COMPOSITION OF RICE STRAW ENSILED WITH UREA AND MOLASSES AT VARYING LEVELS

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ABSTRACT
Feeding rice straw only does not provide enough nutrients for ruminants to maintain high production levels due to the low nutritive value of this highly lignified materia also these high level of lignification and low nitrogen content are the main deficiencies of rice straw, affecting its value as feed for ruminants. Urea is fed as a replacement for a part of the protein in a ration. Urea is frequently included in ruminant diet to partially replace protein ingredients. Molasses help in facilitating the natural preservation by lowering the PH and producing lactic acid bacteria also molasses is added in Ruminant diet as a source of energy. The objective of this researchwas to assess change in nutritional composition of rice straw ensiled with urea and molasses at varying levels. Complete Randomized Design (CRD) was used in this experiment ,with four treatments and three replications each. The treatments were A (1kg of Rice Straw + 20g molasses + 40g Urea), B (1kg of Rice Straw + 40g molasses + 40g Urea), C (1kg of Rice Straw + 60g molasses + 40g Urea) and D (1kg of Rice Straw + 80g molasses + 40g Urea).Sample were thoroughly mixed and ensiled for a period of five weeks. At the fifth week the samples were opened and taken to the laboratory for proximate and minerals analyses. Crude protein content had a significantly (P<0.05) higher value in treatment C (32.56%) which had 60g molasses, followed by treatment B (27.57%) with 40g molasses, then treatment D (24.95%) with 80g molasses and the least value was obtained in treatment A (23.64%) which had 20g molasses. The Crude Fiber CF was higher in the treatment D (19.01%) with 80g molasses, followed by treatment A (16.51%) with 20g molasses, then treatment B (1 5.01) with 40g molasses and the least value was obtained in treatment C (12.01%) which had 40g molasses. The calcium content recorded significantly (p<0.05) higher value in treatment C(2.36%) which had 60g molasses, followed by D (2.12%) with 80g molasses, then treatment A (1.76%) with 20g molasses, and the least value was in recorded in B (1.23%) with 40g molasses while phosphorous content had significantly (p<0.05) higher value in treatment A (12.85%) with 20g molasses, followed by C (12.45%) with 60g molasses, then B (12.25%) with 40g molasses, the least value was obtained in treatment D (11.95%) which had 80g molasses. Conclusively this study indicated that Rice Straw ensiled with varying levels of molasses and Urea was improved nutritionally.

INTRODUCTION

Livestock production in the Tropics is faced with a major challenge of lack of available, quality and cheap feedstuff and about 70-80 % cost of feed goes to feed and these feeds are not readily available, due to seasonality, scarcity and also competition between man and animals. However to reduce cost and competition between man and animal, the use of alternative and inexpensive feedstuff such as crop residues and agro industrial by- products is necessary. Rice straw is a by- product produced after grain and chaffs have been removed. It is primarily composed of fiber including cellulose, hemicelluloses, silica and lignin. Feeding only rice straw does not provide enough nutrients to the ruminants to maintain high production levels due to the low nutritive value of this highly lignified material (Nwandu, et al., 2019). The high level of lignifications and silicification, the slow and limited Ruminal degradation of the carbohydrates and low content of nitrogen are the main deficiencies of rice straw, affecting its value as feed for ruminants Nwandu, et al., 2019. Urea is fed as a replacement for a part of the protein in a ration. Urea is frequently included in ruminant diet to partially replace protein ingredients. Molasses is a byproduct of the sugar beet and sugar cane refinement processes, molasses is suitable for feeding ruminant, easy to use, effective, palatable, and contain some concentrated nutrients, molasses help in facilitating the natural preservation by lowering the PH and producing lactic acid bacteria also molasses is added in Ruminant diet as a source of energy. The main

objective of this research is to assess change in nutritional composition of rice straw ensiled with urea and molasses at varying levels.

MATERIALS AND METHODS

Study Area

The laboratory experiment was conducted in the Animal science laboratory, faculty of Agriculture, Kebbi State University, Aleiro Local Government in Kebbi State.

Data Collection

Rice straw was collected from the local farmers in Jega and was chopped to small particles size, and urea was purchased from Aleiro market while molasses was purchased from Kano .

Treatment of Rice Straw

4 kg of rice straw was sprayed on a clean, hygienic, concrete floor. Then urea and molasses at the rate of 40g: 20g, 40g:40g, 40g:60g, 40g:60g and 40g: 80g were added each to 1kg of the rice straw respectively, urea and molasses were mixed and dissolved in water before mixed with Rice straw.

Experimental Design and Ensiling Procedure

Complete Randomized Design (CRD) (teel and Torrie,1980) was used in this experiment ,with four treatments and three replications each. The treatments were A (1kg of Rice Straw + 20g molasses + 40g Urea), B (1kg of Rice Straw + 40g molasses + 40g Urea), C (1kg of Rice Straw + 60g molasses + 40g Urea) and D (1kg of Rice Straw + 80g molasses + 40g Urea) the sample were thoroughly mixed and ensiled for a period of five weeks.

