Analysis of the Nutritional Content of Sugar cane Waste Ensiled with different levels of cowpea seed residue (*Vigna unguiculata*) for Animal Feeding in Adamawa State.

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Abstract

An experiment was conducted to determine the nutritional composition of sugar cane peels and tops ensiled with different levels of cowpea seed residue. Four silo pits measuring 1m x 1m x 2m were used. The four silo pits were tag T_1, T_2, T_3 and T_4, treatment one (1) which is the control, contains only sugarcane peel and tops in a polythene bag and buried in the silo pit. The sugarcane waste was properly mix with the cowpea seed residue at inclusion level of 4kg, 8kg and 12kg respectively for T_1, T_2, T_3 and T_4, in a completely randomized design. The four diets were properly ensiled in the silo pits under anaerobic condition for 30 days. Data collected at the end of the experiment were temperature and the proximate composition of the feed samples. The result of the experiment showed a significant (<0.001) difference between all the treatment groups. Considering the result there is a high level in the nutrient level of the diets as the level of inclusion of cowpea seed residue increases. The highest level of inclusion which is the 12kg inclusion level contains the highest nutrient level. Farmers are advices to use 12kg of cowpea seed residue in every conventional bag of sugarcane waste for silage making in order to provide quality feed during the periods of feed shortages which usually coincide with sugarcane availability.

Key words: Sugarcane peels, silo, cowpea, silage anaerobic

Introduction

Ruminant animal production in many developing countries of the world is large limited by unavailability and high cost of feeds. Low quality feeds are considered feeds are considered to be the major constraint hampering productivity of farm animals. The unavailability of feed in more persistent in the dry season when natural pastures mature and become highly fibrous and low in crude protein content (Oni *et al.,* 20101). Non-conventional feeds offer the best alternative in our environment for the reduction of feed cost and therefore a reduction in the cost of meat and other animal products (Finangwai *et al.,* 2015). Sugarcane scraping is obtained by scraping the outer part of the stem with knife to remove the bark on the stem that provides protection to the underlying cells. The scrapings consist of wax, pigments and fibrous materials of the rind and a small quality of the parenchyma cells. After scraping, the materials lies wasted littering in both rural and urban settlements constituting environmental pollution. Livestock such as cattle sheep and goats scavenge these residue possible uses of these. Scrapings include feeds for livestock, fuel for cooking, as a mulching material for plant and when decayed could constitute a source of manure for the soil. The proximate composition of sugarcane waste show that the dry matter is about 87.6%, crude protein 3.2%, crude fibre 12.7%, ether extract 2.8%, ash 12.8%, N.F.E. 77.1% and a grass energy of 2.84Mca/kg (Alu, *et al.,* 2915).

Cowpea is one of the most popular grain legumes in Africa as well as some regions in America and Asia. It is often called a black eyed pea. The fresh or dried seed pods and leaves are used as human food. Since they are highly valuable for food, cowpea are only occasionally used to feed livestock, but the hay can be an important fodder. Dual purpose varieties have been develop in

order to provide both grains and fodder. Cowpea waste, such as cowpea waste, such as cowpea seed waste and cowpea hulls have been used to replace conventional feed stuffs in some developing countries (Ikechukwu, 2000). Cowpea seed waste is a by-product obtained from the local production of bean cake. Some households sells bean cake to earn a living or alleviate poverty. The residue is being disposed or scattered on the ground. Its potential for feeding animals is not yet receive wide attention (Adebowale and Taiwo, 1996). Ensiling is a feed processing technique which enhance the feeding value of agro-industrial by-products and other potential plant feedstuffs by reducing the level of toxicants where present, improving the nutrient value, acceptability of feed and utilization of animals. It has been report that unconventional could be conserved and their nutritional value improved by way of ensiling the feed materials which aimed at controlling microbial fermentation that could improve the feeding value of feed ingredient. This study aimed at evaluating the nutritional composition of sugarcane waste ensiled with cowpea seed residue at different levels as a feed for ruminant animal.

