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PREPARATION OF BUFFALO DUNG WASTELAGE AND ITS UTILIZATION AS PROTEIN SOURCE FOR SHEEP

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An experiment was conducted to study the effect of feeding different levels of buffalo dung wastelage on the digestibility of rations in Lohi sheep. The wastelage was prepared by ensiling buffalo dung, wheat straw and molasses (65:20:15) and whole material was treated with 2% urea and was kept for a period of 21 days. On the basis of chemical analysis of ensiled material this wastelage was used to formulate 4 experimental rations A,B,C and D. Cottonseed cake was incorporated as major source of protein in ration A, while in ration B,C and D wastelage was added at the rate of 25,50 and 75%, respectively to replace cottonseed cake on nitrogen equivalent basis. The digestion coefficients of dry matter were 61.20, 65.64, 60.02 and 54.92; of crude protein 56.5, 63.96, 63.33 and 62.21; of crude fat 82.59, 79.38, 74.34 and 65.24; of crude fibre 47.17, 53.29, 49.98 and 56.85 on rations A, B, C and D, respectively. It was concluded that dung wastelage could replace 25 - 50% cottonseed cake or other conventional oilseed cakes in the diets of small ruminants for economical production of mutton.

Key words : Buffalo dung wastelage, Protein source, Utilization.

Introduction

In the business of livestock raising more than 70% of total cost of production is incurred on feed alone [1]. This higher cost on feeding is mainly due to high cost of conventional sources of protein and energy which are used in animal feed. The situation has created a special interest during recent years in finding alternative sources of feed for the ruminants. In this regard there are 2 primary areas of great interest namely recycling of animal waste and the use of crop residues as feed sources. The animal wastes represents, a largely unused and almost neglected source of protein which is available in sufficient quantities to supply most of the supplementary protein requirements for livestock production.

At present, Pakistan's national herd supports 18.3 million heads of buffalo and 17.3 million heads of cattle [2]. These large ruminants can be declared as the major contributer towards fresh manure production. This manure is produced at the rate of 28 and 24 kg/head/day, respectively [3]. It is believed that inclusion of buffalo dung in sheep rations would be of great help in developing the unique ability of these animals to use non protein nitrogen and cellulose.

Buffalo dung can be used for feeding in a number of ways. For instance it can be fed either in dry form, chemically treated fresh manure or in the form of ensiled crop residues. However, ensiling of buffalo dung with a fibrous material such as straw, appears to provide a promising alternative [4]. The same ensiled material thus obtained has been studied in the past and found economical, nutritionally superior and safer from potential pathogenic organisms [5].

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Materials and Methods

The buffalo dung (composit samples) wastelage was prepared by mixing it with wheat straw and molasses in a ratio of 65:20:15. The whole material was treated with 2% urea. The mixture so obtained was filled into polythene bags and dumped into silo pit under anaerobic condition for a period of 21 days. This fermented biomass was then sun dried to reduce the moisture contents for safer storage. The analysis of dried buffalo wastelage was carried out to determine its proximate contents [6]. To prepare the rations wastelage was added at 0,25,50 and 75% level to replace cottonseed cake on nitrogen equivalent bases in rations A,B,C and D, respectively (Table 1). Later on these rations were fed to 4 groups of Lohi sheep (average body weight 38 kg) at random.

Total fecal collection was used to determine apparent digestibility of different nutrients. The samples of feed and faeces were analyzed to determine the dry matter (DM), crude protein (CP), ether extract (EE), crude fibre (CF) and nitrogen

Table 1. Percent Composition of Experimental Rations.

Ingredients	Rations			
	A	B	C	D
Cottonseed cake	50	37	25	13
Wastelage	-	20	40	60
Wheat bran	15	22	16	06
Wheat straw	14	-	-	-
Molasses	20	18	18	20
Common salt	1	1	1	1
Total	100	98	100	100

free extract (NFE [6]. The apparent digestibility of each nutrient was calculated by using the following formula.

$$\text{Digestibility (\%)} = \frac{\text{Nutrient intake-Nutrient out go in faeces x 100}}{\text{Nutrient intake}}$$

Results and Discussion

The chemical composition of wastelage for proximate contents had 16.8% CP, 0.85% EE, 30.08% CF, 32% ash and 20.89% NFE. The wastelage was found to contain high ash contents especially the silica i.e. 6.01%.

Feed consumption. The average daily consumption of ration A,B, C and D was 1.5, 1.5, 1.5 and 1:35kg, respectively by the experimental sheep during a period of 40 days. The digestion coefficient of dry matter were 61.20, 65.64, 60.02 and 54.92%, 56.5, 63.96, 63.33 and 62.21% for crude protein; 82.59, 79.38, 74.34 and 65.24% for crude fat; 47.17, 53.29, 49.98 and 56.85 % for crude fibre; 67.22, 63.46, 59.43 and 44.12 % for nitrogen free extract. The statistical analysis of the data exhibited a significant ($P<0.05$) difference in the amount of ration consumed. The comparison of means did not reveal any significant difference between the composition of rations A,B, and C where as ration D showed significantly ($P<0.05$) lower value as compared to other rations.

