

*Original Research***Effect of Polyherbal Supplementation on Milk Performance of Crossbred Cows****Krishan Lal Gautam*, Rohit Bishist, Bhupender Dutt¹ and Jigmet Namgial**

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Abstract

An experiment was conducted to study the effect of polyherbal supplementation on milk yield and milk quality parameters of crossbred cows maintained at university dairy farm at Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan. Twelve advanced pregnant crossbred lactating cows in their 3rd to 5th lactation was selected on the basis of their body weight and previous lactation milk yield and were divided into two equal groups of six animals in each group. In the treatment group of animals polyherbal mixture was supplemented @ 100 g day⁻¹ cow⁻¹ for a period of 105 days (days pre calving to 90 days post calving) whereas, in control group of animals no supplementation was done. Supplementation of polyherbal mixture resulted in significantly higher average milk yield (kg day⁻¹) in treatment group (8.70 kg day⁻¹) as compared to control group (7.38 kg day⁻¹). Average milk fat%, SNF%, total solid% and protein % were significantly higher in treatment group (4.21, 8.67, 12.83 and 3.44) as compared to control group (3.52, 8.34, 11.86 and 3.34). Net returns on feeding of polyherbal mixture to the lactating crossbred cows were Rs 157.08 which was higher as compared to control group (Rs. 112.97 cow⁻¹day⁻¹). The study concluded that there was 9.3% higher milk yield, early peak yield and better milk composition (fat%, protein, SNF% and total solid %) as compared to that of non-supplemented group.

Key words: Crossbred, Lactation, Polyherbal Mixture, SNF**How to cite:** Gautam, K., Bishist, R., Dutt, B., & Namgial, J. (2019). Effect of Polyherbal Supplementaion on Milk Performance of Crossbred Cows. International Journal of Livestock Research, 9(7), 204-210. doi: 10.5455/ijlr.20190212022005**Introduction**

Livestock is an indispensable part of the traditional agricultural systems of India and plays a major role in generating cash income through the production of milk, butter, meat, egg, hides, skin, wool and manure etc. India supports about 16% of earth's human population and 10.71% of the world's livestock population. India is world's largest producer of milk with an estimated milk production of 163.7 MMT in 2016-17 and

registering a gain of 5.3 per cent against the backdrop of two consecutive drought years during 2014-15 and 2015-16. The share of gross value added of livestock sector to total agriculture (crop and livestock) has increased from 23.8 per cent in 2011-2012 to 26.7 per cent in 2014-15 at constant prices (Anonymous, 2016).

Feed additives or feed supplements viz. medicinal plants extracts, leaf, seed, root *etc.* are added in the standard ration to improve digestion process, immunity and to enhance the quantity and quality of milk. Being a component of nature, these preparations are considered safe, cost effective and environment friendly with no side effect on animal body and producing the milk with highest quality. *Lepidium sativum* (Chandarshoor) belongs to family Brassicaceae and is widely cultivated in tropical and subtropical zones of India. Seeds and leaves of this plant possess diuretics and aphrodisiac properties and are recommended in inflammation, bronchitis, rheumatism and muscular pain (Sharma and Agarwal, 2011). It has a galactogogue effect in animal body by promoting synthesis of milk and improving productivity. Supplementary feeding of polyherbal galactogogue containing *Lepidium sativum* to lactating buffaloes has been reported to be a cost effective method for increasing milk yield and general health condition (Patel *et al.*, 2013). Present study was carried out to assess the effect of inclusion of *Lepidium sativum* in polyherbal mixture on milk production and milk quality parameters of crossbred cows.

Material and Methods

Study was conducted in 2016-17 to assess the effect of supplementation of polyherbal mixture @ 100g/day (Table 1) to the crossbred cows maintained at the dairy farm, Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan (H.P). Twelve advanced pregnant crossbred lactating cows in their 3rd to 5th lactation cows were selected on the basis of their body weight and previous lactation milk yield and were divided into two equal groups with six animals in each group.

Table 1: Ingredient composition of polyherbal preparation

Herb	Part Used	Percent Inclusion
<i>Lepidium sativum</i>	Seed	50
<i>Withania somnifera</i>	Root	15
<i>Tinospora cordifolia</i>	Stem	10
<i>Asparagus racemosus</i>	Roots	10
<i>Leptadenia reticulate</i>	Roots	15

Each animal in treatment group was supplemented with polyherbal mixture @100gm day⁻¹ + standard ration, whereas, animals in the control group were not supplemented with any polyherbal mixture. The milk yield of all the twelve animals were measured daily after 6th day of lactation upto 90 days of lactation. Milk samples were collected from each lactating cow in a clean milk sample bottle during morning and evening milking at the interval of 15 days. Milk samples were subjected to analysis of various parameters viz. fat

%, SNF%, total solids %, protein%, specific gravity and acidity % (FSSAI, 2012). The data so obtained was analysed using OPSTAT statistical software.

