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Comparative Digestibility of Different Cuts of Berseem (*Trifolium alexandrinum*) In Sheep

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Abstract: An experiment was conducted on four castrated lambs to determine the digestibility of different cuts of berseem (*Trifolium alexandrinum*). The apparent dry matter digestibility was 76.64, 76.47 and 72.31 percent for first, second and third cut of berseem, respectively. The organic matter digestibility was 70.7, 77.7 and 74.7 percent, whereas protein digestibility was 78.0, 84.0 and 79.7 percent for first, second and third cut of berseem, respectively and digestibility of different cuts of berseem in sheep did not show any significant difference among different cuttings.

Key words: Digestibility, berseem, different cuts, sheep

Introduction

Berseem is an important legume grown in the Mediterranean area, India and Pakistan. It is valued for its growth in the cooler winter season in the sub tropic and for its good recovery after cutting and grazing. Berseem is superior to grasses in protein and mineral. The potential value of a feed for supplying a particular nutrient can be determined by chemical analysis, but the actual value of the animal feeds can be ascertained better after making allowances for the inevitable losses that occur during digestion, absorption and metabolism. The chemical analysis of a feed is valuable for diet formulation. The digestibility of a feed is closely related to chemical composition and a feed like barely, which varies relatively a little in composition from one sample to another, will show a little variation in digestibility. Other feeds particularly fresh or conserved herbage are much less constant in composition and, therefore, vary more in digestibility. Difference in digestibility between sheep and cattle are small and of little importance with most feeds. However, highly digestible feeds such as cereal grains tend to be more efficiently digested by sheep and poorly digestible feeds such as low quality roughages tend to be better digested by cattle (McDonald *et al.*, 1995).

Keeping in view above facts the study was designed to determine comparative digestibility of different cuts of Berseem in sheep and the test hypothesis that it progressively decreased with the advancement of plant maturity during three cuts of Berseem fodder.

Materials and Methods

Trial of comparative digestibility of different cuts of Berseem in sheep was conducted on January, 1992, at Livestock Experimental Station, Sindh Agriculture University, Tando Jam. Four castrated lambs of one and a half years of age were fed berseem fodder to determine the digestibility of the fodder. The animals were housed in separate metabolic crates and were weighed at the beginning and at weekly interval throughout the study duration (60 days). They were treated for internal parasites and vaccinated against pleura pneumonia and enterotoxemia diseases a week before the start of the

experiment. The sheep were fed on all berseem diet obtained from Latif Experiment Farm, Sindh Agriculture University, Tando Jam. Chaffed berseem from each of three cuts was fed for fifteen days with seven days of adjustment and eight days were taken as a data collection period. Before the start of actual feeding trial the animals were kept in the metabolic crates for twenty four hours and faeces collection bags were fenced to familiarize them. Fresh water was made available *ad libitum* at all times. Weekly feed samples were randomly taken from chaffed berseem during the study period. The faeces collection bags were emptied every day before feeding commenced. Faeces of individual animals were weighed and 10% samples were taken and air dried every day. The air dried samples were bulked over the collection period and kept for subsequent analysis. The air dried samples of berseem were dried in an electric oven at 100°C for 24 hours. The fecal samples were dried at 60°C for 48 hours in electric oven. All the samples were ground and passed through Imm screen and were kept for subsequent analysis. Total nitrogen concentration of feed and faeces was determined by Kjeldahl method (AOAC, 1980). The samples of feed and faeces were ashed in an electric furnace at 550°C for six hours. The mean digestibility for an individual composition was used to compare differences between the three cuts of berseem (Schneider and Cochran, 1967).

