Growth Performance and Nutrient Utilization of Growing Calves with Urea Treated Wheat Straw Based Ration.

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An experiment was conducted for a period of 100 days to study the nutrient utilization, feed conversion efficiency, growth performance as well as economics of raising of male calves fed on ration based on urea treated wheat straw. Eight growing male calves of 5 to 6 month of age of 70 to 71 kg body weight were divided into two equal groups viz control (C) and Treatment (T). The animals of group C and group T fed ad lib wheat straw and urea treated wheat straw respectively along with the concentrate mixture. All the animals of both the group were provided with 1 kg green Lucerne. Wheat straw ensiled with 4% urea in 40% moisture for 21 days resulted in improvement in crude protein content from 3% to 8.77%. Significantly higher (p<0.05) nutrient intake (DM, CP, DCP) was observed in the group supplied with urea treated wheat straw. The digestibility of nutrients were also significantly higher (p<0.05) in T group. The average daily gain in body weight (ADG) was significantly higher (p<0.05) in T group (497.40±7.87) in comparison to C group (302.50±11.40). Better feed conversion ratio was recorded in the animals of group fed ration based on urea treated wheat straw (6.38±1.01). The cost per kg live weight gain in animals fed urea treated based ration was significantly (p<0.05) less (Rs 47.94±1.20) as compared to the control ration (Rs.62.08±1.45). It is concluded that calves can be efficiently and economically raised on urea treated wheat straw based ration.

Keywords: Urea treated wheat straw, digestibility of nutrients & ADG

INTRODUCTION

Cereal straws are low density feeds consist of mainly lignified cellulose and hemicellulose and have been traditionally used as a main feed ingredients (around 70-75%) of ruminant's diet in India. Due to high lignification these crop residues are less palatable, less digestible and low in nutritive value and are considered as sub-maintenance type of feed for ruminants. Studies have shown that the voluntary intake and nutritional value of straw can be improved either through different treatments or supplementing with some concentrate or combining both the processes (Ali and Gilani, 1992; Choudhary, 1998, 2000). The treatment of straw with urea has proved to be a simple, economical and more viable process at farmer's level (Joy et al., 1992; Ali 1986). Variable responses were observed in the live weight gain of animals when untreated or urea treated straw was supplemented with other feed ingredients (Perdock and Leng, 1986). An overall improvement in the growth performance of calves was observed when urea treated wheat straw was fed as compared to untreated straw (Reddy et al., 1989). Orskov et al., (1991), reported that large proportion of urea treated straw could be incorporated into completely mixed formula diets for finishing cattle with high rates of liveweight gain. Hence, the present study was undertaken to evaluate the utilization of urea treated straw in the ration of calves especially those raised for beef purpose, so that this technology can be implemented among rural masses.

MATERIALS AND METHODS

Experimental Animals and Diets

Eight growing Tharparkar crossbred male calves of 5-6 months of age and approximately 70 to 71 kg body weight were randomly divided into two groups viz Control (C) and Treatment (T) of four animals in each and were dewormed before start of the experiment. The animals of group C and T were offered ad lib wheat straw and urea treated wheat straw respectively along with concentrate mixture in the form of pellets. The concentrate mixture contained Maize 24%,
Deoiled mustard cake 10%, Gaur korma (Cyamopsis tetragonoloba) 11%, Rice bran 15%, Deoiled rice bran 7.5%, Chaula churi (Vigna senensis) 10%, Wheat bran 5%, Malt sprout 10%, Molasses 5%, Calcite 1.5%, Salt 1% and Trace minerals 0.1%. The calves of both the groups were fed with 1kg green Lucerne daily. The wheat straws to be supplied for the feeding of animals were chaffed properly to approximately 1 to 2 inches of length. The calves of T group was fed wheat straw treated with 4% urea (w/w) at 40% moisture level for 3 weeks anaerobically. The quantity of daily feed offered to each animal of the respective group and the residual left was recorded for a period of 90 days to calculate the average daily feed intake. At the end of the feeding trial a digestion trial with preliminary period of 4 days and collection period of 6 days was conducted.