Results and Discussion

Milk Yield (kg day⁻¹)

Perusal of data in Fig. 1 revealed that the supplementation with polyherbal supplement resulted in significant increase in the milk yield of crossbred cows as compared to the control group. Average milk yield (kg day⁻¹) in treatment group (8.70) was significantly higher than that of control group (7.38). In the treatment group milk yield increased by 23.5 per cent from the initial day of milk production whereas in control group it increased by 14.12 per cent. Feeding of polyherbal supplement resulted in 9.3 per cent higher milk yield as compared to control. It is evident from the data presented in Fig 1 that feeding of polyherbal supplement in the treatment group 15 days prior to calving and in early lactation period resulted in comparatively higher initial milk yield, which subsequently increased and early peak yield was recorded on day 35-50 days (9.26 kg day⁻¹) after calving whereas in control group peak yield was recorded on day 50-65 (7.86 kg day⁻¹) and subsequently decreased to 7.25 kg day⁻¹ on day 80-95.

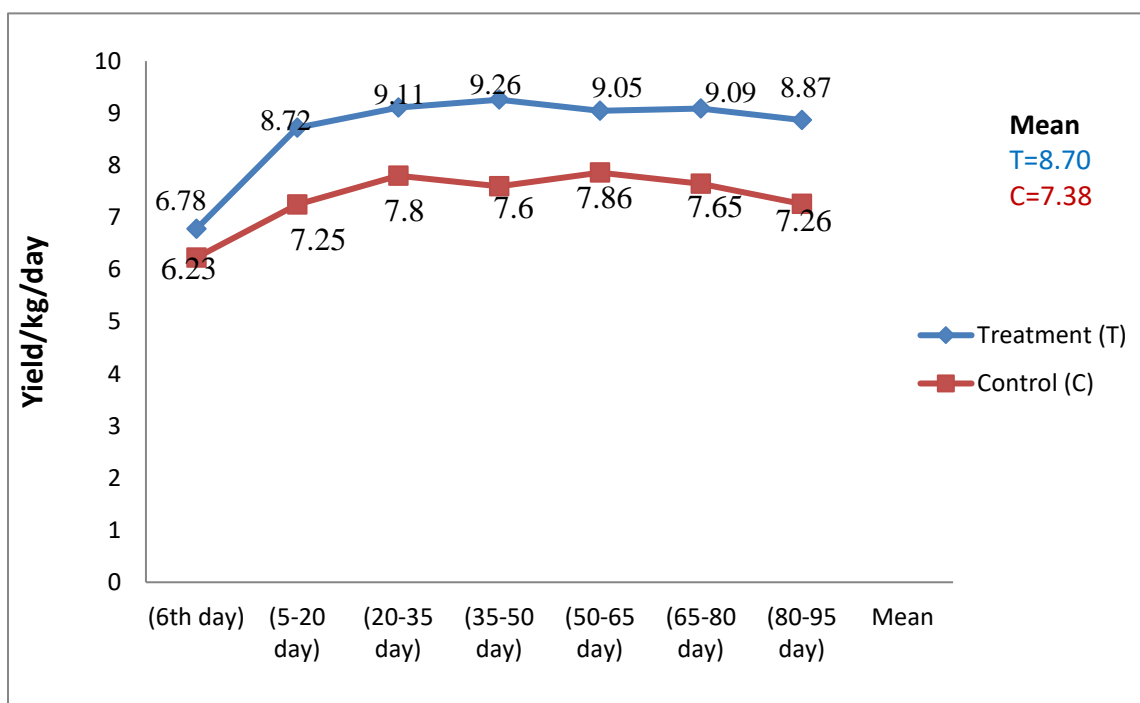


Fig. 1: Effect of polyherbal supplementation on Milk yield (animal kg⁻¹ day⁻¹) at different intervals

Findings in the present study are in agreement with the previous studies of Kumar *et al.* (2011) who reported that supplementation of *Lepidium sativum* @ 150 g day⁻¹ resulted in significant increase in the milk yield of buffaloes as compared to the control group. Mir *et al.* (2015) also reported that 10.1 per cent increase in the

milk yield of Murrah buffaloes on supplementation of *Tinospora cordifolia* in ration. Baig and Bhagwat (2009), Bhatt *et al.* (2009) and Ramesh *et al.* (2000), also found significant increase in milk yield of goats, sheep, cows and buffaloes on supplementation of *Leptadenia reticulata*.

