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Evaluation of a herbal galactagogue on milk production and composition in GIR cows

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Abstract

The herbal galactagogues are ethnoveterinary products prepared for feeding to lactating cows for improving milk production and composition. The effect of a herbal galactagogue having *Asparagus racemosus*, *Pueraria tuberosa*, *Leptadenia reticulata* and *Trigonella foenum-graecum* (Ydik Healthcare Products LLP, Ahmedabad) was evaluated in 14 healthy lactating Gir cows which were kept under similar management practices and offered with similar feeding materials. The same set of cows was used as treatment as well as control group. The pre-trial period of 1 month was considered as control phase in which animals were not offered the above said galactagogue mixture. After 1 month all cows were fed with said herbal galactagogue mixture @ 15 gm/cow/day for 15 consecutive days. Body condition scoring (BCS) was measured two times, i.e., before feeding of herbal galactagogue mixture and at end of feeding period. The daily milk yield was recorded for whole experimental period. Milk samples were drawn at weekly interval in pretrial phase and 6 observations after completion of feeding galactagogue mixture i.e. 15 days onward. The milk samples were analyzed for milk fat % and SNF% by using Lactoscan machine. The pre-trial set data was compared with post-trial set of data by using independent samples 't' test in SPSS 26. The BCS of cows significantly ($p < 0.01$) improved after feeding the galactagogue mixture. Additionally, the average daily milk yield (lit.), milk fat (%) and SNF (%) also increased significantly ($p < 0.01$). The observations of this pilot study strongly suggest that the herbal galactagogue used in the study has beneficial effects on BCS, milk yield, milk fat and SNF contents in Gir cows; however, it should be subjected to further large-scale investigations to derive stronger recommendations and conclusions using a greater number of cattle.

Keywords: Cows, herbal, ethnoveterinary, galactagogue, milk

Introduction

The consumer's demand for improvised, organic and good quality milk and milk products is now growing on constant basis in India. India holds reputable position in terms of number of milch animals and milk production but surprisingly, it faces difficulties in export of milk to different countries accounting to presence of certain abnormalities which makes the milk unsuitable to some standards set by different countries. One such example is presence of chemicals or drugs (especially antibiotics) used to improve milk quality, quantity and to treat udder affections (such as mastitis). The Government has laid guidelines to curb the menace of antibiotic residues in food and food products for human consumption. The policies laid down by the Government also restricts or bans use of certain hazardous drugs. On the other hand, it is also promoting exploration (in terms of research) and application of ethnoveterinary products which limits the use of synthetic chemicals or pharmaceutical agents in animals. One such ethnoveterinary product is a herbal galactagogue which are exclusively prepared to improve quantity and quality of milk. Various herbs are being used since prevedic era because they are considered to be safe for consumption, cheap to procure and easily available with least or no side effects and no residual effect [1]. There are various synthetic galactagogues which are comparatively costlier than herbal preparations. Galactagogues are described to alter hormonal effects and increase prolactin secretion by performing antagonistic effects on dopamine receptors [2]. They are also involved in stimulation of alveolar tissue, raising secretion, restoring and regulating milk yield [3]. Enhancing milk production can be expected to increase by incorporating herbal galactagogue composed of different herbs having proven effects such as Shatavari (*Asparagus racemosus*), Jivanti (*Leptadenia reticulata*) and Methi (*Trigonella foenum*) [4]; however, the dosage, proportion in formulations etc. are often different as observed in published literatures. Therefore, clinical evaluation of various breeds of cattle and buffaloes at farmer's doorstep is required in order to establish the effects of herbal galactagogue on milk production in milch animals.

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With a similar vision, the present investigation focused on evaluation of herbal galactogogue containing *Asparagus racemosus*, *Pueraria tuberosa*, *Leptadenia reticulata* and *Trigonella foenum-graecum* [Dr. Milk, prepared and provided by Ydik Healthcare Products LLP, Ahmedabad] in Gir cows with an objective to evaluate its efficacy on milk yield and milk composition.

Materials & Methods

The present study was carried out at the Postgraduate Institute of Veterinary Education & Research (PGIVER), College of Veterinary Science & Animal Husbandry, Kamdhenu

University, Rajpur (Nava), Himmatnagar in technical collaboration with Polytechnic in Animal Husbandry section of the College. A herbal galactogogue [In powder form with composition mentioned in Table-1] was procured from Ydik Healthcare Products LLP, Ahmedabad to observe its effect on 14 multiparous clinically healthy Gir cows in early lactation. All the cows were included in the study after obtaining informed consent from the owner. The same set of cows were considered as both treatment as well as control group by dividing period before supplementation (as Pre-trial phase) and after supplementation (as Post-trial phase).

Table 1: Combinations herbal galactogogue used in the study (Dr. Milk, Ydik Healthcare Products LLP, Ahmedabad)

Sr. No.	Contents	Remarks/References found for similar/relevant utility
1	<i>Asparagus racemosus</i>	Patel <i>et al.</i> , (2013) ^[4] ; Patel <i>et al.</i> , (2017) ^[5]
2	<i>Pueraria tuberosa</i>	Patel <i>et al.</i> , (2013) ^[4] ; Patel <i>et al.</i> , (2017) ^[5]
3	<i>Leptadenia reticulata</i>	Patel <i>et al.</i> , (2013) ^[4] ; Patel <i>et al.</i> , (2017) ^[5]
4	<i>Trigonella foenum-graecum</i>	Kirar <i>et al.</i> (2020) ^[6]

The first one month was considered as Pre-trial phase in which animals were not offered the above said galactogogue mixture. After one month all cows were supplemented with said herbal galactogogue mixture @ 15gm/cow/day for 15 consecutive days over and above routine feeding, and the phase was considered as Post-trial phase.

