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Short Communication

EFFECT OF FEEDING SUGARCANE TRASH ON HEMATO-BIOCHEMICALS AND RUMEN FERMENTATION PARAMETERS OF GROWING SHEEP

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SUMMARY

The study was conducted on eighteen growing sheep divided in three groups with 6 in each for 90 days. The total mixed rations (TMR) were prepared with of jowar dry fodder, green maize and concentrate mixture (50:20:30 ratio on DMB) and fed in T0 group. The inclusion of 50% sugarcane trash of total dry roughage in T1 group and in T2group, 50% of total dry roughage replaced with enzyme treated (300 g/ton) sugarcane trash in TMR. The offered concentrate mixtures were iscaloric and iso-nitrogenous. The blood samples were collected from the experimental sheep at monthly intervals i.e., on the 0th, 30th, 60th and 90th days, respectively and the hemato-biochemical parameters (Hb, PCV, total protein, albumin and globulin) were analysed and found no significant difference in the treatment groups as compared with control group. Similarly, rumen fermentation parameters like rumen liquor pH, total protozoal count and total nitrogen were studied by collecting the rumen liquor samples at monthly intervals i.e., on the 0th, 30th, 60th and 90th days and found no significant difference in the treatment groups as compared with control group. Therefore, the study concludes that the mean values of hemato-biochemical parameters and rumen fermentation parameters of experimental sheep were within the physiological limit and found to be non-significant among treatment groups.

Keywords: Hemato-biochemicals, Rumen fermentation, Sheep, Sugarcane trash

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Agriculture and animal husbandry have played a crucial role in the rural part of India since civilization. Sheep are an important type of livestock in India and are vital to the agrarian economy of the nation. Sheep are raised mostly for meat purposes in Maharashtra, although in the northern region of the nation, wool and sheep skin are also used as raw materials by numerous industries.

The majority of developing nations currently face a severe scarcity of feed and fodder (20th Livestock Census (2019). For animals to grow more quickly and produce more meat, they need to be fed an economical, balanced and sufficient amount for each animal. Therefore, to meet the daily nutritional needs of ruminant animals, we need to search for more innovative, affordable and readily available agro-industrial feed sources such as sugarcane trash, tops and bagasse, which Indian farmers have not traditionally used to increase weight gain and farm economy.

After the cane is harvested, a significant by-product of the sugarcane industry left in the field is sugarcane dry trash, which is a component of sugar cane tops. The mechanically chaffed sugarcane trash must be combined with concentrate and green fodder as a whole mixed ration to maximize its intake in intensive farming. The available dry sugarcane trash might serve as a supply of dry fodder for feeding ruminant animals as Jaishankar *et al.* (2017). A limited number of research trials employing sugarcane residue especially trash in ruminant animals have been undertaken in India due to a lack of knowledge and comprehension of application at the farm level, particularly for small ruminant animals. It may be possible to greatly reduce feed costs and increase weight gain by using sugarcane residue in sheep diets.

In the present study eighteen (18) growing sheep (4-6 month of age) with similar body weight and sex ratio were selected for the designed experimental study for 90 days. The selected sheep were randomly divided into three experimental groups (T0, T1 and T2) with six growing sheep in each group. Diets were formulated as per ICAR (2013). The total mixed rations (TMR) were prepared with of jowar dry fodder, green maize and concentrate mixture (50:20:30 ratio on DMB) and fed in (T0) group.

The inclusion of 50% sugarcane trash of total dry roughage in (T1) group and in (T2) group, 50% of total dry roughage replaced with enzyme treated (300 g/ton) sugarcane trash in TMR. The fibrolytic enzyme used in T2 contained cellulase (340 EU/kg) and xylanase (1100 EU/kg).

The blood and rumen liquor samples were collected on 0, 30th, 60th and 90th day of trial by following the standard

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procedures. The rumen fermentation parameters (pH, protozoal count, total nitrogen), blood hematological and bio-chemical parameters (hemoglobin, PCV, total protein, albumin and globulin) were studied. Data obtained was subjected to a two-way ANOVA with repeated measures using SPSS statistics software version 20.

