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Effect of Polyherbal Mixture Supplementation on Postpartum Productive Performance in Karan Fries (KF) Cows

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ABSTRACT

The present study was conducted at Livestock Research Centre (LRC), ICAR-NDRI, Karnal To find out the effect of poly herbal mixture supplementation on postpartum productive performance in KF cows. Thirty multiparous calved KF cows were chosen and divided into three groups, 10 cows in each group. One group was considered as control (C) and other two as treatment groups (T_1 and T_2). The control (C) group cows were offered the ration as per the standard feeding schedule (ICAR, 2013). The treatment group (T_1 and T_2) cows were offered the same ration and then additionally the polyherbal mixture combination (25 g each of the herbals + 25g black salt + 250g jaggery) as a treatment for the first 10 and 20 days postpartum period in T_1 and T_2 group, respectively. The productive related parameters, such as 60 days total milk yield (60 DTMY), peak yield (PY), days to peak yields (DPY), milk compositions and production disorders were recorded in 60 days of postpartum period. The treatment groups, 60 DTMY, PY and DPY were increased as compared to control group. Milk fat % and SNF % of treatment groups (T_1 and T_2) were more or less similar, if compared with the control group. Milk lactose % of T_1 and milk protein% of T_2 were significantly ($P \leq 0.05$) higher at 60^{th} day of lactation. The productive disorders incidence was also very low in treatment groups (T_1 and T2) during the 60 days postpartum period.

Keywords: Postpartum, poly herbal mixture, 60 days total milk yield, peak yield, milk compositions

Our country is the number one milk producer in the world. In India, the crossbred cattle population contribution is a significant role in the total milk production. In relation to its milk production growth rate, our demand (6 - 8%) for milk is also increasing continuously. Due to inferior usage of breeds and lack of availability of balance feed to animals, we could not able to fulfil our country's demand. Efficient milk production is the major factor in dairy farming and dairy processing industry. To achieve the efficient milk production, we should optimize the feed usage to enhance the productive performance.

These signify the importance for substitutes in either natural form (such as herbs) or some other form to use in feeding. In natural form, the herbal feed additives are plant derived products which are used in animal feeding to improve the performance of an animal. These are considered as safe, cheap, locally available and at the same time, it will also improve the production performance of milking animals. It can also use as a complement therapy to control the negative incidence of subclinical mastitis in lactating dairy animals (Giacinti *et al.,* 2008). Hence, our current study was intended to find out the effect of polyherbal mixture supplementation on postpartum productive performance in Karan Fries (KF) crossbred cows.

MATERIALS AND METHODS

Ethical approval

This study was conducted after getting approval from the Research Committee and Institutional Animal Ethics

Committee of ICAR - National Dairy Research Institute, Karnal, Haryana, India.

Location of study

The study was carried out at Livestock Research Centre (LRC) of ICAR – National Dairy Research Institute, Karnal, Haryana, India. The livestock farm situated at an altitude of 245 meters above the Mean Sea Level at 29° 43' N latitude and 760 58' E longitude of Indo-Gangetic alluvial plain. The ambient temperature reaches minimum (0°C) in winter season and maximum (45°C) during summer season. Annual average rainfall is around 700 mm, which is received mostly on July to September month.

Selection and grouping of animals

Thirty peri-partum Karan Fries (KF) crossbred cows were selected in this study and selection of cows based on 3000 to 4500 Kg of Expected Producing Ability (EPA) in LRC of ICAR-NDRI, Karnal. The KF cattle were developed by crossing between exotic Holstein Friesian and indigenous Tharparker breed at 50 – 65 % exotic inheritance level. The selected animals were free from infectious diseases, anatomical and physiological disorders. Selected experimental animals have been randomly divided into three groups, one as control group and the other two as treatment group (T_1 and T_2). Each group comprised of 10 animals (Control = 10, T_1 = 10 and T_2 = 10). In this study all the animals were managed under loose housing and group management system as per the farm schedule.

EXPERIMENTAL DESIGN

Procurement and processing of herbs

Individual herbal was procured from local market after assessing their quality in consultation with ayurvedic practitioner and drug manufacture. Each herbal was pulverized separately. The polyherbal mixture was prepared after mixing pulverized herbs in specific proportion. These herbs and its quantity were mentioned in Table 1. The prepared polyherbal mixture was mixed with 2 Kg concentrate feed. Then, it was offered to the individual animals in morning at 8' O clock.