Results and Discussion

The chemical composition was determined of sixty samples of each cut of berseem. Dry matter was 20.00, 24.00 and 28.00 percent in first, second and third cut of berseem, respectively. Crude protein was 20.00, 18.00 and 16.00 percent in first, second and third cut of berseem, respectively. Ash was 10.00, 8.00 and 6.00 percent in first, second and third cut of berseem, respectively. The over all means of chemical composition of dry matter, crude protein and ash were 24.00 ± 1.15 , 18.00 ± 0.86 , 8.00 ± 0.56 in first, second and third cut of berseem, respectively (Table 1). The apparent dry matter digestibility was 76.64, 76.47 and 72.31% in first, second and third cut of berseem, respectively. Organic matter digestibility was 70.77, 70.70

Table 1: Mean values of chemical composition of berseem on dry matter (DM) basis (Percentage)

Particulars	DM	Crude protein	Ash
First cut	20.00	20.00	10.00
Second cut	24.00	18.00	8.00
Third cut	28.00	16.00	6.00
Mean	24.00	18.00	8.00
SE	1.8	0.86	0.56

Table 2: Mean values of dry matter, organic matter and crude protein digestibility of Berseem by sheep. (percentage)

Particulars	First cut	Second cut	Third cut	Mean	SE
Dry matter					
Digestibility	76.64	76.47	72.31	75.14	1.15
Organic matter					
Digestibility	70.77	70.70	74.70	72.05	1.02
Crude protein					
Digestibility	78.40	84.00	79.70	80.7	1.38

Insignificant difference between cuts ($p > 0.05$)

Table 3: ANOVA

Source of Variation	SS	df	MS	F	P-value	F or t
Between Groups	115.1278	2	57.56388	8.701788	0.01685	5.143249
Within Groups	39.69107	6	6.615178			
Total	154.81888					

Insignificant difference between cuts ($p > 0.05$)

and 74.70% in first, second and third cut of berseem, respectively. Whereas crude protein digestibility was 78.40, 84.00 and 79.70% in first, second and third cut of berseem, respectively whereas, over all means of apparent dry matter digestibility, organic matter digestibility and crude protein digestibility were 75.14 ± 1.15 , 72.05 ± 1.02 , 80.7 ± 1.38 , in first, second and third cut of berseem, respectively.

Dry matter, ash and crude protein content of berseem at pre flowering stage were 24.00, 10.00 and 17.00 percent, respectively and apparent dry matter digestibility was 70.00 percent (McDonald *et al.*, 1995), which is in agreement with this study (Table 2).

The digestibility of berseem is affected by several factors, such as species of plant, stage of plant growth, composition of feed, species of animal and feed intake by animal (Ranjhan, 1983; McDonald *et al.*, 1995; Van Soest, 1987). A major factor, which may influence the feed digestibility by an animal is the stage of maturity of the forages, for example, the digestibility of Brown grass decreased from 80% during the first cut, to 66% during third cut and was associated with high fiber content (Van Soest, 1987).

There was no significant ($p > 0.05$) difference between dry matter, organic matter and crude protein digestibility of three cuts of Berseem. This study did not support the hypothesis that increasing maturity of the Berseem fodder will be reflected with decreased digestibility (Table 3).

Since, the sheep were fed first cut for thirty one days as an adjustment period prior to the collection period started. Therefore, it is possible that at the later age of the plants, the chemical composition of first cut of Berseem may have been similar to that of the second cut and during the feeding of first cut it rained heavily and made the fodder succulent and the chemical composition might have changed. Sanyden (1972) reported that by using irrigation, the influence of water on alfa alfa under equal light and temperature was shown to decrease the digestibility as the water supply was increased owing to the increase in the moisture content of forage and simultaneous decrease in dry matter content. The plant age and digestibility of feed have a close relationship. If the age of plant increases the intake and digestibility decreases due to the high fibrous content. Therefore, the low intake of third cut may have been due to the maturation of the plant (Van Soest, 1987). In the present study, digestibility of berseem in sheep did not show any significant difference between different cuttings. The results of digestibility and chemical composition of berseem are valuable in ration formulation and planning of feeding management programs in the province.

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