

# Effect of Feeding Hedge Lucerne (*Desmanthus virgatus*) on Milk Production and Milk Composition in Gir Cows

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## ABSTRACT

Present study was conducted on 18 lactating Gir cows selected after attaining peak yield to assess the effect of feeding different levels of Hedge lucerne (*Desmanthus virgatus*) on milk production and milk composition. Cows were divided into three groups having six animals in each group on the basis of body weight, daily milk yield and parity, and randomly allotted to three dietary treatments, i.e., T1 (control) routine feeding adopted at cattle breeding farm, T2 - 75% CP from concentrate and 25% CP from Hedge lucerne, and T3 - 50% CP from concentrate and 50% CP from Hedge lucerne. Overall dry matter intake (kg/day) was found non-significantly different among treatment groups. Mean daily milk yield recorded over entire experimental period of 120 days was 7.48±0.92, 7.82±0.78 and 7.19±0.47 in T1, T2 and T3 groups, respectively, which did not differ statistically. Non-significant difference was also recorded in milk fat (%). However, there was significant difference between groups in terms of lactose, protein and SNF content of milk. It might be due to change in the ratio of concentrate: roughage in the diets of experimental animals.

**Key words:** Cattle, Feeding, Gir, Hedge lucerne, Milk composition, Milk production.

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## INTRODUCTION

Adequacy and poor quality of feeds are the major reasons for low productivity of farm animals in most tropical countries. Moreover, conventional feed resources for animal production are highly expensive in many parts of the world. To sustain the current status of first rank in milk production of India in the world and to achieve the higher targets in milk production, the animals must be fed quality feedstuffs as per their production potential, but there is shortage of about 26 million tonnes of concentrates, 280 million tonnes of green roughage and 44 million tonnes of straws for feeding livestock in the country (Bakshi and Wadhawa, 2004). Therefore, to meet out the nutrient requirements of livestock, there is need to introduce high yielding forage varieties and to improve efficiency of nutrients utilization.

Hedge lucerne is a perennial green fodder crop. It seems to be alternative protein source to traditionally used oil cakes in the ration of ruminants. Cook *et al.* (2020) reported that *Desmanthus virgatus* is palatable to grazing ruminants throughout the growing season. The production in India is very low due to acute shortage of grazing and browsing resources. Hence it is of prime importance to search alternative feed resources to roughages and concentrates for ruminants (Snitwong *et al.*, 2002; Vinothraj *et al.* (2019). Scanty information is available on feeding Hedge lucerne to ruminants Hence, present study evaluated the effect of feeding varying levels of Hedge lucerne on production performance of Gir cattle.

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## MATERIALS AND METHODS

This feeding trial was conducted from July to November 2020 at Cattle Breeding Farm, Junagadh Agricultural University, Junagadh (India) following approval of Institutional Animal Ethics Committee. Eighteen (18) lactating Gir cows were selected after attaining peak milk production on the basis of their average daily milk yield and fat percent. Cows were

divided into three groups having six animals in each group on the basis of body weight, daily milk yield and parity. Cows were offered nutritional requirements as per ICAR (2013) feeding standard.

Three experimental groups were randomly allotted to three dietary treatments, *i.e.*, T1 (control) routine feeding followed at cattle breeding farm, T2 - 75% CP from concentrate and 25% CP from Hedge lucerne, and T3 - 50% CP from concentrate and 50% CP from Hedge lucerne. Daily dry matter intake was recorded throughout the experiment based on measured quantity of feed offered and left over collected on the next day morning. Daily milk yield (kg) of each was recorded for 120 days and then fortnightly average yield/cow was worked out for each group. 100 mL milk samples were also collected for both morning and evening milking at fortnightly interval and the pooled milk samples were analysed for milk composition on Lactoscan COMBO machine (Lactoscan, Milkotronic Ltd, Bulgaria).

The statistical analysis of experimental data was carried out by one way ANOVA. Pair wise differences in means were compared by Duncan's Multiple Range Test and the difference was considered significant at  $p < 0.05$ .

## RESULTS AND DISCUSSION

The observations on average daily dry matter intake, milk yield and milk composition of lactating Gir cows fed concentrate with CP 0.0% (T1) and 25.0% (T2) and 50.0% (T3) from Hedge lucerne (*Desmanthus virgatus*) over 120 days of feeding experiment are presented in Table 1.

The overall mean daily DM intake did not vary between groups. The mean daily milk yields (kg) of experimental cows during entire experimental period of 120 days were  $7.48 \pm 0.92$ ,  $7.82 \pm 0.78$  and  $7.19 \pm 0.47$  in T1, T2 and T3 groups, respectively, which also did not differ significantly ( $p > 0.05$ ) among the groups. It means that Hedge lucerne can be used to replace total crude protein requirement of milch animal up to 50% in the concentrate ration. Results of this study are in agreement with findings by Vinothraj *et al.* (2019).

