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UTILIZATION OF UNCONVENTIONAL SUGARCANE TRASH AS FEED IN NARISUWARNA X KENGURI SHEEP

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Abstract

In a pilot study, fifteen NariSuwarna X Kenguri sheep of average body weight 25.88 kg were fed chopped sugarcane trash ad libitum and restricted (250g) concentrate feed mixture separately to assess the dry matter intake (DMI). The mean roughage DMI, roughage DMI per cent body weight and roughage DMI $W^{0.75}$ observed were 385.12 g, 1.48 per cent, 33.59 g respectively. The mean concentrate DMI, concentrate DMI per cent body weight and concentrate DMI $W^{0.75}$ recorded were 232.50 g, 0.9 per cent, 20.28g respectively. The mean total DMI, total DMI per cent body weight and total DMI $W^{0.75}$ recorded were 617.62 g, 2.39 per cent, 53.86 g respectively. Total mixed ration(TMR)using ground SCT and concentrate in the ratio of 50:50. The DMI of TMR was studied. The mean total DMI, total DMI per cent body weight and total DMI $W^{0.75}$ recorded were 882.17 g, 3.36 per cent and 76.40 g respectively. Higher DMI was observed for mixed diets then feeding roughage and concentrate separately. This was indication to use sugarcane trash as sole roughage source along with concentrate feed mixture supplementation to improve DMI.

Key words: Sheep, Sugarcane trash, mixed diet, DMI, metabolic body weight,

I. INTRODUCTION

India stands 2nd in the world in sugarcane production, Karnataka on 4th position with 4.1 lakh hectare cultivable area. In general, the quantity of sugarcane trash available is around 3- 6 tons/hectare after harvest of sugarcane. Unfortunately, the good fibrous feed material is burnt on farm due to unpalatable and high labour cost involved in collection of trash. The burning of crop residues on farm was estimated to be around 93 MT per year [1] which is also one of the reasons for scarcity of the fodder that leads to significant increase in cost of fodder in recent years. However, the problems associated with the crop residues are low nutritive value, poorly available nitrogen, low digestibility and low voluntary intake [2] due to interlocking of cell wall polysaccharides with lignin and higher levels of silica [3]. Hence, the greatest challenge before the animal nutritionist is to improve the crop residues' palatability in order to increase the intake. Processing the sugarcane trash can improve palatability and intake of roughage. Unprocessed sugarcane trash was unpalatable and refused to consume by sheep, but surprisingly intake of chopped sugarcane trash was noticed. This encouraged to estimate the chemical composition and to conduct pilot study on intake of sugarcane trash.

II. MATERIALS AND METHODS

Fifteen NariSuwarna X Kenguri sheep (age: 9 to 13 months; Body wt. (25.88 kg) were housed in individual cages at experimental animal shed, Department of Animal Nutrition, Veterinary College, Bidar. The pilot study was conducted for the duration of 14 days. Trash and CFM fed separately for 7 days and total mixed (TMR) diet (50:50) fed for another 7 days to assess dry matter intake. Sugarcane trash as roughage source weighed and offered to individual sheep *ad libitum*. The daily allowance of 250g concentrate feed mixture was weighed and offered twice a day at 11.00 AM. and 5.00 PM. The left over feed was recorded on the next day at 8.30 AM. Clean drinking water was provided to all the animals thrice a day at 9.00 AM. 1.00 PM. and 5.00 PM. Further, the TMR with the ratio of 50:50 was prepared and fed to sheep for one week to assess the dry matter intake. The samples of feed offered were collected daily for determination of dry matter.

Procurement of feed ingredients

As per the opinion of the sugarcane farmers, sugarcane trash is unpalatable to ruminants and the same is burnt on the sugarcane field due to labour cost involved for the collection. Hence, an attempt was made to use sugarcane trash as a source of roughage. Around 4-5 tons of trash was procured from the sugarcane field located within 2 kms of the institution at free of cost. Only the top layer of the harvest which was spread on entire sugarcane field was collected. The procured trash was chopped and utilized for animal trial as roughage source. The ingredients like maize, soybean meal, sodium bi carbonate, dicalcium phosphate, mineral mixture, salt and vitamin supplements for concentrate preparation were procured from the local market.

Chemical Analyses

The samples of various mixed diet and fecal samples were analyzed for proximate analysis [4]. While the fiber fractions NDF, ADF and ADL were determined as per the method described by [5].

III. RESULTS AND DISCUSSION

Chemical composition

The chemical composition (per cent dry matter basis) of sugarcane trash and concentrate feed supplements were presented in Table 1. The chemical composition includes proximate analysis as well as forage fiber analyses. The proximate composition DM, OM, CP, EE, CF, NFE, TA, NDF, ADF and ADL content of sugarcane trash was 92.7, 88.6, 3.0, 1.5, 34.7, 49.4, 11.4, 79.1, 50.3 and 20.8 per cent and that of concentrated feed mixture were and 91.5, 91.0, 16.5, 1.9, 2.6, 55.3,9.0, 23.8, 18.5 and 2.0 per cent respectively. The values can be compared with reported values of hemicelluloses, cellulose and lignin content of 26.0, 36.0 and 10.0 per cent respectively [6] whereas another study revealed to have 12.3, 53.9, 29.5 and 3.5% of hemicellulose, cellulose, lignin and total ash respectively [7]. The sugarcane trash is equivalent to any of the cereal crop residue like paddy or wheat straw, bajra and maize stovers in its chemical composition.