During digestion trial, the daily records of the feed intake, residue left and the faeces voided were maintained accordingly. The oven dried sample of feed offered, residue and faeces voided were analyzed for proximate principles (AOAC, 2005). The body weight of the calves was recorded at the beginning of the experiment and was measured every fortnight individually. The economics of feeding was calculated on the basis of the prevalent market cost of wheat straw @ Rs 3/kg, urea-treated wheat straw including cost of urea, labour cost, and cost of polythene sheet as @ Rs 2.80, concentrate mixture as @Rs 11/kg and green Lucerne @ Rs 1.50/kg. The data were statistically analyzed by using randomized block design (Snedecor and Cochran 1994).

RESULTS AND DISCUSSION

Chemical composition of the feed and fodder

The chemical composition of untreated and urea treated wheat straw is presented in the Table 1. These results are in agreement with the report of Gupta and Murdia (2006), who reported similar values for untreated and urea treated wheat straw.

Nutrient intake

The values of nutrient intake, digestibility of nutrients, growth performance and economics of feeding are presented in the Table 2. The dry matter intake (kg) was significantly (p<0.05) higher in T group than C group. The higher DMI on urea treated wheat straw based ration was also reported by Rao et al., (1991) and Gupta and Murdia (2006), which may be due to increase in availability of nutrients by solubilization of hemicellulose, more surface area for microbial action and additional supply of nitrogen for growth of ruminal microbes. The CP as well as DCP intake (g) was significantly (p<0.05) higher in group T. Narayan et al., (2004) also reported higher CP and DCP intake by calves in the ration based on urea treated wheat straw. The TDN intake (kg) was significantly (p<0.05) higher in the calves in group T fed ration based on urea treated wheat straw which is in close agreement with Gangwar and Sharma (2001) and Mahender et al., (2005). The nutrient requirement for growing calves of 70-100 kg body weight in Indian condition as per Ranjan (1998) in terms of DCP and TDN is approximately 220 g and 1.5 kg respectively which seems to be satisfactorily fulfilled in the animals of T group as compared to Control group.

Digestibility of nutrients

The digestibility of nutrients (DM, CP, EE, CF, NFE) was significantly (p<0.05) higher in group T. Dajayanegra et al., (1989) reported that both urea treatment and urea supplementation increased intake, rate of digestion and digestibility of nutrients.

Body weight gain

Significantly higher (p<0.05) average daily gain (ADG) was recorded in calves in T group 497.40+ 7.87g in comparison to the animals of C group 302.50+ 11.40, which may be due to higher intake of nutrients (Rao et al., 2003). Better feed

<table>
<thead>
<tr>
<th>Particulars</th>
<th>DM</th>
<th>CP</th>
<th>CF</th>
<th>EE</th>
<th>T.Ash</th>
<th>NFE</th>
<th>Ca</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated wheat straw</td>
<td>90.40</td>
<td>3.0</td>
<td>37.63</td>
<td>2.0</td>
<td>8.0</td>
<td>49.37</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Urea treated wheat straw</td>
<td>76.00</td>
<td>8.77</td>
<td>30.05</td>
<td>2.5</td>
<td>5.68</td>
<td>53.00</td>
<td>0.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Green Lucerne</td>
<td>24.80</td>
<td>20.1</td>
<td>26.5</td>
<td>3.5</td>
<td>13.5</td>
<td>36.4</td>
<td>0.3</td>
<td>0.05</td>
</tr>
<tr>
<td>Concentrate mixture</td>
<td>90.18</td>
<td>17.13</td>
<td>11.37</td>
<td>3.0</td>
<td>4.5</td>
<td>64.00</td>
<td>0.6</td>
<td>0.6</td>
</tr>
</tbody>
</table>
conversion ratio 6.38±1.01 was observed in the animals of T group fed with urea treated wheat straw. Ramachandra (1997) also reported significantly better weight gain and feed efficiency in Sahiwal calves fed urea treated wheat straw as compared to untreated wheat straw based ration.

Cost economics
The cost of feeding per animal per day was calculated as Rs 18.78 for Control group and Rs 23.87 for T group, and the better cost of production per kg live weight gain was observed in the animals of T group supplied with ration based on urea treated wheat straw as Rs 47.94 verses Rs 62.08 for the animals in Control group.

CONCLUSIONS
From the present study it can be inferred that the nutritive value of wheat straw in terms of nutrient composition, digestibility, and body weight gain of animals can be improved significantly through ensiling of wheat straw with urea. Further, assessment in cost economics of feeding urea treated based ration to growing calves is of great significance. The lower feed cost per kg live weight gain for calves fed urea treated wheat straw indicates its economic feasibility and greater scope for the production of good quality cheaper beef in India.

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REFERENCES


