

Effect of feeding groundnut haulm based complete rations on production performance of cross bred dairy cows

J.V. Ramana*, A. Ravi *, P. Kavitha*

*Department of Animal Nutrition, College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupati - 517 502, AP, India.

Keywords: Dairy Cows
Groundnut Haulm Based Complete Ration
Conventional Ration
Milk Yield
Butter Fat.

Abstract

Dairy animal rearing is an integral part of small holder farming system in India. The traditional feeding system for dairy cattle is based on the use of straw, natural grasses supplemented with a little or no concentrates. Poor nutrition has been identified as a major constraint to productivity in smallholder dairy farming. In the present situation pastures are degraded and the area under green forage crops is shrinking due to increase in human population and urbanization. As a result the crop residues are the bulk of feeds available. They have low nutritional value, bulky and fibrous. Feeding crop residue based total mixed rations is the efficient method of utilization of crop residues and to minimize the wastage. A field trial was conducted to study the groundnut haulm based complete ration on production performance of Dairy cattle. Feeding trial was conducted for 90 days on 20 milch cows, randomly divided in to two groups; control and treatment with ten animals in each group. The control group were offered conventional ration consisting of 8 hours of grazing, green forage, paddy straw and concentrate mixture and the treatment group were fed on groundnut haulm based complete ration consisting of crushed groundnut haulm and concentrate in 60:40 ratio. The dry matter intake, average milk yield (kg/day), 4% FCM (kg/day), milk fat content were increased significantly ($P < 0.01$) in the treatment group. Dry matter intake and feed cost per kg of 4% FCM did not differ significantly between two groups but were lower in the control group as compared to treatment group. Net profit over feed cost was higher in treatment group (Rs.56.02), compared to control group (Rs.41.04).

Introduction

India has a large population of 210 million cattle and 111 million buffaloes (FAO, 2012). Dairy cattle production in the country is characterized by low productivity levels mainly due to genetic and nutritional constraints. Quantitative and qualitative shortage of feeds and fodder affects the performance of milking animal. Unless feeding management is improved these animals may be limited to fully express their potential genetic superiority. It is fundamental approach to provide good quality diets to dairy cattle in sufficient amount to maximize production. Since feed cost is becoming the most important factor in livestock production, increasing

self sufficiency in feed production will be an important factor in future development programs. It is estimated that approximately 500-550 Mt of crop residues are produced per year in the country (MoA, 2012). The quantity and quality of fodder available from natural pasture shows seasonal fluctuation. There is an acute shortage of feed supply during the dry season and the available feed during this period is of very poor quality. Cultivated fodder is limited to less than 4.5 per cent of the area under cultivation in country. Present area under fodder crops in India is around 8.6 million hectare. Effective utilization of the available feed resources (agricultural and agro-industrial byproducts, natural pastures and browse) and appropriate supplementation of poor quality natural pasture and crop residue based diets appear

Corresponding author: J.V. Ramana, Professor and Head, Department of Animal Nutrition, College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupathi - 517 502, Andhra Pradesh, India.
E-mail: jvenkataramana@rediffmail.com

to be the necessary steps to alleviate the nutritional problems of dairy animals. Worldwide total crop residues is estimated to be 3.8 billion metric tons with cereals contributing 74%, sugar crops 10%, legumes 8%, tubers 5% and oil crops 3% (Lal, 2005). Crop residues will provide more than 70% of the feed resources for Indian livestock by the year 2020 (Ramachandra *et al.*, 2007). These crop residues have special importance in livestock feeding as they constitute a major portion of roughages. High percentage of structural carbohydrate and low nitrogen content of these roughages result in low palatability and poor nutrient utilization in ruminants. However, incorporation of these crop residues in complete diets improves both palatability and nutrient utilization (Dhuria *et al.*, 2011). The complete feed system not only ensures better utilization of nutrients from agricultural crop residues but also supplies balanced nutrients, controls the ratio of roughage to concentrate, provide uniform blend of feed, reduces feed wastage and enables use of locally available feed ingredients (Raut *et al.*, 2002; Krishnamurthy and Ramaprasad, 2005).

