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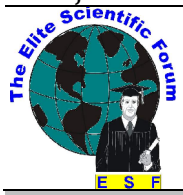

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SHORT COMMUNICATION

Enhancement of Productivity of Sheep through Feeding Of Urea Molasses Treated Rice Hulls

Khalid Mahmood Raisani, Masroor Ahmad Bajwa, Ferhat Abbas, Mohammad Masood Tariq*, Majed Rafeeq, Mohammad Arif Awan, Sohail Sajid, Farhat Abbas Bukhari and Abdul Waheed
Centre for Advanced Studies in Vaccinology and Biotechnology (CASVAB) University of Balochistan, Brewery Road, Quetta, 87300-Pakistan

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***Corresponding Author:**
tariqkianiraja@hotmail.com

ABSTRACT

The study was carried out to assess the effect of urea treated rice hulls and concentrates supplementation on weight gain and to compare the economics of urea treated rice hulls. The experiment was conducted on indigenous Balochi sheep of 10 to 12 month of age. A total of 16 Sheep were divided into four groups; each group consisting of 4 sheep, and kept under stall feeding for a period of nine weeks. Group A, B and C were given rice hulls treated with 2, 3, 4% urea and 10% molasses plus concentrate while group D served as control (3kg green fodder plus 0.5kg concentrate mixture and wheat straw). Daily feed intake and weekly weight gain were recorded. The experiment was designed in CRD fashion. Statistical analysis revealed that group A, B and C had similar feed intake ($P>0.05$), while group D consumed significantly ($P<0.05$) more feed than all other groups. The average daily weight gain, total weight gain and feed conversion ratios (FCR) were found significant for all groups ($P<0.05$). However, no differences ($P>0.05$) were observed between group A and B for these parameters. The group D was found most efficient for daily weight gain, total weight gain and FCR. Group C had the highest weight gain as compared to group A and B. No significant difference in feeding cost was observed for group A, B and C. Results concluded that the urea molasses treatment affected the productive performance of sheep without much additional cost.

INTRODUCTION

Over the years, the livestock has emerged as a leading sub-sector of the agricultural economy of Pakistan. Sheep is among major livestock species of the country. In Pakistan the population of sheep is 28.1 million (GOP, 2011) which is 18% of total ruminants. About 48% of sheep population is found in Balochistan. Out of 31 breeds of Pakistan four distinct breeds of sheep are present in Balochistan. These breeds are Balochi, Beverigh, Harnai and Rakhshani (Isani and Baloch, 1996). Balochistan is largest province of the country having a land mass of 34.7 million hectares, out of which 93% land mass comprises of rangelands. Range based livestock production system is one of the major sources of livelihood for people living in rural areas. The actual carrying capacity of rangelands is limited as compared with the number of small ruminants. Therefore, nutritional deficiency is a serious limiting factor for livestock production particularly for sheep and goats, in Balochistan. The unbalanced diet is the major factor for high losses during lambing (Dove and Carpenter, 1992). As a result of scarcity of nutrition, the productivity of sheep in Balochistan is far below than their actual potential.

Agriculture by-products are important source for feeding the livestock. Rice is the second most important crop in Pakistan. Rice hulls, by-product of the rice milling industry, are common source of roughages for ruminants in some parts of the world. Rice hulls contain approximately 21% silica, 72% acid detergent fiber (ADF), 15% acid detergent lignin (ADL) and are low in nitrogen (N) (Tillman et al., 1969). Rice hulls as a cereal by-product are low in protein and available carbohydrates, yet at the same time high in crude fiber, total ash and silica. Among all cereal by-products, the rice hulls have the lowest percentage of total digestible nutrients which is less than10% (Juliano, 1985).

Keeping in view the feed shortages for sheep production and availability of rice hulls in abundance,

the present study was designed to introduce rice hulls as source feed by treating it with urea and molasses. It was hypothesized that this treatment may enhance the nutritive value of rice hulls and may make it a useful and economical feed. Therefore, the current study was conducted to test effects of urea treated rice hulls on the weight gain, cost of urea treated rice hulls.