Table: 1 Proximate Analysis and Temperature of Feed Samples

Parameters	T_1(0kg)	T_2(4kg)	T_3(8kg)	T_4(12kg)	SEM
Dry Matter %	83.25^{a}	81.65^{a}	81.60^{a}	81.60^{a}	1.227^{NS}
Crude Protection	2.43^{d}	4.69^{c}	5.72^{b}	7.83^{a}	0.007***
Crude Fibre %	46.16^{a}	36.71^{b}	34.55^{c}	31.28^{d}	0.007***
Ether Extract	3.75^{b}	4.87^{ab}	5.15^{ab}	6.00^{a}	0.007***
Ash %	2.01^{a}	3.40^{b}	3.84^{b}	4.22^{a}	0.01***
N.F.E %	32.90^{a}	31.98^{c}	32.32^{b}	30.77^{d}	0.141**
Temperature ^{0}C	37.60	38.80	40.80	41.80	

a, b, c, d – Row means with different superscript are either significant at <0.05 or highly at p<0.01: SEM (standard error of mean).

Materials and Methods

The study was carried out at the teaching and research farm of the Department of Animal Science and Range Management, Modibbo Adama University of Technology, Yola to determine the nutrient of quality of sugarcane waste ensiled with different levels cowpea seed residue (Vigna unguiculata). Sugarcane waste was collected from the selling points in Yola, Adamawa State Capital, foreign materials were removed and chopped to 2-3 cm length to ease mixing and compaction. The description of the place was as indicated by Adebayo and Tukur (1991). Four (4) different silo pits were dugged measuring 3ft deep, 1m wide and 2m length. Four different diet was prepared. The chopped sugarcane waste was mixed with different levels of cowpea seed residue. The cowpea seed residue was obtained from who engage themselves in local production of bean cake-Diet one (1) which is the control contain only sugar cane waste with no cowpea seed waste, which diet two (2) contain sugarcane waste which was thoroughly mixed four (4) kilograms (kg) of cowpea seed residue, diet three (3) and Four (4) contain sugarcane waste mixed with eigth

(8) and twelve (12) kilogram (kg) of cowpea seed residue respectively. The four diets were put in to a conventional grain sack and put in to the silo lined with polythene sheet. It was covered with the sheet, trampled and covered with silo. After thirty (30) days ensiling, temperature and samples of the ensiled materials from each of the experimental diets for analysis using the completely randomized design. The representative were analysed for Dry matter (DM), crude protein (CP), crude fibre (CF), ether extract, Ash and Nitrogen free extract (N.F.E.) according to AOAC (2005) procedures. Data generated were subjected to analysis of variance (ANOVA) according to Steel and Torrie (1980). Where significant ($P<0.001$) different between means exist, least significant (LSD) was used to separate the means (Steel and Torrie, 1980)

Result and Discussion

The result of the study were summarized in Table 1. The result of the temperature of the ensiled materials which had a role to play in the formation process of the silage making shows that it ranges from 37.6 – 41.8^{0}C. Also temperature range of 29.40 – 45^{0}C was reported as satisfactory silo temperature Amodu and Abubakar 2994. The result of the proximate composition of the different diets showed a significant ($P<0.001$) difference across the treatment groups. The dry matter content range between 81.60 – 83.25% which did not show any significant difference among the groups. The crude protein content increases among the treatment groups as the level of cowpea seed residue increases and shows a significant difference ($P<0.001$) among the groups, it ranges from 2.43 – 7.83 which is closer to the value of 8% defined as the crude protein by ruminants (Norton, 2003) and is similar to the result obtained by Ngele, 2006. The crude fibre content of the diets decreases as the level inclusion of cowpea seed waste increases and this is as the result of activities of micro-organisms which are known for bioconversions of carbohydrate to protein (Ashiru and Maigandi 2013). The result also shows that the ash content also increases as the level of inclusion increases, it ranges from 2.01 – 4.22, and the ash content is much higher than the value of 1% as reported by Boda, 1990, but lower than that of Maigandi *et al.*, 2004. The result for ether extract EE also increases as the level of inclusion increase while the result ranges from 30.77 – 32.90. The result of EE obtained in this study is lower than that reported Yahya *et al.*, 2017 who reported 3.15 and 3.05 for ensiled and non-ensiled sugarcane tops.