Milk Composition

Data pertaining to the effect of polyherbal supplementation of milk composition of crossbred cows is presented in Table 2. Fat is the most important constituent of milk which is utilized for fixing the price of milk for purchase and sale. The average milk fat per cent was significantly ($P < 0.05$) higher in treatment group (4.21) as compared to the control group (3.52). Highest milk fat (4.57%) was recorded on day 95 of the sample collection in treatment group which was statistically at par with milk fat % of 4.47, 4.37 and 4.33 on day 80, 65 and 50, respectively in the treatment group and was significantly higher than the milk samples collected on day 6, 20 and 35 of the treatment group and all the milk samples collected from the control group.

Table 2: Effect of polyherbal supplementation on milk composition at different intervals

Observation	Days/ Groups	I	II	III	IV	V	VI	VII	Mean
		(6day)	(20day)	(35day)	(50 day)	(65 day)	(80 day)	(95day)	
Fat (%)	Treatment (T)	3.69	3.87	4.14	4.33	4.37	4.47	4.57	4.21
	Control (C)	3.47	3.55	3.52	3.54	3.49	3.5	3.55	3.52
Solid Not Fat (%)	Treatment (T)	8.452	8.644	8.698	8.719	8.69	8.717	8.775	8.67
	Control (C)	8.242	8.382	8.359	8.365	8.359	8.355	8.317	8.34
Total Milk Solids (%)	Treatment (T)	12.16	12.17	12.84	13.05	13.06	13.19	13.35	12.83
	Control (C)	11.72	11.93	11.88	11.9	11.85	11.85	11.87	11.86
Specific gravity	Treatment (T)	1.028	1.028	1.029	1.029	1.029	1.029	1.029	1.029
	Control (C)	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028
Acidity (%)	Treatment (T)	0.137	0.137	0.138	0.137	0.138	0.138	0.138	0.138
	Control (C)	0.135	0.134	0.135	0.135	0.136	0.135	0.135	0.135
Protein (%)	Treatment (T)	3.55	3.53	3.44	3.4	3.41	3.39	3.4	3.44
	Control (C)	3.35	3.35	3.35	3.35	3.35	3.33	3.33	3.34

The average SNF per cent was significantly ($p < 0.05$) higher in the treatment group (8.67) as compared to control group (8.34). The average total milk solids per cent was significantly ($p < 0.05$) higher in the treatment group (12.83) as compare to the control group (11.86). Interaction effect between the group and time period exercised a significant ($P < 0.05$) effect on total milk solid per cent in the milk of crossbred cows of both the groups. The highest total milk solid per cent (13.35) was observed in the milk samples collected from crossbred cows of treatment group on day 95 and the minimum (11.71) was observed in the control group on day 6. Highest total milk solid in the milk (13.35) was recorded on day 95 of the sample collection in treatment group which was statistically at par with 13.19, 13.06 and 13.05 on day 80, 65 and 50 respectively in the treatment group, and was significantly higher than the milk samples collected on day 6,

20 and 35 of the treatment group and all the milk samples collected from the control group. The groups, time intervals as well as interaction effect between groups and time intervals exerted a non-significant ($p>0.05$) effect on specific gravity in the milk of crossbred cows of both the groups. The average specific gravity was higher (1.029) in the treatment group as compared to the control group (1.028). The changes in milk acidity level of crossbred cows during the experimental showed that the groups, time period as well as interaction effect between the group and time period exerted a non-significant effect in both the group of animals.

Total milk protein per cent was significantly influenced by groups, time period as well as interaction effect between groups and time period. While comparing the effect of groups, significantly ($p<0.05$) higher mean total milk protein were observed in the treatment group of animals (3.44) as compared to the control group (3.34) of the animals. The interaction effect between groups and time intervals showed a significant ($p<0.05$) effect on total protein content in the milk of crossbred cows of both the groups. Highest milk protein per cent (3.55) was recorded in the cross bred cows in treatment group on day 6th after the calving which was statistically at par with the 3.53 on day 20 in the treatment group and was significantly higher than the milk samples collected on day 35, 50, 65, 80 and 95 of the treatment group and all the milk samples collected from the control group whereas, lowest milk protein per cent (3.33) was recorded in the milk samples of cross bred cows of control group on day 95.