Table 1: Polyherbal mixture ingredients and its quantity

Sl. No.	Common Name	Name of Herb (in Hindi)	Scientific Name	Part of Herb Used	Quantity
1	Carom	Ajwain	*Trachyspermum ammi*	Seed	25 g
2	Cumin	Jeera	*Cuminum cyminum linn*	Seed	25 g
3	Fengreek	Methi	*Trigonella foenum graecum*	Seed	25 g
4	Ginger	Sundh	*Zingiber officinale*	Rhizome	25 g
5	Fennel	Saunf	*Foeniculum vulgare*	Seed	25 g
6	Indian dill	Sowa	*Anethum graveolens*	Foliage	25 g
7	Turmeric	Haldi	*Curcuma longa*	Rhizome	25 g
			Other Ingredients:		
8	Black salt	Kala namak	—	—	25 g
9	Jaggery	Gur	—	—	250g
			Total		**450 g**

Table 2: Experimental design of polyherbal mixture supplementation in post-partum Karan Fries Cows

Sl. No	Group	Experimental Design
1	Control	Feed as per the standard feeding followed at NDRI farm (ICAR, 2013).
2	T_1	Feed as per the standard feeding followed at NDRI farm (ICAR, 2013) + Polyherbal mixture only in the first 10 consecutive days of first month of postpartum.
3	T_2	Feed as per the standard feeding followed at NDRI farm (ICAR, 2013) + Polyherbal mixture only in the first 20 consecutive days of first month of postpartum.

Data recording

During the experimental period 60 days total milk yield (60 DTMY), peak yield (PY), days to peak yield (DPY), milk composition (Fat%, SNF%, Lactose% and Protein%) at fortnight interval and percentage of productive disorders (Abomasal displacement, Clinical mastitis, Milk fever and Ketosis) were recorded.

Statistical analysis

The mean and standard error were calculated and the calculated mean values were analysed by one-way ANOVA with the help of SPSS software.

RESULTS AND DISCUSSION

The mean ± standard error 60 days total milk yield (60 DTMY), peak yield (PY) and days to peak yield (DPY) of control (C), T_1 and T_2 group were presented in Table 3. The average 60 DTMY and PY higher in polyherbal supplemented group (T_1 and T_2) as compared to C group. But, these values were statistically non-significant at any level. The T_1 and T_2 group milk production was increased at 11.9% and 13.9%, respectively with control group. This result was supported by Thakur *et al.* (2006) in KF cows were herbal supplementation significantly increased the milk yield around 10% in mid-lactation. The present findings also supported by (Mahanta *et al.,* 2004) and (Chandra *et al.,* 2017) in Murrah buffaloes; Mishra *et al.* (2008) in crossbred cows; (Patel *et al.,* 2013) in Surti buffaloes. But, most of these findings were statistically significant. The T_1 and T_2 PY production was 1.75 Kg and 1.55 Kg higher than control (C) group. These PY also attained late compare to control group. The obtained value shows that the polyherbal mixture increased the DPY around 5 - 10 days.

Table 3: 60 Days Total Milk Yield (60 DTMY), Peak Yield (PY) and Days to Peak Yield (DPY) of Control and Polyherbal Supplemented Karan Fries cows

Group	Milk Production Performance		
	60 DTMY (Kg)	PY (Kg)	DPY (Days)
Control (C)	784.50 ± 62.51	16.00 ± 0.98	36.40 ± 7.46
10 days treatment (T_1)	878.00 ± 45.65	17.75 ± 0.82	41.60 ± 4.44
20 days treatment (T_2)	893.10 ± 74.15	17.55 ± 1.19	47.30 ± 6.29

The mean values of fortnight interval milk composition of control, T_1 and T_2 groups were presented in Table 4.The control group fat % continuously decreased up to 3rd fortnight period and then it increased. The T_1 and T_2 group fat% continuously increased throughout the experimental period. Overall, the fat% was high at 4th fortnight interval in control group. But, the rates of increasing or decreasing values were nowhere significant in the entire group of animals.

