RESEARCH ARTICLE

International Journal of Multidisciplinary and Scientific Emerging Research

Available at http://www.ijmser.com/ (ISSN 2349 – 6037)

Digestibility of Crop Residues in Feeding of Sheep Lambs

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Accepted **24** October 2014, Available online **30** October 2014, **Vol.3, No.1 (October 2014)**

Abstract

The experiment was conducted in Research Station in Gadarif State,Sudan to measure the digestibility of (Dry matter-DM, Crud protein- CP and Crud fiber- CF) of three types of crop residues (Sorghum, Groundnut and Sesame straw) in feeding nine local Sudanese Sheep Lambs. The results indicate that the sesame straw, ground nut straw and sorghum straw results were 50.07 %, 45.97 % and 33.17 % respectively and was significant (P> 0.05).For crud protein-CP, sorghum straw, groundnut straw and sesame straw result were 47.10% , 24.27 % and 19.30% respectively and was significant (P> 0.05).For Crud fiber CF sesame straw, sorghum straw and groundnut straw result were 49.90 % , 27.70 % and 11.52 % respectively and was significant (P > 0.05).

Keywords: *Digestibility - crop residues – feeding - Sheep Lambs – straw.*

1. INTRODUCTION

Agricultural crop residues typically are used as roughage or bedding for cattle because of their inherent poor digestibility, (Adam, L. *et al* 2011). According to FAO,1987, crop residues and by-products are often used interchangeably. There is a need to differentiate between the two terms as they may serve slightly different nutritional roles. Crop residues are the materials left in the field after harvesting the target crops (maize stover, cassava tops, maize cob, cassava peels). They are usually fibrous, low in nitrogen and widely spread geographically because they are produced on the farm. They form the basal or principal feed in small-scale farming systems during the dry season. Agro-industrial by-products, on the other hand, are produced mainly after processing of crops for the production of a main product that may be radically different from the starting crop. They may be rich in nitrogen (oil seed cakes, brewery and flour milling by-products) and may be both low or high in fibre (sugar cane bagasse, palm press fibre). Since they are produced at factory sites, they are less widespread geographically. With a few exceptions, they are used mainly as supplements and not main or basal feeds. El Hag, 1985 indicated that the survey over 4.5 million tons of agro - industrials by – products are available in Sudan. The major by – products include cereal straw, ground nut hull and haulms, sugar cane tops, bagasse, molasses , cotton stalks and trash, sesame field residues, wheat bran and cotton seeds cakes and field residues of sorghum and cotton after crop harvest. Oil seed cakes and milling industry byproducts are additional animal feed ingredients. Animal feed industry or the manufacturing of animal feed started recently and have a considerable share in supplying the livestock production sector with a balanced feed rations especially the dairy and poultry units. Beef cattle and sheep are primarily grazing animals. At certain times they are fed mixed diets at the feedlot of different energy and protein levels (Izeldin A. B., 2008).

Sudan sheep have been classified by physical features and ecological distribution, four main local groups have been identified: Sudan Desert, Sudan Nilotic, Sudan Arid Upland and Sudan Equatorial Upland. Fused ecotype groups, resulting from non-systematic crossbreeding at the boundaries of the eco zones of the pure types, have also been recognized. More than 65% of the sheep in Sudan are of the Sudan Desert breed. Compared with the other types, this breed has remarkable productive and marketing features, and so is given priority in research and development programmers. More than 65% of the sheep in Sudan are of the Sudan Desert breed. Compared with the other types, this breed has remarkable productive and marketing features, and so is given priority in research and development programmes, FAO, 1990.

Digestibility is the result of two competing processes: digestion and passage. In order to develop mechanistic model of digestion to be used for feed evaluation, both processes have to be quantified, Wilfart *et al*., 2007. The digestibility of feed is most accurately defined as that proportion which is not excreted in the faeces and which,

is therefore, assumed to be absorbed by the animal. It is commonly expressed in terms of dry matter and as a percentage or a coefficient McDonald *et al*., 2002.

The objective of this study was to determine the optimum treatment combinations for improving DM and fiber digestibility of different crop residues for eventual on-farm treatment options.

2. MATERIAL AND MATHOD

The experiment was carried out at Livestock Research Station in Gadarif State in eastern Sudan, Nine experiment sheep lambs (8 – 12 month age), and 25 -36 Kg mean body weight brought from Gadarif market were used in the study. The animals were healthy; they were treated with *Ivomic (MSD)* for internal parasites and sprayed with *Sypermethrine* (Jordon) for the control of external parasites, vitamins, and oxytetracyclline 5 ml / animal as protective dose .The animals were numbered and kept under full shade, in pen (1 m X 0.5 m.), roofed, with good local materials. Clean water was provided in suitable troughs, available all time. Lick stones also take place in pens.