MATERIALS AND METHODS

The feeding trial was performed on 16 Balochi sheep having 10-12 months of age, divided in four groups in Quetta. Quetta is situated between 30° 15' North and 66° 55' East, at an altitude of 1,675 meters in Balochistan (Pakistan). The climate of the district is generally dry and fairly arid. The rainfall is scanty and irregular with average annual rainfall of 226 mm (Rashid et al., 2012).

The present experiment was conducted at the animal house of CASVAB, University of Balochistan, Quetta during January to March, 2009. Three groups of sheep were fed urea molasses treated rice hulls along with concentrates while fourth group (control) was served with 3kg green fodder plus 0.5kg concentrate mixture and wheat straw. After an adjustment period of three weeks, data were collected on weight gain, feed intake and feed efficiency. The trial was conducted under intensive management system.

Preparation of Feed & Selection of Treatment Groups: Three batches of rice hulls were treated with 2, 3, and 4% urea plus 10% molasses and ensiled for eight weeks (Table 1). Molasses was diluted with water and then urea (2, 3 and 4%) was added and sprayed on rice hulls. The pH was monitored on weekly basis and checked before starting the feeding trial. The sheep were kept on concrete floor in shed under intensive management system. The sheep were ear tagged for identification. Pre-trial de-worming and vaccination of animals were practiced.

Sixteen sheep were randomly divided into four groups with four sheep in each group. A 3 weeks adaptation period was given and feeding trial was conducted for 9 weeks post adaptation period. All the sheep were weighed initially. Animals were offered measured quantity of feed on every morning and refusal was collected prior to next feeding. Fresh water was available *ad libitum*.

The ingredients and chemical composition of concentrate mixture is given in Table 1. Proximate analyses of rice hulls and urea molasses treated rice hulls were carried out from at Animal Science Institute, NARC Islamabad.

Data Collection: The data were collected on daily feed intake (DFI), weekly weight gain (WWG), feed efficiency (FE) and economics. The FCR was also calculated.

Data Analysis: The data were subjected to statistical analysis in complete randomized design (CRD) using SPSS Version16 for Windows, statistical package.

Table 1: Ingredient and nutrient composition of concentrate mixture

S. No	Ingredients	%age
1	Wheat bran	39.47
2	Sorghum grain	26.32
3	Rice polish	26.32
4	DCP	5.26
5	Salt	2.63
Nutrient composition of concentrate mix		
1	Dry matter (%)	89.0
2	Total Digestible Nutrient (%)	72.1
3	Digestible energy (Kcal/kg)	3192
4	Crude protein (%)	11.7
5	Crude fiber (%)	6.0
6	Calcium (%)	1.3
7	Phosphorus (%)	1.9
8	Acid Detergent Fiber (ADF)	10.9
9	Neutral Detergent Fiber (NDF)	24.9

RESULTS

Feed Intake

The average daily and total feed intake of the all treatment groups are presented in Tables 3. It was found that there was no significant difference ($P>0.05$) were among groups A, B and C treatment groups, while group D consumed more feed than others ($P<0.05$).

Weight Gain: The total weight gain of treatment groups A, B and C was 4.14±0.41, 4.06±0.65 and 6.50±0.18 kg, respectively during the trial period. While weight gain in group D was 9.95±0.66kg per head. This showed a significant difference ($P<0.05$) between treatment groups (Table 3). The results of average daily weight gain showed significant difference ($P<0.05$) between treatment groups, However, no differences ($P>0.05$) was observed between group A and B.

Feed Conversion Ratio (FCR): Average FCR for the treatment groups is presented in the Table 3. FCR was significantly different ($P<0.05$) between treatment groups, however group A and B had similar FCR.

Economics for Weight Gain: Overall feeding cost and profit are presented in Table 4. The results showed that group D gained maximum weight per head per day but at the same time the cost of feed was higher for group D than other groups. The treatment group C had the highest weight gain (4% urea treated rice hulls) as compare to group A and B. There is no difference in feeding cost in groups A, B and C.

