

Original Research Article

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## Economics of Milk Production Feeding Different Protein Supplements of Gir Cows

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### ABSTRACT

#### Keywords

Cost, Economics, Gir cows, Gross return, Guar meal, Income, Milk production, Mustard oil cake

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A study was conducted on 16 lactating Gir cows, which were divided into four groups on the basis of body weight and average milk yield/day at Dairy farm (LPM Deptt.) S.K.N. College of agriculture, Jobner (Rajasthan) and subjected to four dietary treatments i.e. Wheat straw *ad-lib.*+ Green Lucerne (5 kg) + Concentrate (T<sub>1</sub>), T<sub>1</sub> + Urea 75 g/cow (T<sub>2</sub>), T<sub>1</sub> + Mustard oil cake 614 g/cow (T<sub>3</sub>) and T<sub>1</sub> + Guar meal 505 g/cow (T<sub>4</sub>). The studied for their economics of milk production. Average daily milk production (litre/cow) was significantly (P<0.05) higher in T<sub>4</sub> (7.85) than T<sub>3</sub> (7.13), T<sub>2</sub> (7.05) and T<sub>1</sub> (6.67). Total feed cost/litre of milk (Rs) was 29.86, 24.19, 28.29 and 25.98 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> groups respectively during winter season.

### Introduction

Livestock is an integral part of agriculture and plays an important role in contributing to national economy. Total Milk production in the India was 187.7 million tonnes during 2019 (GOI, 2019). India is the world's largest milk producer, with 21 per cent global production. Rajasthan is ranked 2<sup>nd</sup> in India and produces 23.6 million tonnes of milk every year. Gir is a most important milch cattle breed of India. The distribution of this breed is Gir hills and forest of Kathiawar, Junagadh, Bhavnagar, Rajkot and Amreli

districts of Gujarat and also in some parts of Maharashtra and Rajasthan. The body of Gir animals is well proportioned, the head is moderately long but massive in appearance with prominent bony forehead straight and leveled back are the most the marking characters of the breed and body colour is red to white, Udder is well developed and round in Gir cattle. Cattle of this breed are most important for their tolerance to stress conditions and resistant to various tropical diseases. Nutrition plays crucial role in growth, reproduction and production of animals but the biomass resources are very

limited and there is shortage of feed and fodder. There is a serious shortage of conventional feed resources. Hence, it is necessary to look for protein rich, nonconventional feed resources. Proper and balance feeding is essential for economic milk production to make dairy farming a successful enterprise because feed cost accounts about 75 per cent of milk production in cattle. The cost per kg milk can be reduced by 60 per cent and 40 per cent, respectively by feeding good quality leguminous and non-leguminous fodder (Upadhyay, 1994). Feeding is one of the most important determinants of profit in the livestock farming. Urea is non-protein nitrogen compound. Cattle and other ruminants convert urea to protein through the production of ammonia and carbon dioxide. Urea when used for treatment of straw boost the nutritional quality of straw in terms of increased nitrogen content, enhanced the palatability and digestibility.

The composition of mustard cake (MC) varies with the variety, growing conditions and processing methods. The crude protein content varies from 33-40 per cent in mustard cake. Guar Meal used in concentrate rations for lactating dairy cows. In dairy cattle, Guar meal is a highest protein containing animal feed in its group. It is having upto 50 per cent of protein with a high digesting content. Complete ration not only improves the feeding value of feed stuff but also simplifies feeding, minimizes labour and maximizes automation. The cost of feeding per litre milk production is a significant factor governing the economic viability of livestock sector which must be reduced by adopting new measures in the ration formulation. This leads to search for sources that are also easily available and economically feasible. The expected output from this study will fill the gap of the existing deficiency of knowledge to develop the best feeding strategies to be more economically efficient in dairy production.

## **Materials and Methods**

The experiment was carried out at Dairy farm, Department of Livestock Production Management, S.K.N. College of Agriculture, Jobner (Jaipur). Sixteen lactating Gir cows were selected for the experiment. They were randomly divided into four groups of four in each group on basis of nearness in their production and body weight of cows and four dietary treatments were formulated i.e.

Wheat straw *ad lib.* + 5.0 kg Lucerne + Concentrate palleted feed (T<sub>1</sub>), T<sub>1</sub>+ Urea @ 75 g per cow per day (T<sub>2</sub>), T<sub>1</sub>+ Mustard cake @ 614 g per cow per day (T<sub>3</sub>) and T<sub>1</sub> + Guar meal @ 505 g per cow per day (T<sub>4</sub>) and the studied for their economics of milk production feeding different protein supplements of Gir cows.

## **Cost of feeds**

Economics of feeding under different treatment was calculated from the records of feed and by considering the procurement cost of feeds and fodder used for feeding of Gir cows. Gross return was from sale of milk from different groups of cows. The cost of Lucerne and wheat straw was Rs. 700/Qtl. and Rs. 890/Qtl. respectively, which cost of concentrate palleted Rs. 2375/Qtl, Mustard cake Rs 3500/ctl, Guar meal Rs 3910 and Urea Rs. 1000/Qtl. The milk was sold to milk window @ Rs. 42/lit. during experiment period.

## **Statistical analysis of data**

The experiment planned with subject to analysis of variance (ANOVA) for randomized block design (RBD) and the means were tested by least significance difference. Different statistical tools such as mean, standard deviation (SD), standard error (SE) were worked out to compare the group.