The details of results obtained regarding the hemato-biochemicals and rumen fermentaion parameters of growing sheep are presented in table 1 & 2. The mean values of haemoglobin observed are well within the normal physiological range (Bhattacharya, 2011). The average values of haemoglobin were analysed as 10.35± 0.28, 10.38±0.24 and 10.39±0.19 for the treatment groups T_0, T_1 and T_2, respectively. The mean values of Haemoglobin analysed during the experimental period were found to be non-significant (P>0.05) between and within the treatment groups (T_0, T_1 and T_2). Hence, from the analysed values and observations, it is evident that the inclusion of SCT and enzymes did not have any adverse effects on Hb values. Varlyakov *et. al.* (2010), Rivero *et. al.* (2016) and Beigh *et. al.* (2018) reported the similar results with our study and reported non-significant effect on haematobiochemical parameters in their experiment. However, Saleem *et. al.* (2011) reports contrary results to our present study.

The values of PCV analysed are well within the normal physiological range (Bhattacharya, 2011). The average values of PCV observed are 30.52±0.58, 30.43± 0.51 and 30.53±0.52 for the treatment groups T_0, T_1 and T_2, respectively. The mean values of PCV observed during the experimental period were found to be non-significant (P>0.05) in both between and within all treatment groups. The findings of Rivero *et. al.* (2016) and Beigh *et. al.* (2018) are similar results with our study and reported non-significant effect on haematobiochemical parameters in their experiment. Similarly, the average serum total protein (g/dl) values recorded at monthly intervals during the experimental period were analysed as 6.95±0.09, 6.88±0.08 and 6.94±0.10 for the treatment groups T_0, T_1 and T_2, respectively. The values of serum total protein are found to be statistically non-significant (P>0.05) in both between & within all treatment groups (T_0, T_1 and T_2).

Similarly, the findings of Rivero *et. al.* (2015 and 2016), Kholif *et. al.* (2017), NE *et. al.* (2017) and Mousa *et. al.* (2022) are similar results with our study and reported non-significant effect on haematobiochemical parameters in their experiment.

The average values of serum albumin (g/dl) were analysed as 2.82±0.05, 2.80±0.05 and 2.84±0.05 for the treatment groups T_0, T_1 and T_2, respectively. The average mean values of serum albumin are statistically non-significant (P>0.05) among all the treatment groups. Similarly, Kholif *et. al.* (2017), NE *et. al.* (2017) and Mousa *et. al.* (2022) reported similar and comparable reports to present study. The values of serum globulin observed were well within the normal physiological range (Bhattacharya, 2011). The average values of serum globulin were observed as 4.13±0.08, 4.08±0.06 and 4.10± 0.07 for the treatment groups T_0, T_1 and T_2, respectively. The mean values of serum globulin observed during the experimental period were found to be non-significant (P>0.05) in both between and within all treatment groups. Similarly, the results of our study were in agreement with the findings of Kholif *et. al.* (2017), NE *et. al.* (2017) and Mousa *et. al.* (2022) who reported similar and comparable reports to present study. NE *et. al.* (2017) to evaluate the effect of using EFE on the biochemical parameters of growing lambs. Similar results found that the globulin activity was not significantly (P > 0.05) affected by direct-fed microbial (DFM) supplementation.

The average rumen liquor pH values recorded at monthly intervals during the experimental period were 6.91±0.08, 6.85±0.08 and 6.73±0.07 for the treatment groups T_0, T_1 and T_2, respectively. The values of rumen liquor pH are found in the normal range and statistically non-significant (P>0.05) in between and within all the treatment groups. The observations of Rojo *et. al.* (2005), Rodriguez *et. al.* (2007), Ganai *et. al.* (2011), Saleem *et. al.* (2011), Rajamma *et. al.* (2014) and Hassan *et. al.* (2015) with regard to pH are similar to present study.

The average total protozoal count values recorded at monthly intervals during the experimental period were 28.79±1.25, 27.25±1.20 and 29.13±1.18 for the treatment groups T_0, T_1 and T_2, respectively. The values of total protozoal count are found within the normal range (Bhattacharya, 2011) and statistically non-significant (P>0.05) in between and within all the treatment groups but numerically higher in the treatment (T_2) group than the control (T_0) and treatment (T_1) groups. The observations of Rojo *et. al.* (2005), Rodriguez *et. al.* (2007), Ganai *et. al.* (2011), Saleem *et. al.* (2011), Rajamma *et. al.* (2014) and Hassan *et. al.* (2015) with regard to pH are similar to present study. The mean total nitrogen values recorded at monthly intervals during the experimental period were 76.83±1.81, 75.04±1.85 and 77.88±1.83 for the treatment groups T_0, T_1 and T_2, respectively. The values of total nitrogen are found within the normal range (Bhattacharya, 2011) and statistically non-significant (P>0.05) in between and within all the treatment groups, but numerically higher in the treatment (T_2) group than in the control (T_0) and

