EFFECT OF FEEDING DIFFERENT LEVELS OF TREATED BROILER LITTER ON PALATABILITY AND GROWTH PERFORMANCE OF SHEEP

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ABSTRACT

This study was planned to assess the effect of different treatments on broiler litter palatability and growth performance. Twenty five Lohi sheep female young stock were individually tagged, tied and boxed in a performance trial. Four experimental and one control, iso-caloric and iso-nitrogenous rations were studied. Sun dried and formalin treated broiler litter was used to replace 15 and 30 percent nitrogen of a standard sheep ration. Four rations (B, C, D, E) thus formulated were compared with a control standard farm ration (A). Rations B and C contained 10 and 20 parts of formalin treated broiler litter; whereas, rations D and E contained 11 and 22 parts of sun dried broiler litter. Results showed that after control ration palatability was higher (P<0.01) in ration B containing 10 parts of formalin treated broiler litter. Daily weight gain and feed conversion ratio were better at this ration (B) but statistically non-significant. Results further revealed that the cost of production was also less (P<0.01) at this ration (B) which determined that sheep performed better at ration containing lower level of formalin treated broiler litter than control and sun-dried containing broiler litter rations.

Key words: Broiler litter, processing, palatability and growth performance in sheep.

INTRODUCTION

Animal protein (milk, meat, egg) being high quality is a basic component of human diet. Nutrients (Digestible protein, Total digestible nutrients) short supplies not only hamper animal’s productivity but also severely affect their reproductive traits (Raza et al., 1999). Fodder and forages are the cheapest source of livestock feeding but their consistent shortage because of extensive urbanization, destruction of range lands due to cultivation, overgrazing and deforestation has further aggravated the condition and increased the gap between demand and supply for animal feeding particularly for small ruminants (Lachica and Agilera, 2003). This has posed a challenge for the animal scientists to explore new feed resources to grapple the situation.

Animal wastes because of their high protein value have a long history of feeding in animals to fulfill their maintenance requirements in combination with crop residues or ensiling with leguminous fodder and even during crunch periods can be used as staple food (Tagari et al., 1981 and Rasool, 1993). Broiler litter is the richest non-protein nitrogenous source (Banerjee, 1996) but poor palatability and presence of certain pathogens however, not aflatoxins (Makkar, 2002) limits its use in animal feeding (McCaskey et al., 1985). It also contains many other basic nutrients and unidentified growth factors (Smith, 1981).

Rumen microbes have the ability to degrade uric acid into ammonia relatively at a slower rate than urea, thus it can be used more efficiently (Oltjen et al., 1968) by ruminants. It has been observed that properly processed animal waste reduced pathogens, enhanced its keeping quality and palatability (Chaudhry et al., 1993) and has no undesirable effects on animal health (Simove et al; 1982 and Adesehinwa et al., 2010). On account of its high nutrient value it has attracted the researchers to consider it a feed ingredient due to the fact that the conventional feed stuff can no longer meet the needs of rapidly growing livestock (Abeke et al., 2003).

Present study was conducted to see the effect of treatment method and different levels of treated broiler litter on feed intake (palatability) and growth performance of sheep.

MATERIALS AND METHODS

Saw-dust based broiler litter was sun dried to 8 to 10 percent moisture contents. Another part, with 30 percent moisture was treated with formalin @ 0.8 Liter/100 Kg broiler litter on dry matter basis (DMB). After eight hours of heaping under anaerobic conditions it was dried under shade/shed to moisture content of 8 to 10 percent. Each type of treated broiler litter was incorporated to replace 15 and 30 percent nitrogen of a standard sheep ration. Four rations (B, C, D, E) thus formulated were compared with a control standard farm ration (A). Rations B and C contained 10 and 20
parts of formalin treated broiler litter whereas rations D and E contained 11 and 22 parts of sun dried broiler litter. All the rations were iso-nitrogenous and iso-caloric, with percent ingredient composition as shown in Table-1.