They revealed that milk yield increased up to 1.5 litre/day/animal when animals were offered mixed green roughage including hedge lucerne. Snitwong *et al.* (2002) recorded increase in 4% FCM by 9.38% and 14.22% as compared to control group when Thai lactating zebu cows were fed with 1.5 kg and 3.0 kg Hedge lucerne leaf meal per day per cow, respectively, along with normal ration. Similarly, the grass intake and milk production was not affected when perennial rye grass was offered to lactating HF cows (Elgersma *et al.*, 2002).

The present study didn't show any significant difference among groups in milk fat (%) and ash (%) content of milk samples of experimental cows indicating that feeding of varying levels of Hedge lucerne (*Desmanthus virgatus*) had no significant effects on these constituents. However, there were significant differences between treatment groups in terms of lactose (%), protein (%) and SNF (%) content of milk in the present study. It might be due to change in the ratio of concentrate: roughage in the diets of experimental animals. Contrary to our findings, Snitwong *et al.* (2002) recorded significantly low percentage of milk fat content when cows were supplemented with Hedge lucerne leaf meal as compared with those fed un-supplemented diet. The total solid of milk was also found decreased with the increased level of dried hedge lucerne feeding. However, other chemical compositions of milk were not affected significantly.

In brief, the experimental results on feeding of Hedge lucerne to lactating Gir cows showed that, 50% crude protein requirement can be replaced by Hedge lucerne without any adverse effect on milk production and milk composition.

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**Table 1:** Effect of hedge lucerne on daily average dry matter intake (kg) and milk yield (kg), and milk composition of experimental Gir cows

Parameter	Dietary treatment groups			P Value
	T1	T2	T3	
Av. dry matter intake (kg/d)	$9.33 \pm 0.08$	$9.40 \pm 0.07$	$9.24 \pm 0.13$	0.56
Av. daily milk yield (kg)	$7.48 \pm 0.92$	$7.82 \pm 0.78$	$7.19 \pm 0.47$	0.84
Av. milk fat (%)	$4.46 \pm 0.16$	$4.40 \pm 0.10$	$4.38 \pm 0.09$	0.89
Av. milk SNF (%)	$8.06^a \pm 0.02$	$8.11^b \pm 0.00$	$8.15^b \pm 0.00$	0.02
Av. milk protein (%)	$3.16^a \pm 0.01$	$3.51^c \pm 0.04$	$3.38^b \pm 0.04$	0.02
Av. milk lactose (%)	$4.16^b \pm 0.02$	$4.03^a \pm 0.03$	$4.14^b \pm 0.02$	0.003
Av. milk ash (%)	$0.80 \pm 0.01$	$0.82 \pm 0.01$	$0.83 \pm 0.01$	0.42

Means with different superscript (a,b) differ significant ( $p < 0.05$ ) between groups.



## REFERENCES

- Bakshi, M., & Wadhwa, M. (2004). Evaluation of forest tree leaves of semi-hilly arid region as livestock feed. *Asian-Australasian Journal of Animal Sciences*, 17(6), 777-783.
- Cook, B.G., Pengelly, B.C., Schultze-Kraft, R., Taylor, M., Burkart, S., Cardoso Arango, J.A., González Guzmán, J.J., Cox, K., Jones, C., & Peters, M. (2020). *Tropical Forages: An Interactive Selection Tool*. 2<sup>nd</sup> revised edn., International Center for Tropical Agriculture (CIAT), Cali, Colombia and International Livestock Research Institute (ILRI), Nairobi, Kenya.
- Elgersma, A., Smit, H.J., Tas, B.M., Taweel, H.Z., Dijkstra, J., Boer, H., & Tamminga, S. (2002). Effect of perennial ryegrass cultivar on intake of fresh grass and milk production. *X European Workshop Techniques for Investigating Intake and Ingestive Behaviour by Farm Animals*, Reykjavik. pp. 4-4.
- ICAR (2013). Daily nutrient requirements of lactating cows under tropical conditions. Indian Council of Agricultural Research, New Delhi, India.
- Snitwong, C., Jindatajak, Y., & Namta, S. (2002). Use of hedge lucerne leaf meal in dairy cows: III. Hedge lucerne leaf meal as protein supplement in roughage-based ration of dairy cows. *Animal Nutrition Division Annual Research Report, Department of Livestock Development, Bangkok*, pp. 204-214.
- Vinothraj, S., Alagesan, P., Saravanakumar, S., & Srinivasan, R.D. (2019). Impact of mixed fodder cultivation in dairy cattle milk yield. *International Journal of Current Microbiology and Applied Sciences*, 8(3), 1000-1003.