The animals were divided in to three groups each of three sheep lambs was assigned randomly to one of three equal groups with three animals in each group. The experimental design was complete randomized design (CRD). Each group contained three replicates. Pens were used as the experimental unit for feed performance data. Animal groups were randomly allotted to one of three dietary-treatment groups in a factorial arrangement of three diets (sorghum straw, sesame straw and ground straw) Fed according to the average weight (500 ±5 g / animal) on three experimental diets: A = Sheep fed sorghum straw, B = Sheep fed ground straw. And C = Sheep fed sesame straw. The diets were fed in a changeover design periods of 3 weeks.

Fourteen days were allowed as changes over period between treatments before measurement were taken. The diets were fed ad labium, individual and intake was measured weekly from daily data.

Three days before the beginning of the collection the Zipped canvas bag attached to webbing harness of the sheep in order to measure the digestibility trials.

The collection period was extended to 21 days. Feaces was collected every morning and transferred quickly to determine the dry matter by using dry oven at 70-80 ºC. Daily samples from each animal were accumulated) and pooled together in container to taken for chemical analysis.

$$DDM = \frac{\text{DM intake (g)} - \text{faecal output (g) DM} \times 100}{\text{DM intake (g)}}.$$

$$\textbf{D}CP = \frac{\text{CP intake g/d} - \text{faecal output C.P g/d} \times 100}{\text{C.P intake g/d}}$$

$$\textbf{DCF} = \frac{\text{CF intake g/d} - \text{faecal C.F g/d} \times 100}{\text{C.F intake g/d}}$$

3. RESULT

The Digestibility of Dry Matter DM, Crud Protein CP, Crud Fiber CF:

In the digestibility trails, the table below shwed that the digestibility of three treatments in dry matter, crud protein and crud fiber. In dry matter digestibility DDM the table show that, there was a significant differences between T1 (sorghum straw) and T2 (groundnut straw) ($P < 0.05$), more over between T1 and T3 (sesame straw) ($P<0.0.5$), but table indicate as the same time, there was no significant between T2 and T3. The least significant difference LSD (833.90).

In crud protein digestibility DCP the table show that, there were a significant differences between the treatments T2 (groundnut straw) and treatment T1 (sorghum straw) and T3(sesame straw) ($P < 0.05$), LSD (22.47), but there were no significant difference between T1 and T3 ($P<0.05$).

Crud fiber digestibility DCF, table below (show that, there were no significant differences between T1 (sorghum straw) and T2 (groundnut straw) ($P < 0.05$), but the significant difference take place between T1 and T3 (sesame straw) ($P<0.0.5$), and T 2 and T3 ($P< 0.05$). The least significant difference LSD (516.1).

Tret	DDM	DCP	DCF
T1	33.17□ ± 3.17	47.10 [a] ± 9.42	27.70□ ±7.96
T2	45.97 [a]□ ± 4.69	24.27□ ±14.1	18.23□ ±11.52
T3	50.07 [a] ± 10.91	19.30 [a] ± 9.72	49.90 [a] ± 10.83
C.V	16.48 %	37.21 %	31.99 %
LSD	14.48 *	22.47 *	20.42*
SE +	4.097	6.493	5.90

Table 1: Analysis of Variance of Digestibility Trails:

T1 = Sorghum straw
T2 = Groundnut straw.
T3 = Sesame straw.
SE standard error of difference between any two means
a, b, c means the same column with different superscript are different significantly ($P>0.05$).
C.V= correction value.
LSD= the least significant difference ($P< 0.05$).
* = significant difference
** = Highly significant
ns = non significant.

4. DISCUSSION AND CONCLUSION

Crop residues under study with low crud protein CP, sorghum straw (5.5 % CP) groundnut straw (9.9 % CP) and sesame straw (4.3 % CP) content like other roughages is characterized nutritionally by low intake and low digestibility. Low nitrogen content which was below

recommended nitrogen concentration for ruminant feeds (13% C.P DM) as suggested by Salter, *et al* (1975).

Panigrahi *et al* (1995), stated that Fibrous crop residues, although inherently of low nutritive value, are of particular importance as sources of nourishment for ruminant livestock in the dry season.

The results of this study showed poor digestibility of the three crop residues under study, sorghum straw (DM) 33.17 %, (CP) 47.1 %, (CF) 27.7 %), groundnut straw DM 45.97%, CP 24.27%, CF 18.23%) and sesame straw digestibility (DM 50.07 %, CP 19.30 % , CF (49.90%). Coppock, D.L. *et al*., 1987; Found by C.P digestibility was 25.6%. However other treatments had negative C.P digestibility due to this deficiency caused by low intake and poor digestibility as concluded also by Greenhalgh, F.D. *et al* (1967). Feeding sesame straw to lamb sheep was effected by low dry matter intake, low dry matter digestibility and loss in weight.

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