## Results and Discussion

The data collected during the experimental trial were subjected to standard methods of statistical analysis and presented in this chapter in the form of tables along with the implications of the results to the economics of milk production feeding different protein supplements of Gir cows under following head.

### Feed cost of milk production

The economic evaluation of feeding the experimental ration and the feed cost of per

litre milk production was presented in Table 16. Total feed cost was 70,033.5, 61,385.6, 73,618.8, 73,530.3 (Rs) in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, respectively. Income for sale of milk is Rs. 101, 085.6, 106,545.6, 107,969.4 and 118,893.6 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> groups respectively. Lactation yield (300 days) per cow were calculate is 2007, 2115, 2142 and 2358 liter in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> groups, respectively. The feed cost per litre milk production was 29.08, 24.19, 28.64 and 25.98 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, respectively. The feed cost per litre milk production was higher in group T<sub>1</sub> as compared to T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> in Gir cows.

**Table.1** Feed cost of milk production under different treatments

| Particulars   | T <sub>1</sub> | T <sub>2</sub> | T <sub>3</sub> | T <sub>4</sub> |
|---|----------------|----------------|----------------|----------------|
| <b>Total quantity of lucerne green (qtl)</b>                          | 18             | 18             | 18             | 18             |
| <b>Total quantity of wheat straw (qtl)</b>                            | 18.90          | 18.79          | 23.72          | 24.44          |
| <b>Total quantity of concentrate (qtl)</b>                            | 17.1           | 13.50          | 13.50          | 13.50          |
| <b>Mustard cake (qtl)</b>   | -              | -              | 2.21           | -              |
| <b>Guar meal (qtl)</b>  | -              | -              | -              | 1.82           |
| <b>Urea (Kg)</b>  | -              | 27             | -              | -              |
| <b>Feed cost (Rs.)</b>  |                |                |                |                |
| <b>Lucerne</b>  | 12,600         | 12,600         | 12,600         | 12,600         |
| <b>Wheat straw</b>  | 16,821.00      | 16,723.1       | 21,110.8       | 21,751.6       |
| <b>Concentrate</b>  | 40,612.5       | 32,062.5       | 32,062.5       | 32,062.5       |
| <b>Mustard cake</b>   | -              | -              | 7,845.5        | -              |
| <b>Guar meal</b>  | -              | -              | -              | 7,116.2        |
| <b>Urea</b>   | -              | 270.0          | -              | -              |
| <b>Total feed cost</b>  | 70,033.5       | 61,385.6       | 73,618.8       | 73,530.3       |
| <b>Total milk production in 90 days/ 4 cows</b>                       | 2406.8         | 2536.8         | 2570.7         | 2830.8         |
| <b>Total income sale of milk (90 days)</b>                            | 101,085.6      | 106,545.6      | 107,969.4      | 118,893.6      |
| <b>Estimated milk production in (300 days) lactation (litre)/ cow</b> | 2007           | 2115           | 2142           | 2358           |
| <b>Milk yield /cow per day (litre)</b>                                | 6.69           | 7.05           | 7.14           | 7.86           |
| <b>Average daily feed cost per animal</b>                             | 194.54         | 170.52         | 204.50         | 204.25         |
| <b>Feed cost /litre of milk</b>                                       | <b>29.08</b>   | <b>24.19</b>   | <b>28.64</b>   | <b>25.98</b>   |

Cost of items- (as per college rates through tender etc.)

Green lucerne- Rs. 700/qtl  
 Wheat straw- Rs. 890/qtl  
 Concentrate- Rs. 2375/qtl  
 Mustard cake- Rs. 3550/qtl  
 Guar meal- Rs. 3910/qtl  
 Urea- Rs. 1000/qtl  
 Milk rate- Rs. 42/litre

The higher return from T<sub>2</sub> and T<sub>4</sub> as compared to T<sub>3</sub> and T<sub>1</sub> groups due to more milk production and lower feed cost as compared to other groups. T<sub>4</sub>, T<sub>2</sub> groups are more economical as compared to T<sub>3</sub> and T<sub>1</sub> groups but urea feeding is not beneficial. Mahdevi *et al.*, (2010) pointed out that replaced protein sources with cheaper Guar meal resulted in better economic efficiency. Guar meal can be used to substitute other protein sources without any side effect reported by Turki *et al.*, 2011. The feed cost proved that ration contained 5 per cent Guar korma improved the economic return (L.E. /H/D) recorded by Soliman *et al.*, (2014). The cost of one kg feed for groups fed Guar meal & CSC+GM diet were Rs. 14.48 & 16.70 & it results that Guar meal based diet was more economical than diet containing CSC+GM observed by Sharif *et al.*, (2014). While the feed cost per kilogram milk yield was increased with increasing GKM levels showed by Wahab *et al.*, (2016). Protein sources are more economical are reported by Boori (2018), Choudhary (2020).

Therefore, It can be concluded that feeding of Guar meal (T<sub>4</sub>) increased the milk production as compared to Urea and Mustard oil cake feeding in Gir cows as well as increased palatability and utility of poor quality roughage (Wheat straw) and feed cost per litre milk was minimum in T<sub>2</sub> (Urea feeding group) but not better perform on milk yield. T<sub>4</sub> (Guar Meal feeding group) group was also more economical as well as better perform of milk production of Gir cows during winter season.

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