

EFFECT OF FEEDING CROP RESIDUES BASED COMPLETE RATIONS ON GROWTH IN RAM LAMBS

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Abstract: An on-farm experiment was conducted by feeding intensively with cereal crop residue based complete rations (mash form) and compared them with traditional sole grazing system to assess the growth rate in native ram lambs. Three rations Viz. sorghum (R-I), sweet sorghum (R-II) and maize (R-III) straw based complete rations (50R:50C) were prepared mash form and compared them with traditional grazing (R-IV). Weight gain and average daily gain (ADG) were significantly ($P > 0.01$) higher in the ram lambs fed three crop residues based complete rations than sole grazed animals. It was also observed that, three complete rations prepared with sorghum, sweet sorghum and maize straw were comparable among themselves on growth. It is concluded that, hitherto wasted cereal crop residues could be effectively used as roughage source at 50 per cent level in complete rations for the feeding of ram lambs to obtain optimum gain.

Key Words: Crop residues, complete rations, growth, ram lambs.

INTRODUCTION

Sorghum and maize are the major cereal crops grown abundantly in rain fed areas of India. The straw that is by-product obtained after harvesting the crop can be used as the ruminant feed as roughage source. Sorghum straw contributes up to 40% value of the total crop in dry areas (Badve *et al.*, 1995). Sweet sorghum straw is available after harvesting and threshing of grains for extraction of bio-ethanol and this can also be used as feed material for ruminants. It is well recognised that cereal crop residues are of low nutritive value (Sundstol and Owen 1984) because of fibrous in nature, bulky and more of lignin content. However, when these straws/crop residues are suitably processed physically and incorporated into complete diet or total mixed rations either in mash or pellet form, they can be successfully used for optimum growth and milk production from ruminant animals (Reddy *et al.* 2003). However, the level of incorporation of crop residues in the complete diet is influenced by the quality of crop residue (Anandan *et al.* 2010). Therefore, the present field experiment was carried out to assess the growth in native ram lambs by feeding sorghum, sweet sorghum and maize straw based complete rations and compared with traditional grazing.

MATERIALS AND METHODS

This on-farm experiment was conducted in ram lambs by feeding different crop residue based complete rations in Mahbubnagar district of Andhra Pradesh, India for a period of four months during February to May, 2012.

Preparation of complete rations

Crop residues viz. sorghum (R-I), sweet sorghum (R-II) and maize (R-III) straws were procured from nearby villagers. Concentrate feed (20 per cent CP) for the preparation of complete rations was purchased from the local market. To prepare complete rations (50R:50C) the respective crop residues were ground through 8 mm sieve using hammer mill and mixed with concentrate mixture in a mixer at Rural Feed Processing Unit (RPFU), Mahbubnagar and stored in gunny bags for feeding of ram lambs during experimental period. These three crop residue based complete rations were transported from RPFU to farmer's doorstep by using mini truck at fortnightly intervals.

Selection and grouping of experimental animals

Growing healthy native ram lambs (n=200) of about 4-5 months old were selected/identified from the various local sheep farmers and were randomly allocated in to four experimental groups so as to contain 50 animals in each group. The mean body weights (kg) of ram lambs in four groups was 13.5 ±1.08 (R-I), 12.4 ±0.45 (R-II), 11.20 ± 0.80 (R-III) and 13.92±0.89 (R-IV), respectively.

Feeding management of experimental ram lambs

Three crop residue based complete rations viz. R-I, R-II, R-III were offered to ram lambs of respective groups for four months period at 4% of their body weight and the fourth group (R-IV) was maintained solely on traditional grazing. Amount of feed offered was calculated based on fortnightly body weights of ram lambs. Daily feed intake was calculated by subtracting the amount of feed residue left over on the next day from total feed offered.

The ram lambs were housed according to group in well ventilated, clean pens with an open area for movement during the day time. All the experimental ram lambs were fed *ad libitum*. Feed was offered twice daily at 9.00 and 15.00 h by weighing spring balance and residue if any left was weighed after 24 h. All the experimental animals were offered clean, fresh drinking water round the clock. Hygienic surroundings were maintained throughout the experimental period. All the animals were treated for external and internal parasites with Ivermectin and Fenbendazole drugs, respectively, in the beginning and again after three months of experimental period. Animals were vaccinated against PPR disease seven days after the initial deworming.