Table 1. Details of hemato-biochemicals parameters of growing sheep

Days	Treatment Group			P-value
	T_0	T_1	T_2	
Hemoglobin (g/dl)				
0	10.23±0.64	10.27±0.60	10.20±0.38	NS
30	10.30±0.68	10.40±0.50	10.27±0.40	NS
60	10.33±0.48	10.37±0.49	10.43±0.42	NS
90	10.53±0.61	10.47±0.46	10.67±0.38	NS
MEAN±SE	10.35±0.28	10.38±0.24	10.39±0.19	NS
Packed Cell Volume (%)				
0	29.90±1.30	29.87±1.15	29.83±1.11	NS
30	30.13±1.39	30.03±1.02	30.17±1.19	NS
60	30.60±1.05	30.47±1.07	30.73±1.01	NS
90	31.43±1.11	31.37±1.03	31.40±1.00	NS
MEAN±SE	30.52±0.58	30.43±0.51	30.53±0.52	NS
Serum Total Protein (g/dl)				
0	6.82±0.19	6.76±0.17	6.79±0.21	NS
30	6.93±0.20	6.86±0.21	6.88±0.17	NS
60	6.97±0.18	6.92±0.16	6.96±0.22	NS
90	7.07±0.17	6.98±0.16	7.12±0.16	NS
MEAN±SE	6.95±0.09	6.88±0.08	6.94±0.10	NS
Serum Albumin (g/dl)				
0	2.74±0.11	2.70±0.12	2.75±0.10	NS
30	2.83±0.10	2.78±0.14	2.87±0.11	NS
60	2.78±0.10	2.82±0.11	2.84±0.12	NS
90	2.92±0.11	2.91±0.11	2.92±0.10	NS
MEAN±SE	2.82±0.05	2.80±0.05	2.84±0.05	NS
Serum Globulin (g/dl)				
0	4.08±0.11	4.06±0.10	4.05±0.13	NS
30	4.10±0.14	4.09±0.11	4.02±0.12	NS
60	4.20±0.19	4.10±0.19	4.12±0.22	NS
90	4.15±0.23	4.07±0.12	4.20±0.13	NS
MEAN±SE	4.13±0.08	4.08±0.06	4.10±0.07	NS

NS: Non Significant

Table 2. Details of rumen fermentation parameters of growing sheep

Days	Treatment Group			P-value
	T_0	T_1	T_2	
Average rumen liquor pH				
0	6.75±0.19	6.82±0.14	6.78±0.15	NS
30	6.95±0.18	6.77±0.16	6.83±0.12	NS
60	7.10±0.14	6.77±0.20	6.58±0.15	NS
90	6.85±0.15	7.07±0.11	6.72±0.17	NS
MEAN±SE	6.91±0.08	6.85±0.08	6.73±0.07	NS
Average count of total protozoa (y*104/ml)				
0	27.50±0.98	25.83±0.90	26.67±0.94	NS
30	27.17±1.18	26.83±1.10	27.83±0.99	NS
60	30.67±1.03	28.67±1.05	30.83±0.85	NS
90	29.83±1.04	27.67±1.05	31.17±1.10	NS
MEAN±SE	28.79±1.25	27.25±1.20	29.13±1.18	NS
Average total nitrogen (y/dl)				
0	73.17±4.35	72.17±4.35	74.33±3.75	NS
30	76.33±3.74	74.50±2.34	77.17±4.11	NS
60	78.67±2.93	75.83±4.39	79.17±3.93	NS
90	79.17±3.74	77.67±3.99	80.83±2.29	NS
MEAN±SE	76.83±1.81	75.04±1.85	77.88±1.83	NS

NS: Non-Significant

treatment (T_1) groups. The observations of Rojo *et. al.* (2005), Rodriguez *et. al.* (2007), Ganai *et. al.* (2011), Rajamma *et. al.* (2014) and Hassan *et. al.* (2015) with regard to pH are similar to present study.

CONCLUSIONS

The inclusion of untreated sugarcane trash (50%) and enzyme-treated sugarcane trash (50%) of total dry roughage in the Total Mixed Ration (TMR) did not affect the hemato-biochemical and rumen fermentation parameters of growing sheep.

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