

Effect of Herbal Galactogogue Supplementation on Production Performance of Lactating Kankrej Cows

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ABSTRACT

Keywords

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The present study was undertaken to evaluate the efficacy of herbal galactogogue mixture containing *Asparagous racemosous* (Shatavari), *Leptadenia reticulata* (Jivanti) and *Trigonella foenum-graecum* (Fenugreek) on production performance of lactating Kankrej cows. Twenty four lactating Kankrej cows were divided equally into four treatment groups. The T₁ group was fed with basal diet without herbal mixture supplementation (control); groups T₂, T₃ and T₄ were fed with basal diet + 30, 60 and 90 g/cow/day herbal mixture supplementation, respectively. The dry matter intake was comparable among all the treatment groups. Average daily milk yield and 4% fat corrected milk yield were significantly (P<0.05) higher in herbal galactogogue supplemented groups as compared to the control group. No significant differences were observed in milk composition among the different treatments. The percentage daily return over control was 23.95, 24.89 and 19.25 in T₂, T₃ and T₄ groups. Supplementation of Shatavari, Jivanti and Fenugreek in equal proportion at the dose rate of 60 g/cow/day resulted in significant increase in milk yield and daily return income in lactating Kankrej cows.

Introduction

Kankrej is one of the important Indigenous breeds of cattle in India and is found in South-East Rann of Kutch comprising of Mehsana, Kutch, Ahmedabad, Kheda, Sabarkantha and Banaskantha districts of Gujarat and Barmer and Jodhpur districts of Rajasthan. The Kankrej cattle are very highly priced as fast, powerful draft cattle. They are also fair producer of milk. Average milk yield of Kankrej cattle is around 1,738 kg, average calving interval is around 450 days and fat content varies from 2.9 to 4.2 percent (NBAGR, 2017). Whereas, average standard (305 days) lactation yield was 2627 liters with

average calving interval of 447 days has been achieved in Kankrej cows maintained at Livestock Research Station, Sardarkrushinagar Dantiwada Agricultural University, Gujarat (Anonymous, 2017). The optimum milk production is the basic requirement of dairy economics and the milk yield can be increased by the use of certain galactogogue herbs in cattle. Galactogogues are the substances which are believed to assist in the initiation, maintenance, or augmentation of maternal milk production. They increase prolactin secretion by antagonizing dopamine receptors (Gabay,

2002), stimulate the activity of mammary alveolar tissue and thereby regulate milk yield (Ravikumar and Bhagwat, 2008).

Shatavari (*Asparagus racemosus*) is one of the most commonly used herbs in traditional medicine due to presence of steroidal saponins and saponinins (Krishana *et al.*, 2005). It acts as galactogogue and enhances the blood prolactin level and stimulates the cellular division of mammary gland (Pandey *et al.*, 2005; Kumar *et al.*, 2014). Jivanti (*Leptadenia reticulata*) is considered to be a tonic drug and is used to vitalize, nourish and rejuvenate the body. It has potent lactogenic, anabolic and galactogogue effect (Ravishankar and Shukla, 2007). Fenugreek (*Trigonella foenum-graecum*) has been used as such for centuries as a purpose of galactogogue (Swafford and Berens, 2000). Positive effects of these galactogogue herbs on milk production in ruminants have been reported earlier by Patel *et al.*, (2013), Balgees *et al.*, (2013) and Degirmencioglu *et al.*, (2016). The objective of the present study was to investigate the effects of galactogogue mixture of Shatavari, Jivanti and Fenugreek on milk production and feeding economics of lactating Kankrej cows.