Materials and Methods

A field trial was conducted on 20 cross bred milch cows belonging to the farmers of Palamaner village in Chittoor district of Andhra Pradesh, India for 90 days. Cows in first two lactations in early lactation were selected and were randomly divided in to two groups with 10 cows in each group. The animals in control group were offered a conventional ration consists of 8 hours of grazing, 10 kg green fodder, 4 kg paddy straw and 3 kg concentrate mixture and the animals in the treatment group were fed with complete diet made up of crushed ground nut haulms and concentrate in 60:40 proportions according to their nutrient requirements (ICAR, 1998).

The animals were housed in well ventilated conventional stalls and fed respective diets throughout the experimental period with individual feeding and watering arrangements. Daily milk yield was calculated by adding the total milk produced in the two milkings per day. 4% fat corrected milk yield was calculated (NRC, 2001)

Daily milk yield and feed intake were recorded for each animal. Milk samples were estimated every forte night for butter fat and solids not fat. Data were analyzed by standard statistical procedures (Snedecor and Cochran, 1989).

Results and Discussion

Dry matter intake

Dry matter intake per day differed significantly ($P \geq 0.01$). Dry matter intake per day was 7.97 kg, 8.16 kg in control group and treatment group respectively. DMI was within the range of ICAR 1998 standards, indicating the good palatability of the complete ration which is in agreement of the findings of Rajakishore *et al.*, 2013. Feed efficiency per kg 4% FCM was better in the treatment group (1.42 ± 0.028), but it was not significant.

Milk yield

The average milk yield and 41% fat corrected milk per day were shown in the table. The milk yield/day and 4% FCM were higher ($P \geq 0.01$) in the treatment group (5.84 ± 0.12 , 5.87 ± 0.13) as compared to control group (5.39 ± 0.06 , 5.30 ± 0.07). The raise in the milk yield might be due to the better utilization of the feed nutrients. Higher digestibility in complete rations were also observed by Reddy *et al.* (2001) in buffalo bulls, Mahender *et al.* (2006) in Nellore lambs and Kumar *et al.* (2010) in lactating Murrah buffaloes. Babiker *et al.* (2009) reported that the sugarcane bagasse based complete diet pellets improved the FCR and attributed to the absence of selective feeding by lambs. Talpada *et al.*, 2002 hypothesized that complete feeds provide uniform supply of nutrients at regular interval which helps to maintain steady rumen environment resulting in better digestibility of nutrients.

Milk composition

% Milk fat increased ($P \geq 0.01$) in the group fed with ground nut haulm based complete ration when compared to those on conventional ration. Solids not fat (SNF) did not differ significantly between two groups. Higher milk fat in the group fed with complete diets were also observed by Nagalakshmi *et al.*, (2006) and Raja Kishore *et al.*, (2013). This could be due to the better availability of the precursors for synthesis of milk fat.

Cost economics

Feed cost per day per animal, cost of feed per kg 4% FCM were more in the control group (Table-2). Income from milk (10%) and net profit over feed cost (36%) were higher in the treatment group. It was similar to the findings of Raja Kishore *et al.*, (2013) who reported that crop residue based complete rations to cattle and buffaloes reduced the cost of feeding animals for milk production.

Table 1: Milk yield and composition of milk of crossbred cattle fed on complete rations

Parameter	Control	Treatment
Milk Yield (kg/d)**	5.3928±.06736	5.8399+ .12455
Butter Fat %**	3.8920±.03055	4.0265+ .04871
4 % FCM (kg/d)**	5.3092± .07685	5.8700+ .13789
SNF (%)NS	8.1863+.04290	8.2915+.03679

Table 2: Feed intake, feed efficiency and cost economics

Parameter	Control	Treatment
DMI (Kg) per day**	7.9750±.05993	8.1667±.08946
4 % FCM (kg/d)**	5.3092± .07685	5.8700±.13789
DMI(Kg) per Kg 4% FCM ^{NS}	1.5160±.02144	1.4253±.02855
Cost of feed (Rs.) per day**	91.7125±.68915	90.7317±.99394
Cost of feed (Rs.) per Kg 4% FCM ^{NS}	17.4458±.24914	15.8343±.31707
Income from milk (Rs.)**± (@ 25/Kg 4% FCM)	132.75±1.92009	146.75±3.44622
Net benefit over feed cost (Rs.)	41.04±1.80939	56.02±2.76802

** (P ≥ 0.01)

NS : non-significant

Conclusion

It can be concluded that groundnut haulm based complete rations improve milk yield, butter fat and reduce the cost of milk production with 36% net profit over conventional ration.

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