Table 4: Fortnight Interval of Milk Composition (Fat%, SNF%, Protein% and Lactose %) of Control and Polyherbal Supplemented Postpartum Karan Fries Cows

Group	Fortnight Interval of Fat% (Mean ± S.E)			
	1st	2nd	3rd	4th
Control (C)	3.90 ± 0.27	3.89 ± 0.23	3.78 ± 0.25	4.16 ± 0.25
T_1	3.68 ± 0.11	3.75 ± 0.10	3.78 ± 0.16	3.82 ± 0.13
T_2	3.88 ± 0.17	3.90 ± 0.17	3.91 ± 0.11	4.10 ± 0.28
	Fortnight Interval of SNF% (Mean ± S.E)			
Control (C)	8.67 ± 0.05	8.64 ± 0.05	8.62 ± 0.08	8.63 ± 0.04
T_1	8.66 ± 0.04	8.66 ± 0.03	8.69 ± 0.03	8.65 ± 0.04
T_2	8.69 ± 0.06	8.62 ± 0.03	8.65 ± 0.04	8.64 ± 0.05
	Fortnight Interval of Protein% (Mean ± S.E)			
Control (C)	3.11 ± 0.03	3.16 ± 0.05	3.14 ± 0.04	3.19^{A} ± 0.04
T_1	3.18 ± 0.06	3.23 ± 0.06	3.26 ± 0.06	3.04 ± 0.08
T_2	3.16 ± 0.05	3.25 ± 0.04	3.23 ± 0.04	3.25^{B} ± 0.04
	Fortnight Interval of Lactose% (Mean ± S.E)			
Control (C)	4.21 ± 0.06	4.15 ± 0.06	4.13 ± 0.06	4.19^{A} ± 0.05
T_1	4.15 ± 0.07	4.21 ± 0.09	4.13 ± 0.06	4.29^{B} ± 0.04
T_2	4.16 ± 0.08	4.22 ± 0.07	4.16 ± 0.07	4.14 ± 0.06

The lactose % of control group continuously decreased up to 3rd fortnight of postpartum. The treatment groups (T_1 and T_2) shown continuous increased in milk lactose% up to 2nd fortnight of lactation period, and then it was decreased. On 4th fortnight of lactation, the T_1 group lactose% (4.29 ± 0.04) was significant at 5% level ($P<0.05$).

The similar findings were in accordance with Berhane and Singh, 2002 in crossbred cows, (Mishra *et al.,* 2008) in crossbred cows, (Tanwar *et al.,* 2008) and (Patel *et al.,* 2013) in Surti buffaloes, (Chandra *et al.,* 2017) in Murrah buffaloes and Barjibhe, 2016 in Sahiwal cattle where the herbal feeding in lactating animals had shown significantly higher milk lactose percentage than the non- supplemented group animals.

Effect of polyherbal with productive disorders

The productive disorder (%) of control, T_1 and T_2 group in sixty days postpartum period Karan Fries cows have been presented in Table 5. Clinical mastitis and ketosis percentage of control group was 20% and 10%,

respectively in 60 days postpartum period. Mainly the mastitis incidence was happened due to hormonal changes and it alters the immune responsiveness during the periparturient period (Cai *et al.,* 1994 and Grohn *et al.,* 1995). Abomasal displacement and milk fever was not observed in the entire three groups in throughout the experimental period. The clinical mastitis incidence of T_2 group was found to be 10%. No productive disorders were recorded in T_1 group. This was shown that the herbal feeding of animals improved the microbial resistance as compared to control group in 60 days postpartum period.

Table 5: Productive disorders (%) of Control and Polyherbal Supplemented Postpartum Karan Fries Cows

Productive Disorders	Different Groups of Productive Disorders (%)		
	Control (C)	T_1	T_2
Abomasal Displacement	0%	0%	0%
Clinical Mastitis	20% (2/10)	0%	10% (1/10)
Milk Fever	0%	0%	0%
Ketosis	10% (1/10)	0%	0%

In this aspect, (Ponnusamy *et al.,* 2017) reported that *Chenopodium* paste, turmeric (contain curcumin), gugal, babul and other ingredients (salt, honey and alum) paste were used for treating mastitis. The astringent, anti-inflammatory and antibacterial effect of turmeric helped for reducing the mastitis incidences. The sugar cane may be the reason behind the prevention of ketosis incidence in treatment (T_1 and T_2) groups as compared to control group.

CONCLUSION

The ancient practice of supplementing poly-herbal mixture during postpartum is well known, however newer findings of our present study depicting that supplementation of poly-herbal mixture improves the productive performance and productive disease resistance in early postpartum Karan Fries (KF) crossbred cows.

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