Materials and Methods

The present study was conducted at Livestock Research Station, SDAU, Gujarat which is located in semi-arid region of Banaskantha District of North Gujarat having latitude of 24.35° North and longitude of 72.59° East and at an elevation of 189 meters above the mean sea level. Twenty four lactating Kankrej cows were categorized into four treatment groups having six cows in each on the basis of parity, milk yield and body weights. The T₁ group was fed with basal diet without herbal mixture supplementation (control) and groups T₂, T₃ and T₄ were fed basal diet + herbal mixture (Shatavari, Jivanti and Fenugreek at 1 : 1 : 1 ratio) supplementation at the rate of 30, 60

and 90 g/cow/day, respectively. All the animals were fed balanced ration to fulfill the nutrient requirement as per ICAR (2013) feeding standard for a period of 60 days. The feeds and fodders used in the experiment were green maize, jowar hay, cotton seed cake and concentrate mixture. The concentrate mixture was composed of crushed maize grain, 20%; de-oiled rice bran, 35%; rice polish, 10%; molasses, 10%, rape seed cake, 15%, guar bhardo, 7%, mineral mixture, 2% and common salt, 1%. The chemical composition of feeds and fodders were analyzed as per AOAC (1995) procedures.

All the cows were reared under standard management practices with free access to fresh and clean drinking water. All cows were milked twice a day (morning 4:00 a.m. and evening 4:00 p.m.) and individual milk yield of each cow was recorded daily during the experimental period of 60 days by using electronic weighing balance. For analysis of milk constituents, milk samples were collected at weekly interval. Milk fat, solid not fat (SNF), protein and lactose were determined by using EKOMILK Ultra Pro Milk Analyzer. Feed efficiency in terms of dry matter intake kg/kg of milk yield in experimental lactating Kankrej cows was determined. Economics of feeding was calculated by considering expenditure on feeds and herbal mixture supplementation and return from the sale of milk.

Statistical analysis

The data obtained from the experiment were analysed statistically as per the procedures of Complete Randomized Design (Snedecor and Cochran, 1994). Treatment mean comparison was made by using Duncan's New Multiple Range Test (DNMRT) to verify significance difference among treatment mean values. The differences among treatments were declared significant at $p < 0.05$.

Results and Discussion

The chemical composition of feeds and fodders fed to lactating cows is given in Table 1. The crude protein content in concentrate mixture, cotton seed cake, green maize and jowar hay was 18.59, 22.44, 5.37 and 4.81 %, respectively. Feed intake, milk yield and milk composition in lactating Kankrej cows fed herbal supplement are represented in Table 2. The dry matter intake in T₁, T₂, T₃ and T₄ groups was 9.25, 10.34, 10.21 and 10.55 kg/d, respectively, which was comparable among all the treatment groups. The similar feed intake observed in this study indicates that herbal supplementation did not have any adverse effect on palatability. The average milk yield was 8.78, 10.49, 10.67 and 10.55 kg/d in groups T₁, T₂, T₃ and T₄, respectively.

The results indicated that supplementation of galactogogue mixture of herbs significantly increased milk yield as compared to control group. Also, 4% fat corrected milk yield (kg/d) was significantly higher (P<0.05) in groups T₂ (11.78), T₃ (11.97) and T₄ (11.75) than the group T₁ (9.90). The higher milk yield in herbal supplemented groups may be due to estrogenic effect of galactogogue herbs on mammary glands which stimulates alveolar secretory epithelial cell division and proliferation which helps in sustenance of increased milk production. Moreover, these herbs might have helped in optimizing the

ruminal fermentation that ultimately increased the nutrient availability for milk production (Bhatt *et al.*, 2009). Dadkhah and Yeganehzad (2011) also reported that supplementation of galactogogue herbal mixture in dairy cows had higher levels of hormone prolactin and insulin, which lead to increase milk production. Similar to present findings other workers (Patel *et al.*, 2013; Sukanya *et al.*, 2014; Galbat *et al.*, 2014; Degirmencioglu *et al.*, 2016) reported that dietary supplementation of herbal galactogogue in dairy animals significantly increased milk yield. No significant differences were observed in percentages of milk fat, SNF, protein, lactose and total solids among the different treatment groups. In agreement with our result, Tanwar *et al.*, (2008), Baig and Bhagwat (2009) and Patel *et al.*, (2013) who found that there was no significant effect on milk composition in dairy animals fed herbal supplementation.