Digestibility of various nutrients of rations. Summary of the data regarding the digestibility percentage of various nutrients i.e. dry matter (DMD), crude protein (CPD), ether extrac (EED), crude fibre (CFD) and nitrogen free extract (NFED), are presented in Table 2.

Dry matter disgestibility (DMD). The average values for the dry matter digestibility of rationsA, B, C and D were found in the order of 61.20, 65.64, 60.07 and 54.92%. respectively. The statistical analysis revealed significant ($P< 0.01$) differences among the dry matter digestibility of various rations. Ration B having 25% wastelage was found to be the superior one ($P<0.05$). Rations A and C showed significantly higher digestibility as compared to ration D and were non significant

TABLE 2.AVERAGE COEFFICIENTS OF DIGESTIBILITY OF VARIOUS NUTRIENTS OF EXPERIMENTAL RATIONS.

Rations	DMD	CPD	EED	CFD	NFED
	b	b	a	c	a
A	61.20	55.50	82.59	47.17	67.22
	a	a	a	a	a
B	65.64	63.96	79.38	53.29	68.46
	b	a	b	b	b
C	60.07	63.33	74.34	49.98	59.43
	c	a	c	a	c
D	54.92	62.21	65.24	56.85	44.17

* Same superscripts in the columns show non-significant differences.

to each other. These results are in accordance with the results stated by [7-9]. They have reported a decline in the digestibility of dry matter contents of the rations with increasing proportion of wastelage. The highest DMD of ration B might be due to maximum supplementation with cottonseed cake which reduced the lignocellulosic intake.

Crude protein digestibility (CPD). The average coefficient of CPD of rations A,B,C and D having 0, 25, 50 and 75 % wastelage level were found to be 55.5, 63.96, 63.33 and 62.21, respectively. The statistical analysis revealed a significant difference among experimental rations. The comparison of means exhibited that digestion coefficient of ration A differed significantly from rations B, C and D. The digestibility of crude protein of these rations (B,C & D) were found superior to ration A and were almost similar to one another. These results are in agreement with El-Ashry *et al.* [8], who reported high CPD for diets containing high buffalo manure wastelage but the results of CPD differed which were reported by Jakhmola *et al.* [9] and Newton *et al.* [10]. These workers reported low CPD of diets containing wastelage as compared to control diets. This could be due to the ensilage of buffalo dung and the straw material ensiled with urea. The urea resulted in a significant increase in total nitrogen and apparent digestibility of protein.

Ether extract digestibility (EED). The average value for ether extract digestion coefficients of rations A,B,C and D were 67.22, 68.46, 59.35 and 44.17, respectively. The statistical analysis of the data revealed significant ($P<0.01$) differences among the EED of rations. Rations A and B were superiorly digested with respect to their ether extract content when compared with ration C and D. The digestibility of ration C was significantly ($P<0.05$) higher than that of ration D. The EED afterwards decreased with the increasing level of wastelage in the diet. These results are in line with the findings of Harpster *et al.* [7] and Newton *et al.* [10]. They reported least digestibility of EE with maximum level of wastelage. The reason for a decline in the EE with maximum level of wastelage may be attributed to higher calcium contents of wastelage. The calcium may react with non esterified fatty acid to form insoluble soap [11].

Crude fibre digestibility (CFD). The average values of coefficients of CFD of rations A,B,C and D were 47.17, 53.29, 49.98 and 56.85%, respectively. Statistical analysis revealed that the average digestion coefficients of ration B, C and D containing 25, 50 and 75% wastelage were found higher than the control ration . In case of raion D a some what higher value of crude fibre digestibility was observed than the rest of two rations i.e. B and C. Increase in digestion coefficients of crude fibre (CF) may be due to the addition of urea before ensiling process which probably resulted in the ammoniation of was-

telage including wheat straw and this ultimately resulted in an improvement in the digestion coefficient of fibre.

Nitrogen free extract digestibility (NFED). The average values for NFED of rations A,B,C and D were 67.22, 68.46, 59.43 and 44.17% respectively. The statistical analysis revealed significant ($P<0.01$) differences among NFED of rations. It was evident that the digestibility of rations A and B were significantly ($P<0.05$) superior to ration C and D. There existed non-significant difference between the digestibilities of ration A and B. However, digestibilities of rations C and D were significantly different. The decrease in the digestibility value of ration C and D containing 50 and 75% wastelage might be due to higher inclusion of lignosilica with the increasing level of wastelage [12].

It can be concluded from the results of the experiment that non protein nitrogenous substances like dung wastelage can be used on commercial basis for economical production of small ruminants when it is replaced with the cottonseed cake @ 25-50%. Moreover, this will be of great help to reduce the protein gap existing between the ever growing population (3.1% annually) in the country and the available animal protein sources.

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