

Supplementation of herbal Galactagogues and Calcium for management of low milk yield in cross bred cows: On- farm assessment of technology at field level

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Abstract

A polyherbal galactagogue (*Jeewanti & Shatavari*) and Ca supplementation was evaluated on lactating crossbred cows in Pali district of Rajasthan. A total 50 recently parturated crossbred cows were selected from five villages for on farm trial (OFT) and control (10 cows) during 2008-2013. Four polyherbal galactagogue per day for initial 15 days and 50 ml of Ca supplementation for 305 days were supplemented in treatment group. The daily milk yields of all 50 cows were recorded during the complete lactation period. A significant higher ($p < 0.05$) total milk yield (16.90 %) of treatment group was recorded. Average milk production was increased 350 litres per lactation in treatment group. The cows of treatment group had 45-60 days before show the oestrus symptom than control. The net profit of treatment was INR 600/animal/month higher than control and calculated cost-benefit ratio of treatment and control group was 1:1.25 and 1:1.30 respectively. It was concluded that supplementation feeding of polyherbal galactagogue and Ca to cross bred cow is cost effectively beneficial for milk yield and reproductive management.

Keywords: cross bred cow; Ca; polyherbal galactagogue; milk yield; reproduction

Introduction

Maximum milk production is the basic need in the management of dairy economics. Dairy farming is most effective entrepreneur for rural development, employment and sustained income (Prasad, 2011). It acts as insurance in several adverse condition. India is having 308 million cattle population (GOI, 2019). Rajasthan is the largest state of India endowed with huge livestock production which is at present 56.80 million (Livestock Census, 2019). The cattle and buffalo population is 13.9 and 13.7 million respectively. Rajasthan harbours 11.27 % of the livestock of country. The livestock population has increased by 61% during last century. Rajasthan is having second position in milk production and contributes 12 % of milk to the national production in the year of 2016-2017. Animal husbandry sector Contributed 8 % to the GDP of the state (Animal husbandry department, 2022). The Livestock to Man ratio is much higher in arid areas. There are 124 heads of livestock per 100 persons in arid zone. The land availability per unit of livestock is more in arid region but fodder resources are much less than rest of the state. The per capita availability of milk in Rajasthan is 539 against 523.5 g/day in the country (NDDDB, 2019). Cross bred cows contributed 30 % in total milk production at national level (Annual report, 2022-2023). The average productivity of livestock is lower than the develop country. It is primarily due to shortage of good quality of fodder and other critical nutrients which are required for maintenance of normal physiological functions, production and reproduction of animals. Several measures have been initiated by the Government to increase the productivity of livestock, which has resulted in increasing milk production significantly. Nutritional strategies can be used to prevent metabolic diseases in the early days post-calving and to increase milk production. Galactogogues are medications believed to assist in the initiation, maintenance, or augmentation of milk production. Researcher has also reported significant galactopoietic response in various milch animals (Preciado *et al.*, 2011). Singhal (1995) observed as high as 31.10 % increase in milk yield of Payapro (herbal galactogoue) fed cows; whereas Qureshi (1999) not only observed an increase in milk yield in dairy cows fed with Lectovet (an herbal combination). Herbal preparations have also been shown to relieve the heat stress in dairy cows and ultimately improve their productivity (Zhang *et al.*, 2007). The objectives of the present experiment were to evaluate the effect of the Ca supplementation and herbal galactogogue on milk yield and reproductive performance in dairy cows.

Materials and Methods

The present investigation was designed for technology assessment about low productivity in dairy crossbred animal. The study was conducted in the five villages of Pali district during 2008-2013. Total 50 farmers were selected during the study period. Animals were selected between 3-5 parity and less than one month of calving. The mean previous parity milk yield noted at the start of experiment. All the animal remained tied except for watering. The field trial was conducted in almost similar condition of housing, feeding and other management condition. There physiological parameters were within normal range *viz.* Temp., pulse, resp. and rumination and no history of retention of placenta/ other reproductive problem. Before starting the assessment trial, all the animals were deworming with albendazole 3 gm/ animal. Cows were milked twice daily and milk yield was recorded for every milking using digital weighing machine to weight the bucket after each milking. Galactogoue bolus were given to animal @ 4 bolus / day/ animal for two weeks orally along with calcium supplementation 50 ml/twice a day/animal mix in concentrate. The balance concentrate feed (saras gold) was feed as the half of the milk production of the animals. Farmers concerned were taken before start of on farm trial. The milk yield was noted 305 days/lactation. Resumption of oestrous cyclicity postpartum was evaluated by symptomatic observation of oestrus system by the farmers.