The animals were weighed fortnightly using a spring balance before offering the feed and water in the morning. Weights were recorded on two consecutive days and the mean was taken to represent the body weight. Average daily gain (ADG) and feed conversion efficiency (FCE) was calculated by using the formulae.

$$ADG (g) = \frac{\text{Final weight (g)} - \text{Initial weight (g)}}{\text{Number of days}}$$

$$FCE = \frac{\text{Feed intake (kg)}}{\text{Weight gain (kg)}}$$

Statistical analysis of the data was carried out according to the procedures suggested by Snedecor and Cochran (1994). Analysis of variance was utilized to test the significance of

various treatments and the difference between treatment means was tested for significance by Duncan's Multiple Range and F Test (Duncan, 1955).

RESULTS AND DISCUSSION

Comparable feed intake of 783, 751 and 685g was observed in R-I, R-II and R-III rations, respectively. This less variation in feed intake might be due to almost same nutrient composition, physical form and level of incorporation of three crop residues in complete rations. Feed intake and its utilization in ruminants were mainly influenced by the kind of roughage and roughage to concentrate ratio in the diet (Van Soest, 1982; Forbes, 1986; Haddad, 2005; Cantalapiedra *et al.*, 2009). The weight gain and average daily gain (ADG) were significantly ($P < 0.01$) higher in the ram lambs fed three crop residues based complete rations in comparison to sole grazed ram lambs (Table 1). These results indicated that crop residue based complete ration feeding has shown significant effect in growth rate of ram lambs in comparison to traditional grazed animals in which no concentrate was present. Feed efficiency and cost per kg gain were also comparable among three crop residues based complete rations. Similar type of results were also observed in lambs by Katyar *et al.* (1974), Ali *et al.* (1979), Karim and Rawat (1997), Reddy and Raghavan, (1987), Baruah *et al.* (1988), Pathak *et al.* (1987). Presumably the higher concentration of energy in the low roughage diet together with the lower efficiency with which ME of fibrous feeds is utilized in the fattening process or growth (Blaxter, 1962) resulted in better growth rate and feed conversion efficiency with high concentrate diet. The growth rate was improved with the increase in the proportion of concentrate in the diet and feed conversion efficiency accordingly improved (Mallikharjunappa *et al.*, 1983; Sejra, 1990). Similar observations were also reported by Matthes, (1991) in German black pied bulls and Cherkashchenko and Adil'bekov (1993) in young bulls. It was also observed that, three complete rations prepared with sorghum, sweet sorghum and maize straw as roughage source were comparable among themselves on growth in ram lambs.

Table 1. Effect of feeding different crop residue based complete rations on growth in ram lambs

| Parameter | Complete Ration | | | Control (grazing only) (R-IV) |
|---------------------|---------------------------|----------------------------------|---------------------------|-------------------------------|
| | Sorghum straw based (R-I) | Sweet sorghum straw based (R-II) | Maize straw based (R-III) | |
| Initial weight (kg) | 13.5±1.08 | 12.4±0.45 | 11.20±0.8 | 13.92±0.89 |
| Final weight (kg) | 25.3±1.14 | 24.8±2.45 | 22.71±1.95 | 19.74±0.82 |
| Wt. gain (kg) | 11.8 ^a ±0.27 | 12.4 ^a ±0.61 | 11.51 ^a ±0.26 | 5.82 ^b ±0.3 |
| ADG (g) | 98.33 ^a ±2.2 | 103.3 ^a ±3.56 | 95.92 ^a ±2.2 | 48.5 ^b ±2.48 |
| Feed intake (g/d) | 783 | 751 | 685 | -- |
| Feed efficiency | 1:7.96 | 1:7.27 | 1:7.14 | -- |

^{a, b} means with different superscripts in a row differ significantly ($P < 0.01$).

CONCLUSION

Based on the results, it was concluded that, hitherto wasted cereal crop residues (by products) could be effectively used as roughage source at 50 per cent level in complete rations (mash form) for the feeding of ram lambs to obtain optimum gain than sole grazing in the tropical developing countries where the adequate quantities of cereal crop residues are available.

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