NSAP 47th Annual Conference (JOS 2022) CONFERENCE PROCEEDINGS
THEME: SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

EFFECT OFENSILED OR UNENSILED MAIZE COBTREATED WITH NON-PROTEIN NITROGEN AND SOYBEAN MEAL ONGROWTH OF YANKASA SHEEP

***Yahaya Y. A[1], Sadiq M.S[2], Muhammad, I.R[3]**
1. Department of Animal husbandry Services, FMARD Area 11Garki Abuja.
2. Department of Animal Science, Faculty of Agriculture, Federal University of Kashere
3. Department of Animal Science, Faculty of Agriculture, Bayero University, Kano
*Corresponding Author: e-mail: yakububgr@yahoo.com. 08020323216

Abstract
A feeding trial which lasted twelve (12) weeks was carried out to determine the growth performance of growing Yankasa rams fed ensiled and unensiled maize cob treated with non-protein nitrogen sources and Soybean meal. Twenty four (24) Yankasa rams with average weight (11 kg) and aged between 5 to 8 months were randomly allocated to six treatments of four replicates in a Randomized Complete Block Design. The experiment diets were formulated and designated as Treatment A1 (ESBM) : Ensiled Maize cob + Soybean , Treatment B1: (EPL Ensiled Maize cob + Poultry Litter), Treatment C1 (EU): Ensiled Maize cob+ Urea , Treatment A2 (USBM) Unensiled Maize cob + Soybean, Treatment B2 (UPL):(Unensiled Maize cob + Poultry Litter , and Treatment C2 (UU: Unensiled Maize cob+ Urea).The result showed that average daily weight gain (84.72g) in treatment with poultry litter ensiled maize cob was significantly (P<0.05) higher than 66.67g in ensiled urea, 65.27g in unensiled soybean meal and 65.27g in unensiled urea, It was concluded tha tusing maize cob treated with poultry litter, urea and soybean meal ensiled and unensiled enhance crude protein content and reduction of fibre fractions of maize cob. Also improvement of the growthperformance of growing Yankasa rams was achieved. poultry litter ensiled maize cob treatment had better performance.It was recommended, that urea, poultry litter and soybean meal could be used to improve the quality of maize cob to alleviate dry season fed shortage and cost of feeding small ruminants.Treatment of maize cob improved the performance of growing Yankasa rams.

Keywords: Ensiled and Unensiled Maize Cob, Soybean Meal, Granulated Urea.

INTRODUCTION

In the tropics feed resources for livestock are mainly from rangeland complemented with crop residue. Crop residues which are post-harvest materials or roughages left after the removal of the primary feed (grain) from crop plants constitute an important feed for ruminants during the long dry season Finangwai*et al* 2010 Reported that crop residues are generally low in protein and high in cellulose contents, hence low voluntary intake and digestibility. In Nigeria cereal residues such as sorghum, maize, millet stovers and rice straw are the most important feed for ruminants. The need to use crop residues to complement the dry season feed shortages have predicated on the fact that conventional feed have become expensive due to their competitive use by man and livestock. Amongst the cereal crop residues, maize cob is the most abundant but underutilized and has the greatest potential as a basal feedstuff for small ruminants in the savannah. However, the major limiting factors in the utilization of these crop residues are its cellulosic fibers and low protein contents consequently low digestibility and relatively poor nutrient composition Al-maadhidi *et al* 2010. Therefore, this study was design to assess the growth performance of growing Yankasa Rams fed Maize cob ensiled with different non-protein sources.

MATERIAL AND METHODS

Location of the study

The experiment was conducted at Kaduna Sate Veterinary Department in Birnin Gwari Local Government Area of Kaduna state. The State is located in the Northern Guinea Savannahit has an area of about 48,473.2 square kilometers with a projected population of 8.9 million KDBS 2020. The State has a suitable climate and

environmental conditions favourable for cereal crop production and is becoming notable especially for maize production Ammani *et al* 2012.

Experimental animals and their management

Twenty four (24) Yankasa rams weighing 11 ± 02 kg and aged between 5 to 8 months were used for the experiment. The animals were purchased from Kara market, Birnin Gwari, Kaduna State. Animals were fitted with neck band for identification. The animals were quarantined for two weeks and prophylactic treatments were carried out. The animals were managed intensively and group fed with cowpea hay, groundnut haulm and wheat offal before the commencement of the experiment. Water and salt lick were provided *ad-libitum.*

Feed formulation and experimental design

Maize cobs were collected from Dawakin Bassa in Birnin Gwari LGA of Kaduna State. Poultry litter were obtained from deep litter poultry while urea and soybean which were obtained from Kasuwan Gwari Market in Birnin Gwari. Maize cobs were ground using maize threshing machine to 5cm and below size, poultry litter was sundried for 5 days at 8 hours per day to prevent fermentation. Three hundred kilograms of each of the experimental treatments were produced for the feeding trial. The materials were ensiled for 21 days and polythene was used to further seal the silo after filling to allow air tight medium for adequate fermentation.The experiment diets were formulated and designated as Treatment A1 (ESBM) : Ensiled Maize cob + Soybean , Treatment B1: (EPL Ensiled Maize cob + Poultry Litter), Treatment C1 (EU): Ensiled Maize cob+ Urea , Treatment A2 (USBM) Unensiled Maize cob + Soybean, Treatment B2 (UPL):(Unensiled Maize cob + Poultry Litter , and Treatment C2 (UU: Unensiled Maize cob+ Urea) in a Complete Randomized Design (CRD).