The total feed cost, net return over feed cost and percentage daily return over control are given in Table 3. The total feed cost (Rs./cow/day) was 127.00, 135.34, 138.50 and 147.59; while net return over feed cost was 136.40, 179.36, 181.60 and 168.91 in T₁, T₂, T₃ and T₄ groups, respectively. The percentage daily return over control was 23.95 (T₂), 24.89 (T₃) and 19.25 (T₄) in herbal galactogogue supplemental groups.

Table.1 Chemical composition (% DM basis) of feeds and fodders

Composition (%)	Concentrate mixture	Cotton seed cake	Green Maize	Jowar hay
Crude protein	18.59	22.44	5.37	4.81
Crude fibre	8.58	10.43	32.53	39.35
Ether extract	3.43	8.33	1.42	1.05
Ash	12.2	7.37	9.57	8.01
NFE	57.2	51.43	48.89	53.22
Calcium	1.19	0.16	0.49	0.44
Phosphorus	0.96	1.07	0.25	0.06

Table.2 Feed intake, milk yield and milk composition in lactating Kankrej cows fed herbal supplement (n=24)

Parameters	Treatments				SEM
	T ₁	T ₂	T ₃	T ₄	
Body weight (kg)	458.33	441.67	452.17	445.67	3.664
DM intake (kg/d)	10.06	10.34	10.21	10.55	0.104
DM intake (% BW)	2.19	2.34	2.26	2.37	0.041
Initial Milk yield (kg/d)	7.09	7.32	7.17	7.23	0.049
Average Milk yield (kg/d)	8.78 ^a	10.49 ^b	10.67 ^b	10.55 ^b	0.449
4% FCM yield (kg/d)	9.90 ^a	11.78 ^b	11.97 ^b	11.75 ^b	0.486
Feed efficiency	1.15	0.99	0.96	1.00	0.043
<i>Milk composition (%)</i>					
Milk fat	4.86	4.82	4.80	4.75	0.023
Milk SNF	9.42	9.60	9.66	9.69	0.060
Milk protein	3.96	4.02	4.11	4.13	0.040
Milk lactose	4.74	4.86	4.93	4.90	0.042
Milk total solids	14.28	14.41	14.46	14.43	0.040

^{a, b} Means within a row bearing different superscripts differ significantly (P<0.05)

Table.3 Economics of feeding herbal supplement to lactating Kankrej cows (n=24)

Parameters	Treatments			
	T ₁	T ₂	T ₃	T ₄
Feed cost (Rs./cow/day)	127.00	130.54	128.90	133.19
Supplement cost (Rs./cow/day)	0.00	4.80	9.60	14.40
Total feed cost (Rs./cow/day)	127.00	135.34	138.50	147.59
Average milk yield (kg/day)	8.78	10.49	10.67	10.55
Receipt from sale of milk @ Rs.30/kg (Rs./cow/day)	263.4	314.7	320.1	316.5
Net return over feed cost (Rs./cow/d)	136.40	179.36	181.60	168.91
% daily return over control	-	23.95	24.89	19.25

The total feed cost, net return over feed cost and percentage daily return over control are given in Table 3. The total feed cost (Rs./cow/day) was 127.00, 135.34, 138.50 and 147.59; while net return over feed cost was 136.40, 179.36, 181.60 and 168.91 in T₁, T₂, T₃ and T₄ groups, respectively. The percentage daily return over control was 23.95 (T₂), 24.89 (T₃) and 19.25 (T₄) in herbal galactagogue supplemental groups. The result of present study concurred with the findings of Tanwar *et al.*, (2008), Patel *et al.*, (2013), Kumar *et al.*, (2014) and Sukanya *et al.*,

(2014) who reported herbal galactagogue supplementation reduced the cost per kg milk production and increased daily return in dairy animals.

Supplementation herbal galactagogue mixture of Shatavari (*Asparagus racemosus*), Jivanti (*Leptadenia reticulata*) and Fenugreek (*Trigonella foenum-graecum*) in equal proportion at the dose rate of 60 g/cow/day resulted in significant increase in milk yield and daily return income in lactating Kankrej cows.

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