Table 1.Chemical composition of sugarcane trash and Concentrate feed mixture

Chemical composition	SCT	CFM
Dry matter	92.7	91.5
Organic matter	88.6	91.0
Crude protein	3.0	16.5
Ether extract	1.5	1.9
Crude fiber	34.7	2.6
Nitrogen free extractives	49.4	55.3
Total ash	11.4	9.0
Neutral detergent fiber	79.1	23.8
Acid detergent fiber	50.3	18.5
Acid detergent lignin	20.8	2.0

Body weight and dry matter intake

The mean body weight and dry matter intake of roughage and concentrate were presented in Table 2. The mean body weight and metabolic body weight of 15 sheep was 25.88 kg and 11.47 kg respectively. The mean roughage dry matter intake, roughage DMI per cent body weight and roughage DMI $W^{0.75}$ was 385.12 g, 1.48 per cent, 33.59 g respectively. The mean concentrate DMI, concentrate DMI per cent body weight and concentrate DMI $W^{0.75}$ was 232.50 g, 0.9 per cent, 20.28g respectively. The mean total DMI, total DMI per cent body weight and total DMI $W^{0.75}$ was 617.62 g, 2.39 per cent, 53.86 g respectively. The results were in corroboration with the several authors; the dry matter intake (DMI) by sheep depends on the type of diet offered. It has been observed that when diets consisting of different forages are offered *ad libitum*, DMI varied. For example DMI of barley hay was 45.1, alfalfa hay 67.0, acacia 30.1 and barley straw 44.1 g DM/kg$W^{0.75}$ [8]. The observed DMI for adult sheep was as per the values reported [9] 1.8-3.0 kg DM/100kg (average: 2.5 kg) of feed for maintenance and gestation (last 6 weeks) 3-3.8kg DM/100 kg. [10] Red Maasai sheep fed with untreated maize stover *ad libitum* and 100g cotton seed cake separately, the DMI was 530 g/d. As [11] feeding of free choice tree leaves with restricted or *ad libitum* concentrate supplementation on intake of weaner lambs. DMI was 88 to 104 g per kg $W^{0.75}$. Therefore, the DMI of sugarcane trash is equivalent to any other crop residues.

Table 2. DMI of sugarcane trash in NariSuwarna X Kenguri sheep

Parameter	Mean±SE
Mean body weight (kg)	25.88±0.74
Mean metabolic body weight (kg)	11.47±0.25
Mean Roughage DMI (g)	385.12±29.51
Mean Roughage DMI % BW	1.48±0.09
Mean Roughage DMI/kg $W^{0.75}$ (g)	33.59±2.19
Mean concentrate DMI	232.50±0.00
Mean concentrate DMI % BW	0.90±0.03
Mean concentrate DMI/kg $W^{0.75}$	20.28±0.45
Mean total DMI	617.62±29.51
Mean total DMI % BW	2.39±0.09
Mean total DMI/kg $W^{0.75}$	53.86±2.03

The mean body weight and dry matter intake of TMR with roughage:concentrate ratio of 50:50 were presented in Table 3. The mean body weight and metabolic body weight of 15 sheep was 26.12 kg and 11.55 kg respectively. The mean total DMI, total DMI per cent body weight and total DMI $W^{0.75}$ was 882.17 g, 3.36 per cent and 76.40 g respectively. The recorded DMI are in corroboration with the reports of several authors; as [12] osmanabadi goats fed with diet 60 per cent locally available crop residues such as sorghum strover, soybean straw and corn cobs. The DMI (g/d) ranged from 615 to 924 and the DMI /kg $W^{0.75}$ ranged from 2.19 to 3.33 with the highest values on soybean straw based complete rations. [13] TMRs fed with 40 (T-1), 50 (T-2) and 60 (T-3) per cent gram straw to 18 Marwari rams. The DM intake observed was 87.9, 84.1 and 80.19 g/kg $W^{0.75}$ in T-1, T-2 and T-3 group respectively. [14] cluster bean straw based TMR fed to Marwari rams in loose (T-1) and block (T-2) form. The DMI in two treatment groups were recorded to be 92.64 and 100.68 g /kg $W^{0.75}$ respectively in T-1 and T-2. The [15] growing Nellore X Deccani ram lambs fed complete rations with 60:40 (T-1), 50:50 (T-2), 40:60 (T-3) and 30: 70 (T-4). The DMI was 771.93, 754.46, 777.91 and 763.53 g/d; and the DMI (g) per kg metabolic body weight was 90.31, 86.67, 88.19 and 86.16 respectively, in T-1, T-2, T-3 and T-4 treatment groups. Wheat straw and concentrate with 50:50 ratio fed to sheep and the DMI observed 895.40 and 899.08 g/d [16]. The DMI of mixed diets were higher than the rations fed roughage and concentrate feed mixture separately. Therefore the chopped sugarcane trash can be used as roughage source as such or in mixed diets to prevent scarcity of fodder.

Table 3. DMI of TMR (50:50) in NariSuwarna X Kenguri sheep

Parameter	Mean±SE
Mean body weight (kg)	26.12±0.71
Metabolic body weight (kg)	11.55±0.24
Mean DMI (g)	882.17±47.31
Mean DMI % BW	3.36±0.13
Mean DMI/kg $W^{0.75}$	76.40±3.05

However, chemical processing like urea ammoniation of sugarcane trash may further improve the nutritive value of diet and dry matter intake and growth in ruminants, since the lignin content is high in sugarcane trash and solubilisation of lignin due to urea ammoniation might improve DMI. The results of this pilot study can only be an indication to further research to assess the growth performance, digestibility of nutrients and rumen fermentation parameters upon feeding of processed sugarcane trash with different levels of concentrate feed mixture or in the form of total mixed ration.

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