Data Collection

Feed intake

The animals were housed individually and provided with water *ad libitum.* The experimental diets formulated were given to the animals every morning between 7:00am-7:30am daily throughout the period of the study at the rate of 5% of their body weights.

Live weight changes

Prior to the commencement of the experiment, the experimental animals were balanced for weight and allocated into six treatment groups. The initial weights were taken and the animals were thereafter weighed weekly in order to find out their liveweight changes, the live weight changes were determined by difference (final-initial), the daily record of the feed intake was obtained by subtracting the quantity of left over from.

Chemical analysis

Experimental diets were analysed in the Department of Animal Science Laboratory Bayero University, Kano for dry matter (DM), crude fibre (CF), ether extract (EE), nitrogen free extract (NFE)according Van Soest*et al* 1991. The acid detergent fibre (ADF) and neutral detergent fibre (NDF) were analysed according to the procedure of Van Soest*et al* 1991. Metabolizable energy of the diets was estimated using the method of (A.O.A.C. 1990).:Metabolizable energy [(ME) Mekcal/Kg] = 37(%CP) +81.1(%EE)+35.5(%NFE) Cellulose = ADF – ADL , Hemicellulose = NDF –ADF. Organic matter (OM) = DM - ASH.

Data analysis

Data generated were subjected to analysis of variance (ANOVA) using SAS 2002 Significant means were separated using least significance difference test (LSD) at 5% probability level.

Result

Table 1: Chemical Composition (%) of Basal Diets

TRT	A_1(ESBM)	B_1(EPL)	C_1(EU)	A_2(USBM)	B_2(UPL)	C_2(EU)	SUPPL
Dry Matter	95.59	94.65	95.28	95.56	97.53	96.96^{a}	91.93
Crude Protein	9.66	7.75	6.56	10.43	13.17	11.48^{b}	16.36
Ash	5.78	5.43	3.62	5.18	6.17	5.46	10.21
Crude Fibre	33.57	33.56	32.82	35.44	46.00	38.48	27.59
Ether Extract	3.43	3.27	3.29	3.15	3.11	3.11	6.46
Nitrogen Free Extract	48.33	49.99	54.04	44.21	31.55	45.45	43.92
Acid Detergent Fibre	36.66	40.29	40.75	33.90	46.20	44.86	37.44
Neutral Deterg. Fibre	76.12	81.75	82.91	81.67	87.99	89.63	48.39
Acid Detergent Lignin	19.22	13.75	16.36	17.57	18.47	17.99	7.27
Cellulose	17.44	26.55	24.40	16.33	27.73	27.54	30.19
Hemicellulose	39.47	41.46	42.15	45.10	41.79	44.77	10.37
Energy.	2351.30	2326.72	2428.58	2210.83	1859.13	2290.23	2590.47

A_1(ESBM): Ensiled Maize cob + Soybean , B_1(Ensiled Maize cob + Poultry Litter ,C_1(EU) Ensiled Maize cob+ Urea , A_2(USBM): Unensiled Maize cob + Soybean ,B_2 (Unensiled Maize cob + Poultry Litte C_2 (UU) Unensiled Maize cob+ Urea SUPPL: Supplementary diet

Table 2: Growth performance of growing Yankasa rams fed experimental diets

	A_1(ESBM)	B_1(EPL)	C_1(EU)	A_2(USBM)	B_2(UPL)	C_2(UU)	LSD
Initial Weight (kg)	11.63	11.75	11.88	11.88	11.38	11.63	2.047
Final Weight(kg)	18.50^{ab}	19.38^{a}	17.88^{ab}	17.55^{b}	18.63^{ab}	17.50^{b}	1.856
Water Intake(litre)	2.31^{a}	2.23^{ab}	2.26^{ab}	2.08^{c}	2.25^{ab}	2.19^{b}	0.076
Total Weight Gain(kg)	6.875^{abc}	7.63^{a}	6.00^{bc}	5.67^{c}	7.25^{ab}	5.87^{c}	1.305
Average Daily Gain(g)	76.33^{abc}	84.72^{a}	66.67^{bc}	65.28^{c}	80.56^{ab}	65.27^{c}	14.495
Concentrate Intake(g)	298.62^{a}	297.93^{ab}	298.79^{a}	296.82^{b}	298.58^{a}	298.43^{a}	1.371
Basal Diet Intake(g)	290.77^{c}	334.27^{a}	311.59^{b}	295.81^{c}	292.30^{c}	296.74^{c}	9.198
Total DMI (unit)	589.39	632.2	610.38	592.63	590.88	595.17	??
Feed: Gain	7.71^{bc}	7.49^{c}	10.79^{a}	9.89^{ab}	7.37^{c}	9.14^{ab}	2.128