All cows were kept under similar management practices. The

feed and fodders along with proximate composition offered to all the cows during experimental period is mentioned in Table-2. The similar feed ingredients were used to feed all *the* cows of both groups during whole experiment. The green fodder was used were chaffed and mixed with wheat straw for feeding.

Table 2: Proportion and proximate composition of feed ingredients offered (DM basis)

Sr. No	Name of feed ingredients	Proportion in ration (%)	Proximate composition (%)					
			OM	CP	CF	EE	NFE	Ash
1	Concentrate (Sabar dan)	33	91.79	20.05	10.48	4.81	56.45	8.21
2	Lucerne	17	90.88	18.54	26.15	2.71	40.48	9.12
3	Green maize	17	87.31	9.48	31.77	1.83	44.23	12.69
4	Wheat straw	33	81.35	6.78	29.24	2.01	43.32	18.65

(CF; crude fibre, CP; crude protein, EE; ether extract, OM; organic matter, NFE; nitrogen free extract)

The daily milk yield was recorded for the whole experimental period. Milk samples were drawn at weekly interval in pre-trial phase and 6 observations after completion of feeding galactogogue mixture, *i.e.*, 15 days onward (Post-trial phase). The milk samples were analyzed for milk fat (%) and SNF (%) by using Lactoscan machine.

Body condition scoring was done by using a 5-point scale with 0.25-point increments^[7] twice, *i.e.*, before feeding and at end of experiment period. The pre-experimental set data was

compared with post-experimental set of data by using independent samples 't' test in SPSS 26.

Results and Discussion

The data pertaining to the effect of herbal galactogogue mixture under evaluation (Dr. Milk) on body condition score (BCS), milk yield and milk composition of cows under pre and post trial group with pooled average are given in Table-3.

Table 3: Effect of herbal galactogogue on body condition score, milk production and composition in Gir cows (Mean±S.E. values)

Particulars	Pre-trial	Post-trial	Pooled	Significance
n	14	14	28	
BCS	3.45±0.04	3.79±0.10	3.62±0.06	**
Milk Yield				
Average daily milk yield (lit.)	7.89±0.20	8.73±0.21	8.31±0.16	** (p<0.01)
Milk Composition				
Fat (%)	3.30±0.12	3.79±0.10	3.54±0.09	** (p<0.01)
SNF (%)	8.21±0.04	8.59±0.03	8.40±0.04	** (p<0.01)

The values of BCS in *cows* under pre- and post-trial groups were 3.45±0.04 and 3.79±0.10, respectively. It was significantly increased in cows after supplementation of herbal galactogogue. The beneficial effect of galactogogue on improvement of body condition in cows might be associated with increased salivary secretion, enhanced beneficiary

microflora production thereby upgraded the microbial digestion of feeds^[4].

The values of average daily milk yield (lit.) in pre-trial and post-trial groups were 7.89±0.20 and 8.73±0.21 lit., respectively. The post-trial average daily milk yield increased significantly (p<0.01) in cows after supplementation of herbal

galactogogue mixture. It was nearly 11% rise in milk yield was observed after supplementation of herbal galactogogue. The herbal galactogogue might be associated with stimulation of proliferation of alveolar secretory epithelial cells which are responsible for milk synthesis. Moreover, these herbs could have optimized the ruminal fermentation leading to increased availability of nutrition for better production [5]. The said physiological changes in mammary system and digestion pattern might be the reasons for higher milk yield in cows after feeding of galactogogue. Furthermore, the contents of the galactogogues could have increased levels of prolactin and insulin which are responsible for increase in milk production [8]. Similar observations of dietary supplementation of herbal galactogogue increasing milk yield in dairy animals have been observed in previous studies [4, 9, 10, 11, 12].

With regards to the milk composition, the milk fat (%) in pre-trial and post-trial group were 3.30 ± 0.12 and $3.79 \pm 0.10\%$, respectively. The milk (%) was higher ($p < 0.01$) in post-trial phase. The milk SNF (%) was $8.21 \pm 0.04\%$ and $8.59 \pm 0.03\%$, respectively in pre-trial and post-trial groups. The difference in mean SNF between groups under testing was statistically significant. The supplementation of herbal galactogogue reflected into significantly increase in milk fat and SNF% in dairy cows as reported by previous studies [9, 13]. However, many studies didn't observe similar effect of supplementation of galactogogue on milk composition [4, 5].

Conclusion

The herbal galactogogue containing *Asparagus racemosus*, *Pueraria tuberosa*, *Leptadenia reticulata* and *Trigonella foenum-graecum* used in the study has beneficial effects on milk yield, milk fat and SNF content in Gir cows. The observations made in the present study can serve as baseline data to conduct large-scale investigations in a greater number of animals in future.

Conflict of Interest and Acknowledgement

Authors declare no conflict of interest with regards to funding. Study was conducted by using resources from manufacturer of the herbal galactogogue.

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