Table 1: Percent ingredient and nutrient composition of the experimental rations (on DMB)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>A (Control)</th>
<th>B (15% FT)</th>
<th>C (30% FT)</th>
<th>D (15% SD)</th>
<th>E (30% SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton seed cake (un-decorticated)</td>
<td>27.0</td>
<td>22.0</td>
<td>10.0</td>
<td>21.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Sunflower meal</td>
<td>10.0</td>
<td>9.0</td>
<td>9.0</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Maize (crusted)</td>
<td>14.0</td>
<td>23.0</td>
<td>33.0</td>
<td>26.0</td>
<td>33.0</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>18.0</td>
<td>5.0</td>
<td>4.0</td>
<td>6.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Rice polishing</td>
<td>8.0</td>
<td>10.0</td>
<td>8.0</td>
<td>6.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Wheat straw</td>
<td>11.0</td>
<td>11.0</td>
<td>7.0</td>
<td>9.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Broiler – litter formalin treated (FT)</td>
<td>-</td>
<td>10.0</td>
<td>20.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Broiler litter sun dried (SD)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>11.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Mineral mixture</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Molasses(cane)</td>
<td>11.0</td>
<td>9.0</td>
<td>8.0</td>
<td>10.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Total digestible nutrients (TDN)</td>
<td>71.36</td>
<td>71.26</td>
<td>71.31</td>
<td>71.40</td>
<td>71.20</td>
</tr>
</tbody>
</table>

For palatability trial a known quantity of each of these rations in site specified manger was offered to seven female young stock of Lohi breed of approximately similar body weight, following cafeteria system. Fresh water was supplied round the clock. After first four days of adaptation, during the next ten days the amount of each ration daily consumed was calculated (Qty.of ration offered - Qty.of ration refused) to determine the response of animals to these experimental rations.

In growth performance trial twenty five Lohi female young stock of similar body weight 25±3 kg, individually tagged and tied with two steel boxes, one for water and other for ration were randomly allotted to experimental rations following completely randomized design. Each ration was fed to five sheep at ad-libitum, offering half of the daily allowance at 0800 hours whereas remaining half at 2000 hours. Next morning the refusal was weighed. Fresh water was made available round the clock and about 0.25 Kg. green fodder per sheep was also offered daily to meet the carotene requirements. The trial lasted for 105-days, during which each animal was weighed fortnightly. Daily weight gain, ration consumed, feed conversion ratio and cost of production were determined. The data in both these trials were analyzed using completely randomized design whereas the means were compared through least significant difference test (Steel et al., 1996).

RESULTS AND DISCUSSION

Current study was planned to assess the feasibility of feeding broiler litter (treated or untreated) as non-protein nitrogenous source in sheep feeding. The purpose of the study was to evaluate a non-conventional feed resource in animal feeding with regard to its acceptability/palatability, growth performance and cost of production. The data on daily feed consumption (Kg.) of these rations in palatability trial for 10 days are shown in Table-2.

Table 2. Daily feed consumption by sheep on different experiential rations

<table>
<thead>
<tr>
<th>Rations (kg) consumed</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.15</td>
<td>4.82</td>
<td>4.41</td>
<td>4.00</td>
<td>2.70</td>
<td>2.50</td>
<td>3.64</td>
<td>3.15</td>
<td>3.00</td>
<td>2.00</td>
<td>3.437^a</td>
</tr>
<tr>
<td>B</td>
<td>3.30</td>
<td>3.35</td>
<td>3.10</td>
<td>2.50</td>
<td>1.15</td>
<td>2.0</td>
<td>3.10</td>
<td>3.00</td>
<td>3.70</td>
<td>2.50</td>
<td>2.770^p</td>
</tr>
<tr>
<td>C</td>
<td>1.60</td>
<td>1.40</td>
<td>1.75</td>
<td>1.40</td>
<td>2.00</td>
<td>2.80</td>
<td>1.30</td>
<td>1.10</td>
<td>1.50</td>
<td>2.00</td>
<td>1.685^c</td>
</tr>
<tr>
<td>D</td>
<td>0.95</td>
<td>1.50</td>
<td>1.90</td>
<td>1.10</td>
<td>0.90</td>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
<td>1.00</td>
<td>1.30</td>
<td>1.315^c</td>
</tr>
<tr>
<td>E</td>
<td>0.50</td>
<td>1.90</td>
<td>1.70</td>
<td>0.90</td>
<td>0.90</td>
<td>1.00</td>
<td>1.10</td>
<td>1.00</td>
<td>1.30</td>
<td>1.10</td>
<td>1.140^cd</td>
</tr>
</tbody>
</table>