a,b,c Means with different superscripts within the same row are significantly different ($P<0.05$) A_1(ESBM): Ensiled Maize cob + Soybean , B_1(Ensiled Maize cob + Poultry Litter ,C_1(EU) Ensiled Maize cob+ Urea , A $_2$(USBM): Unensiled Maize cob + Soybean ,B_2 (Unensiled Maize cob + Poultry Litte C_2 (UU) Unensiled Maize cob+ Urea

DISCUSSION

Chemical Composition of the Experimental Diets

The high dry matter (DM) of the ensiled haylage (material) in the present study Table 1 might be attributed to the nature of the experimental material. The crude protein content of the basal diets obtained in the present study was in agreement with the 8% CP recommended for ruminants Norton, (1998), as cited in Ashiru, (2014). The

supplementary diet (16.25%CP) offered during the experiment could probably help in providing adequate nitrogen required by rumen microbes. The chemical composition of the basal diet: dry matter, crude protein, neutral detergent fibre, crude fibre, acid detergent lignin and nitrogen free extract values were similar to Eniolorunda *et al* 2010 when poultry litter was used to improve the quality of fermented maize cob and Adebowale *et al* 2013 when corn cob was treated with water, lye, poultry litter and urea (different nitrogen sources). Therefore, the general increase in crude protein content as a result of treatment with different nitrogen sources (urea, poultry litter and soybean meal) was reported byBen Salem 2004, as cited in Ashiru, R (2014). Who reported that chemical, biological, physical treatments and/or supplementation enhance nutritive value.The decreasing pattern of dry matter content with the increasing period of ensilage could be due to the effect of fermentation which is in line with Aruwayo *et al* 2011) and Kanengoni *et al* 2015. The crude fibre values in the present study meet the minimum requirement for ruminants Benerjee (2007), but lower than 31.13% to 35.11% reported by Eniolorunda *et al* 2010 and 32% to 37% reported by Nayawo, 2010.

Growth Performance

All the experimental rams fed ensiled or unensiled maize cob treated with urea, poultry litter and soybean meal based diets gained weight. The average daily weight gain was higher in animals fed poultry litter ensiled maize cob diet. The average daily gain in this study was similar to reports by Sirajo et al 2020; Ashiru, (2014. This indicates quality improvement of non-protein nitrogen sources used in the feeding improved growth of the rams. The average daily gain recorded is in agreement with Ashiru 2014, although it is higher than Ibhaze, and Fajemisin (2015). who reported 29.00g/day to 38.44g/day when West African Dwarf were fed naturally fermented maize cob based diets, but lower than 18.3g/day reported by Al-maadhidi *et al* 2010,when urea treated corn - cobs was offered as a replacement of concentrate.

Conclusion

It was concluded that maize cob treated with poultry litter, urea and soybean meal, ensiled and unensiled enhance crude protein content and reduction of fibre fractions of maize cob. Also improvement of the growth performance of growing Yankasa rams .Treatment B_1(Ensiled Maize cob + Poultry Litter poultry litter) had shown better performance.

REFERENCES

A.O.A.C. (1990). Official Methods of Analysis 15th Edition, Association of Official Analytical Chemists Arlinton V.A, U.S.A. 1094pp.

Adebowale N. F., Oluwatosin, B. O., .Oluwasola J. A. and Olufemi P.A. O. (2013). Growth Response of West African Dwarf Goats Fed Differently Treated Corncob Silage Diets. Retrieved on3/12/2015 from https://www.academia.edu.

Al-maadhidi, J. F. and AL-khatib, M. T. 2010. Digestion of fiber and increased Crude Protein in Corn-cobs. *Journal of MadenatAlelem college???* 2: 28-29.

Ammani, A.A., Ja'afaru, A.K., Aliyu, J.A. and Arab, A.I. (2012). Climate Change and Maize Production: Empirical Evidence from Kaduna State, Nigeria retrieved from http://dx.doi.org/10.4314/jae.v16i1.1Journal of Agricultural Extension Vol. 16 (1), June 2018.