Recommendation

Based on the result obtained from this study farmers are advised to ensiled sugarcane peels which is available during the extreme dry season when ruminants are facing scarcity of feeds, with high level of cowpea seed residue which is obtained free of charge from women preparing bean cake can improve it nutrient content and provide quality feeds to the animals.

Reference

Adebayo, A. A. and Tukur, A. L. (1991). Adamawa Sate in Maps. Fist Edition Paracellete Publishers, Yola.

Adebowale, E. A. and Taiwo, A. A. (1996). Utilization of crop residues and agro-industrial by-products as complete diets for West African dwarf sheep and goats. *Nigerian Journal of Animals Science* 23 (2): 153 – 160.

Alu, S. E. (2015). Primer of Animal Nutrition and Biochemistry. First Edition. Pp. 121 -122. Onaivi Publishing Co. Keffi, Nigeria.

Amodu, J. T. and Abubakar S. A. (2004). Forage Production and Management in Nigeria. Proceedings of Training Workshop on Forage Production and Management, NAPRI, Shika, Nigeria.

A. O. A.C. (2005). Association of Official Analytical Chemist. Official Methods of Analysis 18th Edition AOAC, Inc. Arlington, Virginia, U.S.A.

Ashiru *et al.*, (2013). Nutritional quality enhancement of Sugarcane with Soya bean residue. Proceedings of 18th Annual Conference of ASAN – NIAS, September, Abuja, Nigeria.

Boda, K. (1990). Non-Conventional feedstuff in the Nutrition of farm Animals. Alservier Publishing Company Inc.

Finangwai, H. I., Enoche, O.W. and Akpa, G.N. (2008). Effects of Urea treated Maize stover based Complete diet on intake and growth rate of Friesian x Bunaji bulls. Proceedings of 13th Annual Conference of ASAN, A.B.U. Zaria, September, 2008.

Ikechukwu, J. (2000). Cowpea hulls as a protein feed stuff for broilers. M.Sc. thesis Animal Nutrition and biochemistry, University of Nigeria pp.47-49.

Maigandi, S. A., Adebiyi, B.Z. and Manga, S.B. (2004).Chemical Composition of ensiled-fore stomach, digesta from animals slaughtered at Sokoto abattoir. Proceeding of 29th Annual Conference of Nigerian Society for Animal Production.

Ngele, M.B. and Adebola, T.A (2006). Nutritional value of rice strew treated with poultry litter. Proceedings of 31st Annual Conference of Nigerian Society for Animal Production. B.U.K.

Oni., A. O., Arigbode, M. O., Oni, O. O., Onwuka, C. F. I., Anele, U. Y., Oduguwa, B. O. and Yusuf, K. O. (2010). Effects of Feeding different levels of (*Manihot esculenta*) based concentrate with (*Ponicum maximum*) based diet on performance of growing West African dwarf goats. *Livestock Science*. 129(1-3).

Steel, R. G. D. and Torrie, J. H. (1980). Principles and Procedures of Statistics. A. Biometric Approach 2nd Edition. McGraw-Hill, New York.

Yahya M. M., Midau, A,. and Sarki, I. (2017). Chemical Composition of ensiled (ESCT) and non-ensiled Sugarcane tops (NESCT) in Adamawa State, Nigeria. Proceeding of 6th ASAN-NIAS Joint Annual meeting, September, 10 – 14, Abuja.