass quality of goats fed the experimental diets

Parameter	T1	T2	T3	T4	SEM	PROB.
Slaughter weight (kg)	9.88	10.87	10.63	11.38	0.37	0.25
Hot carcass (kg)	4.01^{b}	4.21^{b}	4.45^{a}	4.56^{a}	0.08	0.01
Dressing (%)	41.12^{a}	39.66^{b}	41.66^{a}	40.14^{a}	0.36	<0.0001
Head (%)	21.41	21.42	19.74	20.27	0.31	0.14
Neck (%)	8.47^{b}	7.65^{c}	7.67^{c}	8.91^{a}	0.21	<0.0001
Loin (%)	10.50^{c}	10.00^{c}	11.90^{b}	12.65^{a}	0.20	<0.0001
Liver (%)	5.29^{a}	3.78^{b}	3.47^{b}	2.92^{c}	0.33	<0.0001
Heart (%)	1.29^{c}	1.39^{b}	1.47^{a}	1.42^{a}	0.03	<0.0001
Lungs (%)	2.85^{a}	2.38^{b}	2.34^{c}	2.40^{b}	0.08	<0.0001
Kidney (%)	1.26^{a}	1.18^{ab}	1.17^{ab}	1.09^{b}	0.03	0.03
Spleen (%)	1.40^{a}	0.67^{b}	0.61^{b}	0.59^{b}	0.13	<0.0001

Conclusion

It could be concluded that inclusion of bread waste and *Moringa oleifera* leaf in the diet of WAD goats reduced blood cholesterol level, enhanced flesh deposition in the carcass and no visible abnormalities were observed on the visceral organs.

References

Adedapo, A.A., Omoloye, O.A. and Ohore, O.G. (2007). Studies on the toxicity of an aqueous extract of leaves of *Abrus precatorius* in rats. *Onderstepoort Journal of Veterinary Research,* 74: 31-36.

Ayandiran, S.K. and Odeyinka, S.M. (2016). Carcass quality and blood components of rabbits fed bread waste and *Moringa oleifera* leaf. *Proceedings, 11th World Rabbit Congress*, Qingdao, China. Pp: 745-748.

Ilori, H.B., Salami, S.A., Majoka, M.A. and Okunlola, D. O (2013). Acceptability and nutrient digestibility of West African Dwarf goat fed different dietary inclusion of Baobab (*Adansonia digitata*). *ISOR Journal of Agriculture and Veterinary Science,* 6(3): 22 – 26.

Jain, N.C. (1993). *Essentials of veterinary hematology.* Lea and Febiger Publishers, Malvern, Pennysylvania, U.S.A.

Merck (2011). Merck Sharp and Dohme Corp., a subsidiary of Merck & Co., Inc. Whitehouse Station, NJ, USA.

Okah, U. (2006). Performance of sheep fed varying levels of pigeon pea (*cajanu cajan*) seed in the concentrate diets. Ph.D. Thesis, Micheal Okpara University of Agriculture, Umudike, Abia State, Nigeria.

Okah, U., Anokwuru, R.K. and Onyearu, V.O. (2014). Performance of (WAD) bucks fed differently processed poultry droppings. *Nigerian Journal of Animal Production*, 41: 146 – 156

SAS (2008). SAS Users Guide Statistics, SAS inc. Cary, North Califonia, 2008 edition.

Ukanwoko, A.I., Ibeawuchi, J.A., Ukakchukwu, S.N. (2009). Growth performance and carcass characteristics of West African Dwarf Goats fed cassava a leaf meal based diet. *Proceeding of 34th Annual conference of Nigeria Society for Animal Production. University of Uyo.* Pp: 476 – 479.