Table 2: Proximate analysis of rice hulls and urea molasses treated rice hull

Name of Sample	Dry Matter (%)	Crude Protein (%)	Crude Fibre (%)	Total Ash (%)
Rice Hull	91.94	5.63	47.00	17.78
2%Urea+10% Molasses + Rice Hulls	81.84	8.39	44.07	16.88
3%Urea+10% Molasses+Rice Hulls	79.44	10.38	42.90	16.63
4%Urea+10% Molasses+Rice Hulls	49.12	13.53	40.31	16.53

Table 3: Mean initial weight, final weight, total weight gain, average daily weight gain (g), feed consumed and FCR of treatment groups with SEM

Groups	Initial weight (kg)	Final weight (kg)	Total weight gain (kg)	Daily weight gain (g)	Feed Consumed /h/d (kg)	FCR (kg/kg)
A	22.75±0.51	26.89±0.16^{c}	4.14±0.41^{c}	70±6.89^{c}	1.15^{b}	17.45^{c}
B	23.15±0.23	27.21±0.18^{c}	4.06±0.32^{c}	60±5.39^{c}	1.16^{a}	18.05^{c}
C	23.93±0.46	30.43±0.28^{b}	6.5±0.18^{b}	100±2.95^{b}	1.23^{a}	11.96^{b}
D	24.15±0.58	34.10±1.13^{a}	9.95±0.66^{a}	160±1.10^{a}	1.32^{a}	8.35^{a}

*Means within same column with different superscripts are significantly different (P<0.05)

Table 4: Detail of feed cost and profit in terms live body weight gain of treatment groups

Treatment groups	Feed consumed/h/d (kg)	Average Daily Weight gain/h/d (gram)	Cost of feed /head (Rs)	Cost of Live weight (Rs/head)
A	1.15	70±6.89	12.17	11.83^{c}
B	1.16	60±5.39	12.53	11.60^{c}
C	1.23	100±2.95	13.51	18.57^{b}
D	1.32	160±1.10	32.00	28.43^{a}

h = head, d= day

DISCUSSION

Rice is grown in districts of Sibi and Naseer Abad division of Balochistan and the rice hulls are available in abundance and usually have anti -nutritional factors. These anti-nutritional factors can be overcome by treating it with suitable chemical like urea. It is found that the rice hulls treated with urea and molasses at different ratios could be used as an alternative source of feed. The treatment of rice hulls with urea and molasses enhanced its palatability and improved feed intake when the concentration of urea was increased from 2 to 4%. Weight gain and FCR were also affected by different concentrations of urea. More urea means availability of higher concentration of nitrogen in the rumen for the microbes to synthesize proteins which is ultimately used by the animals.

The results of present experiment are in agreement with the finding of Sutton et al. (2001); Dryden and Leng (1988); Leng and Preston (1984); Conrad and Hibbs (1968). They reported that urea treated silage of whole wheat crop increased the digestibility and nitrogen contents. Similar finding was also given by Leng and Preston (1984) who reported that the feeding of molasses-urea blocks improved the animal performance by improving the feed intake and nutrients digestibility. However, Chenost and Kayouli (1997); Reed and Aronen (1990) and Bod'a (1990) found that treated straw without supplements can support production performance by improving the digestibility of nutrients and feed intake by breaking the ester bonds between lignin and hemicellulose and cellulose, and physically make structural fibers swollen. These effects enable rumen microbes to attack the structural carbohydrates more easily which ultimately improve the digestibility and palatability of the treated straw.

The present results of total weight gain and average daily weight gain were similar with the findings of Akhtar et al. (2008) who reported that average weight gain value for *Hissardale* male was 50±0.0, g/d and 70.3±.0.00 g/d for sheep. Similar finding was also reported by Rafeeq et al. (2010) who reported that daily weight gain for *Balochi; Beverigh; Rakhshani; Harnai and Mengali* sheep were 71.28, 57.22, 58.89, 51.54 and 72.31 gram per day, respectively.

Conclusions

The findings of present study revealed that rice hulls could be used as alternative roughage feed for small ruminants when other fibrous source is not available, though it contains anti-nutritional factors such as, high fiber and lignin. Rice hulls treated with 4% urea gave better results in terms of feed consumption, weight gain and FCR.

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