Aruwayo, A., Maigandi, S.A., Malami, B.S., and Daneji A. I. (2011) Haematological and Biochemical Parameters of UdaLambs Fed Graded Levels of Alkali -Treated Neem Kernel Cake. *Nigerian Journal of Basic and Applied Science* (2011), 19(2): 277-284

Ashiru, R. M. (2014) Quality assessment and utilization of sugar cane waste with non-protein nitrogen sources and soybean meal by yankasa sheep. Ph.D Thesis, Department of Animal Science, Faculty of Agriculture, Bayero University, Kano, Nigeria.

Ben Salem, H., Nefzaoui, A. and Makkar, H.P.S. (2004 November). Towards better utilization of non-conventional feed resources by sheep and goats in some African and Asian countries. In: *Nutrition and feeding strategies of sheep and goats under harsh climates*. Proceedings of the Ninth Seminar of the Sub-Network on Nutrition of the FAO-CIHEAM Inter-Regional Cooperative Research and Development Network on Sheep and Goats, Hammamet (Tunisia).

Benerjee, G.C.(2007). *A Textbook of Animal Husbandry* (8th edition). Oxford publishing Co.PVT, Ltd.New Delhi, Pp 1079.

Eniolorunda, O. O., Olarinwa, O. S. and Fajemisin, A. N. (2010) Effects of water levels on the nutritive value of poultry litter in fermented maize cobin O. J. Ifut, I. P. Akpan, U. A. Inyang and I. E. Ebeso (eds). **Diversifying Nigeria's Economy**: Animal Production Option. Proceedings of the 15th annual conference of Animal Science Association of Nigeria held at University of Uyo, Nigeria.

Finangwai, H. I., Ehoche and Akpa G. N. 2010. Effect of urea treated maize stover based complete diets on biochemical changes in the rumen and blood parameters of crossbred WHAT? Bullin O. J. Ifut, I. P. Akpan, U. A. Inyang and I. E. Ebenso (eds). Diversifying Nigeria's Economy: Animal Production Option. Proceedings of the 15th annual conference of Animal Science Association of Nigeria held at University of Uyo, Nigeria. Pp.?

Hamad M.R, Safaa N. A., Aiad, A.M.,Mohamed, S . A. and Soliman, N. A. M. (2011). Replacement Value of Urea Treated Corn with Cobs for Concentrate Feed Mixture in Pregnant Ewes Rations Retreived on 11/3/2016 from www.engineerspress.com.

Ibhaze, G. L. and Fajemisin, A. N. (2015). Blood Metabolites of Intensively Reared Gravid West African Dwarf Goats Fed Pulverized Biofibre Wastes Based Diets. *Animal Research International* 14(1): 2598 – 2603 Retrieved on 2/5/2016 from https://www.unn.edu.ng/wp.

Kaduna State Bureau of Statistics (KDBS) (2020). Projected Kaduna State Population. Retrieved 23/1/2020 from https://kdbs.ng/domains/demography/.

Kanengoni, A. T. Chimonyo, M. Ndimba, B. K. and Dzama, K. (2015). Potential of Using Maize Cobs in Pig Diets - A Review. *Asian-Australasian journal of animal sciences*, *28*(12), 1669–1679. Retrieved on 2/3/2018 from doi:10.5713/ajas.15.0053.

Nayawo, A.A., 2010. Performance of Kano Brown Goats Fed Different Levels of Rice Milling Waste as a Replacement of Wheat Offal. M. Sc. Thesis, submitted to the Department of Animal Science, Bayero University, Kano, Nigeria.

Norton, B.W. (1998). The nutritive value of tree legumes. In: Gutteridge, R.C., Shelton, H.M. (Eds.), *Forage trees legumes in Tropical Agriculture*. Tropical Grassland Society of Australia Inc., St Lucia Queensland.

Pauzenga, U. (1985) Feeding present stock. *Zooteca international* pp 22-25.

Rinne, M. ,Jaakkola, S., Huhtanen, P. (1997). Grass maturity effects on cattle fed silage-based diets. On Organic matter digestion, rumen fermentation and nitrogen utilization. *Animal Feed Science and Technology*, **67**: 1-17.

SAS (2002). Statistical Analysis Software (CDROM), Version 8.1, SAS Institute Inc., Cary, N.C., USA.

Sirajo A., Maigandi S.A., Malami B.S. and Daneji A.I. (2010). Nutritional Evaluation of Poultry Litter Waste Fed to Growing Uda Sheep. in O. J. Ifut, I. P. Akpan, U. A. Inyang and I. E. Ebeso (eds). *Diversifying Nigeria's Economy: Animal Production Option*. Proceedings of the 15th annual conference of Animal Science Association of Nigeria held at University of Uyo, Nigeria.

Van Soest, P.J., Robertson, J. B., & Levis, B.A. 1991. Methods for dietary fibre neutral detergent fibre and nonstarch polysaccharides in relation to animal nutrition. Journal of Dairy Science 74: 3583-3597