Table 1: Gross composition of the Ensiled Rice Straw with Molasses and Urea

Ingredient	A(20)	B(40)	C(60)	D(80)
Rice Straw (Kg)	1	1	1	1
Molasses (g)	20	40	60	80
Urea (g)	40	40	40	40

Twelve (12) bottles of 946ml capacity were used as laboratory silos (Ogunlolu *et al.,* 2010). Procedure of Roy and Rangneker (2006) was followed in which 40g urea was dissolved in water and sprinkled on 1kg of rice-straw, .the sample was ensiled for 5 weeks in triplicate .masking tape was used to further seal and to identify and differentiate the bottles after filling weighed materials and compressed.

Chemical Analysis

After (5 weeks) the ensiled samples were opened and collected for analysis, the sample mixture was analyzed for proximate composition using AOAC (2000) procedures.

Statistical Analysis

The data obtained subjected to analysis of variance (ANOVA) as described by Steel and Torrie (1980) separation of significantly different means was carried out using Duncan.

RESULTS AND DISCUSSION

Table 2 showed the proximaye analysis of rice straw ensiled with urea and molasses at varying levels. The Dry Matter DM contents were significantly ($p<0.05$) different. The dry matter content was higher in treatment C (97.60%) followed by treatments B (97.20%) and D (97.10%) and the least value was obtained in treatment A (96.51%). Also the Crude Protein content had a significantly ($P<0.05$) higher value in treatment C (32.56%), followed by treatment B (27.57%), then treatment D (24.95%) and the least value was obtained in treatment A (23.64%). The Crude Fiber CF was higher in the treatment D (19.01%), followed by treatment A (16.51%), then treatment B (1 5.01) and the least value was obtained in treatment C (12.01%). The DM and CP contents in the present study were higher than what was reported by Ngi et al., 2006 (DM 92.8: CP:4.2) and Peripolli et al 2016 (DM 90.6: CP:4.2). Chemical composition determines the nutritional quality of feed, which is important in livestock feed and rice straw has low nutritional value, so this research has improved the DM and CP contents of rice straw by ensiling with urea and molasses, as urea adds nitrogen to feed materials (Kwaido et al., 2017). The CF values in the present study (19.01-12.01) were lower than 35.1 reported by (Ngi et al.,

2006). High fibre concentration is reported to result in poor nutrient utilization and consequently poor growth in animals due the presence of Non-Starch polysaccharides (NSP), therefore, the lower CF values obtained in this study improved the nutritional value of rice straw (Nwandu, et al., 2019).

Table 2: Proximate composition of Rice Straw ensiled with varying levels of Molasses and Urea.

	Treatments				
Parameters (%)	A(**20g**)	B(**40**)	C(**60**)	D(**80**)	**SEM**
Dry matter	96.51^{c}	97.20^{b}	97.60^{a}	97.10^{b}	0.05
Moisture	3.50^{a}	3.01^{b}	2.50^{c}	3.33^{a}	0.12
Crude Protein	23.64^{d}	27.57^{b}	32.56^{a}	24.95^{c}	1.02
Carbohydrates	51.38^{a}	49.95^{b}	46.46^{d}	48.57^{c}	0.55
Crude Fiber	16.51^{b}	15.01^{c}	12.01^{d}	19.01^{a}	0.76
Lipid	0.68^{a}	0.02^{b}	1.01^{a}	0.51^{ab}	0.13
Ash	4.33^{b}	4.50^{b}	5.51^{a}	4.01^{c}	0.17
NFE	3.79^{d}	4.42^{b}	5.22^{a}	3.98^{c}	0.17

^{a,b,c,d}Means in the same row with different superscript are significantly different ($p<0.5$)

The results of minera composition of rice straw ensiled with varying levels of molasses and Urea were significantly ($p<0.05$) different.Calcium content recorded significantly ($p<0.05$) higher value in treatment C(2.36%) followed by D (2.12%) then treatment A (1.76%), and the least value was in recorded in B (1.23%) while phosphorous content had significantly ($p<0.05$) higher value in treatment A (12.85%), followed by C (12.45%), then B (12.25%), the least value was obtained in treatment D (11.95%). There were higher mineral contents in the present study compared to those values C: 0.29, P: 0.09, Na: 0.27 and K: 1.8 (Ngi et al., 2006) and C: 1.58, P: 0.12, Na: 0.13 and K: 3.4 (Sarnlong et. al., 2010) when rice straw was analyzed alone. This also proved that chemical treatment (urea), ensilage and use of additives (molasses) improved the minerals content of rice straw.

Table 3: Mineral composition of rice straw ensiled with varying levels of molasses and Urea

Minerals (mg/kg)	Treatments				SEM
	A (20)	B (40)	C (60)	D (80)	
Sodium	147.51^{d}	150.31^{c}	153.88^{a}	151.41^{b}	0.75
Potassium	3750.10^{d}	3950.10^{c}	4150.10^{a}	4050.10^{b}	44.59
Calcium	1.76^{c}	1.23^{d}	2.36^{a}	2.12^{b}	0.13
Magnesium	2.01^{d}	2.61^{b}	2.91^{a}	2.41^{c}	0.99
Phosphorous	12.85^{a}	12.25^{c}	12.45^{b}	11.95^{d}	0.99

^{a,b,c,d} means with different superscripts are significantly different ($p<0.05$)

CONCLUSION

This study indicated that rice straw ensiled with varying levels of molasses and Urea was improved nutritionally and can be fed to animals especially ruminants.

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