Findings in the present study are in the agreement with the study of Shah and Mir (2004) who reported 4.47 per cent milk fat on feeding of fenugreek seeds as compare to the control (4.01%). Chandra *et al.* (2017) also reported that milk fat per cent in Murrah buffalo was significantly higher in treatment group supplemented with polyherbal mixture containing *Foeniculum vulgare*, *Trachyspermum ammi*, *Trigonella foenumgraecum*, *Zingiber officinale*, *Anethum graveolens* and *Elettaria cardamomum* as compare to the control group. Fat content of milk of experimental cows may increases as chandrasoor contain higher amount of various types of glucosinates which might enhance the activity of biorumen hydrolysis mechanism therefore fat content during the study increases significantly (Bauman and Devis, 1994). Sharma *et al.* (2014) was reported that supplementation of polyherbal mixture resulted in improvement of body weight, milk fat, protein, lactose and SNF yield in Karan fries crossbred cows. Patel *et al.* (2013) and Kumar *et al.* (2014) also reported slightly higher levels of SNF per cent was observed in milk of Surti buffaloes and Karan Fries crossbred dairy cow fed with polyherbal galctogogue supplements and asparagus root powder as compared to the control. Divya *et al.* (2015) who reported that the total solid content in milk was significantly higher in treatment group supplemented with shatavari as compared to control. Kholif *et al.* (2012) reported that supplementation of garlic, cinnamon or ginger oil increases the milk protein per cent in lactating goats.

Bio-economics of the Trial

Data presented in Table 3 reveal that the cost of daily polyherbal supplementation (Rs cow⁻¹ day⁻¹) was Rs 13.97. Higher total feeding cost Rs 253.22 was observed in treatment group as compared to the control group Rs 239.25. Average daily milk yield in treatment and control group was 7.48 and 8.70 Kg cow⁻¹, respectively. It is evident from the table 4 that the gross return (Rs day⁻¹ cow⁻¹) was Rs 410.3 and 352.22 in treatment and control groups, respectively. On comparison of net returns between control and treatment group it was observed that net return was relatively higher in the treatment group (cow to be fed with the polyherbal supplement @100 g day⁻¹+standard ration) as compared to control (cow to be fed only with the standard ration). Net return was higher (157.08 Rs day⁻¹ cow⁻¹) in treatment group as compared to control (112.97 Rs day⁻¹ cow⁻¹).

Table 3: Economics of polyherbal supplementation in crossbred dairy cows

S. No.	Parameters	Control	Treatment
1	Cost of polyherbal supplement @ 100 g day ⁻¹ cow ⁻¹ (Rs day ⁻¹)	0	13.97
2	Cost of concentrate mixture @ 4 kg day ⁻¹ cow ⁻¹ (Rs kg ⁻¹ Cow ⁻¹)	82	82
3	Cost of green fodder @ 20 kg day ⁻¹ cow ⁻¹ (Rs day ⁻¹ Cow ⁻¹)	60	60
4	Cost of wheat straw @5 kg day ⁻¹ cow ⁻¹ (Rs day ⁻¹ Cow ⁻¹)	37.25	37.25
5	Medicine cost (Rs day ⁻¹ Cow ⁻¹)	5	5
6	Labour cost (Rs day ⁻¹ Cow ⁻¹)	55	55
7	Total	239.25	253.22
8	Milk production (kg day ⁻¹)	7.38	8.7
9	Cost of milk (Rs kg ⁻¹)	44	44
10	Cost of cow dung @ 10 kg day ⁻¹ cow ⁻¹ (Rs day ⁻¹ Cow ⁻¹)	27.5	27.5
11	Gross return (Rs day⁻¹ Cow⁻¹)	352.22	410.3
12	Net return (Rs day⁻¹ Cow⁻¹)	112.97	157.08

The results in the present study are in agreement with the previous studies of Patel *et al.* (2013) who reported that net return over feed cost animal⁻¹ day⁻¹ was recorded higher (1594.90 Rs cow⁻¹ month⁻¹) in treatment group on feeding of polyherbal supplement as compared to control (1255 Rs cow⁻¹ month⁻¹). Bhat *et al.* (2009) also reported that the net profit was calculated as US \$ 1.58, 2.37 and 1.95 animal⁻¹ day⁻¹ in control, Ruchamax and Payapro supplemented animals respectively.

Conclusion

The studies on the effect of polyherbal supplementaion on milk performance of crossbred cows resulted in 9.3% higher milk yield, early peak yield and better milk composition (fat%, protein, SNF% and total solid %) as compared to control group. Net return on feeding of polyherbal mixture to the lactating crossbred cows were Rs 157.08 which was higher than the control group (Rs.112.97).

Acknowledgments

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