Different superscripts on means in the column show significant differences
Palatability of the rations has significantly been affected with both the method of treatment and level of treated broiler litter in the rations. After control ration (A) higher (P<0.01) palatability was observed in rations (B and C) containing formalin treated broiler litter than rations (D and E) containing sun dried broiler litter, however this effect among rations C, D and E was non-significant. Flipot et al.(1975) and Caswell et al. (1975) observed lower (P<0.05) intake in sheep, fed rations containing broiler litter treated with 2 percent formaldehyde or 3 percent ethylene oxide attributed to higher levels of treatment. Similar effect was observed by Sangwan and Mandkhot (1980); Bucholtz et al.(1971); Tagari et al.(1976); Kinzelli et al. (1983) and Caswell et al.(1977) in steers or lambs fed rations containing 34.8 percent of dehydrated litter, which was attributed to lower energy, protein or higher ash contents of the rations. However Tsadik et al. (2008) has reported higher (P<0.05) daily feed and nutrients intake of diets by goats, supplemented with 14 and 28 percent sun dried poultry litter. Whereas Fontenot et al.(1971) and Tinnimit et al. (1972) observed excellent acceptability of sheep and steers to rations even containing 80 percent dehydrated poultry excreta.

In this study all the rations were iso-nitrogenous and iso-caloric and the level of formalin treatment (0.8 Litre/100 Kg DMB) was low which reduced (P<0.01) the ash contents of the ration thus made the ration-B most (P<0.01) palatable than others (C, D, E) after control ration (A). The data on daily weight gain, ration consumed, feed conversion ratio and cost of production are shown in Table-3.

Table 3. Average daily weight gain, feed consumed, feed conversion ratio and cost of production of sheep fed different experimental rations

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Rations</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight gain (g/day)</td>
<td></td>
<td>119.05</td>
<td>131.43</td>
<td>117.14</td>
<td>109.52</td>
<td>103.31</td>
</tr>
<tr>
<td>Feed consumed (g/day)</td>
<td></td>
<td>1214.0</td>
<td>1313.0</td>
<td>1352.0</td>
<td>1243.0</td>
<td>1327.0</td>
</tr>
<tr>
<td>Feed conversion ratio</td>
<td></td>
<td>10.20</td>
<td>9.99</td>
<td>11.54</td>
<td>11.27</td>
<td>12.78</td>
</tr>
<tr>
<td>Cost of production (Rs/Kg weight gain)</td>
<td>51.36⁶</td>
<td>47.61⁴</td>
<td>53.70⁵</td>
<td>55.45⁵</td>
<td>58.70⁵</td>
<td></td>
</tr>
</tbody>
</table>

Different superscripts on mean in row show significant differences

The results showed that daily live weight gain, ration consumed and feed conversion ratio were not affected by the rations. The average daily weight gain was maximum (131.43 g/day) whereas the feed conversion ratio was minimum (9.99) at ration B, however this difference was statistically non-significant. These findings are in line with that of Faichney (1971); Mac Rae et al. (1972) and Wright (1971) who observed increased weight gain, feed efficiency and nitrogen retention when formaldehyde treated casein was fed in sheep instead of un-treated casein. Whereas higher daily weight gain from 440 to 610 g. have been reported by Adesehinwa et al.(2010) and Arave and Tewo (2007) respectively, in pigs or barrows diets containing 20 percent of sun dried broiler litter. The results of this study are further in line with the findings of Kanev et al., 1981; Keys and Smith, 1981; Arave et al., 1988; Srinivas et al., 1989; Reddy et al., 1990 and Qureshi.1991 who reported that weight gain, intake and feed conversion ratio were better but statistically non-significant when processed broiler litter was fed at a level of 20 percent or less than un-processed litter. However, lower intake and weight gain (statistically non-significant) were observed by Sengar and Mudgal (1982) when ground nut oil meal treated with formaldehyde was incorporated in male goat rations. This effect was attributed to higher level of formaldehyde which might have hardened the proteins making them un-available for rumen degradation.

The cost of production of ration B, containing 10 parts of formalin treated broiler litter, replacing 15 percent of ration nitrogen was less (P<0.01) than that of all other rations (A, C, D, E) therefore, it can be concluded that both the treatment and level of treated broiler litter in sheep ration have their impact on palatability and growth performance and thus can safely be fed in sheep.

REFERENCES