Results and discussion

The average milk yield of control and treatment group is given in Table-1. The average milk yield of control group over a period of 305 days were recorded as 2070 litres, whereas, in treatment group, it was recorded as 2470 litres with the difference of 350 litres/lactation. The milk yield of treatment group was found significantly higher than the control group ($p < 0.05$) with 16.90 % higher in average milk yield over control group. Sridhar and Bhagwat (2007) reported that increase in milk production from 9.13 to 31.10 % on supplementation of herbal galactogogue preparation. Anjaria and Gupta (1967) reported the significant increase in milk yield of goats, sheep, cows and buffaloes with *leptadenia reticulata*. Ramesh *et al.* (2004) also reported net gain in milk yield of 0.819 litres per HF cross-bred cow per day after feeding of Galactin- a polyherbal galactogogue. Further, they found that increased milk yield during the declining phase after peak production of milk was sustained by feeding of Ca supplementation. The effect of herbal preparation might have helped in optimizing the ruminal fermentation that ultimately increased the nutrient availability for milk yield (Bhatt *et al.*, 2009). Galactagoues bolus having Jivanti and Shatavari herb, which promote the milk production. Both the herbs stimulating the pituitary gland to release prolactin. Shatawari increase the cellular activity of mammary gland. So that hormonal balance will maintain in lactating animal. Jivanti herb also improves the quality and composition of milk (Patel *et al.*, 2016).

Due to supplementation of both herb increase production and quality of milk. During the present study, the effect of polyherbal galactagogue was observed better reproductive performance as compared to control animal. It might have better effect at farmers door step as animal may on balanced ration and scientific management condition. The calculated costs of feeding, net return over feeding and cost-benefit ratio are given in table 2. The net return over feed cost/animal/month was found higher (INR 2280) in treatment group than control group (INR1680). The calculated costs of feeding and cost-benefit ratio were 1:1.30 in treatment and 1:1.25 in control group. Results from the current on farm trial indicate that responses to oral calcium supplementation benefited in milk yield and reproductive performance in multiparous cows. These results were similar to findings of other researchers (Santosh *et al.*, 2011; Ravikumar and Bhagwat, 2011) that herbal galactagogue preparations significantly increase the milk yield of cow and thereby improve daily economics in field condition.

It was hypothesized that a reduction in subclinical hypocalcaemia (SCH) would benefit lactation and reproductive performance because hypocalcemia is an important risk factor for early postpartum diseases that impair production and reproduction (Dubuc *et al.*, 2011; Ribeiro *et al.*, 2016). Ca supplementation reduces the incidence of SCH and better reproductive performance. The differences in first oestrus symptom in trial animal and control might be due to reproductive management. Therefore, it is plausible that cows more susceptible to SCH might benefit to fertility. Calcium plays important roles on the oocyte maturation and activation during fertilization (Stricker and Smythe, 2003).

Table 1: Milk yield and reproductive performance of crossbred cows before and after supplementation of polyherbal galactagogue and calcium.

S. No	Name of village	No. of animal	Previous milk yield & reproductive performance			Present milk yield & reproductive performance		
			Milk/ lactation(Lt.)	Average milk production /lactation (Lt.)	Post partum estous (months)	Milk/ lactation (Lt.)	Average milk production /lactation (Lt.)	Post partum estous (months)
1	Gujarodhara	10	1800-2100	1950	5-6	2300-2500	2400	3-4
2	Hemawas	10	2000-2300	2150	4-5	2500-2700	2600	3-4
3	Khandi	10	1700-2000	1850	5-6	2100-2300	2200	3-4
4	Kharia Neev	10	1900-2100	2000	6-7	2200-2300	2250	3-4
5	Roopawas	10	2300-2500	2400	5-6	2600-2700	2650	3-4
Average milk yield per lactation			2070			2420 (16.90 %)		

Table 2: Economics of dairy production as influenced by supplementation of polyherbal galactagogue and calcium

Parameter	Control group	Treatment group
Feed and fodder cost/animal/month (INR)	6600	6600
Cost of input / animal/month	-	800
Total feed cost and input cost/animal/month	6600	7400
Average milk yield/animal/month (litres)	207	242
Market value of milk/animal/month @INR 40/ litre of milk	8280	9680
Net return over feed cost (INR/animal/month)	1680	2280
Cost: Benefit ratio over feed cost	1:1.25	1:1.30

Feedback

After on-farm testing of technology, each and every farmer was provided questionnaire to evaluate the technology.

Final recommendation for micro level situation

Feeding of galactagogue (4 bolus orally/animal for one week), calcium supplementation (50 ml for 305 days) and balance concentrate feed enhance the productivity and fertility of dairy animals.

Constraints identified and feedback

Calcium and galactagogue are unavailable at village level and resulted in improper reproductive performance and low productivity. After curing the low productivity, increase the productivity and reproductive performance of the dairy animals.

Process of farmer's participation and their reaction

The farmers coordinated well with staff of KVK in all stages of the programme implementation and followed the guidelines given to them and adopted the technologies without any deviation. The farmers are now

well aware of the importance of supplementation of calcium and galactagogue in post-partum and reported to KVK staff that they will adopt the technology in future and will be in touch with KVK for other technologies.

Conclusion

An OFT was conducted for management of low productivity in cross bred cow. The study reported that there was increase the milk production in dairy animal after technologies intervention of supplementation of oral calcium and galactagogue. The inter-calving period also reduces and oestrus symptom in animals shows within 3-4 months of period. As a whole this technology has highlighted the effort of team in management of low milk yield in field conditions.

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