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Feed additives and supplement effect on production performance of cross breed lactating cows

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Abstract
The experiment was carried out for a period of 45 days (November, 2016 to December, 2016) split into 1 phase or 45 days i.e. winter season on crossbred cows at the Dairy Farm, Department of Animal Husbandry and Dairying, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi. This experiment was conducted comprising three feed additive groups, with 18 crossbred cows in each group. The animals were randomly divided into 3 groups with 6 animals in each group. Cows group was selected according to their milk production, three lactation period and body weight to maintain the similarity in the trial. 6 cattle of group T_1 was feeding only concentrate farm feed " A "roughages without mineral mixture supplements. (Table 1), 6 cattle of group T_2 was feeding mineral mixture (vitamin D_3, vit. B_{12}, Phosphorus, Calcium) supplement fed concentrate farm feed, roughages "B" as per recommendation which is 50gm/cattle/day (Table 2) and 6 cattle of group T_3 was feeding mineral mixture (Vit. A, Vit. D_3, Vit. E, Biotin, Niacin, Ferrous, Copper, Manganese, Zinc, Mg, Co, Iodine, Selenium, Chromium and Potassium) supplement fed concentrate farm feed, roughages "C" as per instruction which is 50gm/cattle/day (Table 3). Milk yield was recorded at pretreatment (0 day) and post treatment (45 day). After complete experiment in three group of milk production T_3(Treatment) group was increase total milk production.

Keywords: concentrate farm feed, roughages, mineral mixture, cross breed cow, milk yield

Introduction
About 66 percent of India's population is employed in agriculture and related industries such as dairy farms and poultry farms. But mostly in the rearing of cattle and buffaloes, which is a complementing activity to agriculture. Despite having the world's largest livestock population, India's livestock production is of a backward nature. Furthermore, in livestock operations with existing resources and infrastructure, the gap between possible and achieved productivity is larger than in any other industry. India is the world's leading producer of milk, accounting for 18.5 percent of global output. By producing 146.3 million tons of milk in 2014-15, India overtook the United States as the world's greatest milk producer India currently has a projected human population of more than 1 billion people, and it is the world's leading milk producer, with an annual output of around 155.5 million tons of milk in 2015-16. In India, Utter Pradesh ranks first in milk production with 26.4 million tones, followed by Rajasthan with 18.5 million tonnes (2015-16 Statistics, NDDB), resulting in per capita availability of 337 gm (2015-16 Statistics, NDDB) per day, compared to the Indian Council of Medical Research's recommendation of 285 g per day (ICMR). In 2013, it was higher than the global average of 294 grammes per day. The Livestock Results from December 2015. In order to boost milk production Supplements are critical for improving the performance of dairy animals. The most essential components of the mineral mixture are enzymes, growth promoters, antibiotics, toxin reducers, vitamins, flavors, antioxidants, and so on. Several of these items are imported from wealthy nations. Mineral supplementation aids in the growth of livestock and their yield capacity, such as reproduction efficiency and milk production. It also aids in the efficient utilization of absorbed nutrients and in a variety of other ways, resulting in improved growth, milk production, and reproduction efficiency. The National Dairy Development Board has established a standardized formulation, plant, and procedure for the manufacturing of mineral combination. For appropriate bodily upkeep, growth, and reproduction, dairy cattle and buffaloes require a variety of dietary mineral components. Major or essential minerals are those that are required in high quantities.

Material and Methods
This investigation was undertaken to study the milk production in lactating crossbred cows on diet containing different feed supplements.

The trial was conducted lactating cows maintained at dairy farm, Department of Animal Husbandry and Dairying, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi. The city of Varanasi is located in eastern part of Uttar Pradesh, which extends from $80^0$45' E to $84^0$30' E and $23^0$45' N to $28^0$30' N. It is situated approximately in the center of North Gang tic alluvial plain on the left bank of river Ganga at an altitude of 128.93 meters from sea level. It comes under subtropical climate and is often subjected to extremes of weather condition, with an average rainfall of about 110 cm per annum. A total of 18 crossbred cows was selected. The animals were quite healthy and all the 18 cross bred cows was randomly divided into 3 groups with 6 animals in each group. Cows group was selected according to their milk production, three lactation period and body weight to maintain the similarity in the trial. The animal was housed in well ventilated cemented sheds which was washed and cleaned daily. The animal was maintained in experimental sheds with arrangement for individual feeding and watering. Proper attention was paid to cleanliness and other related hygienic conditions. The cross bred cows were dewormed and vaccinated against Foot and Mouth disease, Black quarter and Haemorrhagic septicaemia disease. Milking was done by hand milking twice daily from individual animal i.e. early morning at 4.00 A.M. and again at 4.00 P.M. during the experimental period and Daily milk yield was recorded for individual animals at each milking time by using a circular. Data was analyses using the model of the Two Factorial CRD Statistical analysis and simple calculation for mean is done by formula given below:-

Grouping of experimental animals

1. Group T1's 6 cattle were fed only concentrate farm feed "A"roughages with no mineral mixture supplements.(See Table 1)
2. Mineral mixture supplement (macronutrients), feed concentrate farm feed, roughages "B" were fed to 6 cattle in group T2 according to the recommendation of 50gm/cattle/day. (See Figure 2)
3. Mineral mixture supplement (micronutrients), feed concentrate farm feed, roughages "C" were fed to 6 cattle in group T3 as per instruction, which were 50gm/cattle/day. (See Table 3)

Table 1: Concentrate farm feed

	Heifer	Cow
Constraint mixture (maize + rice + mustard + cotton cake + Gram Churi)	8 kg	12 kg
Green fodder (Oat + Berseem + Sorghum)	10 kg	15 kg
Dry fodder	6 kg	8 kg
Salt	50 gm	50 gm
Calcium	-	100 ml

Table 2: Composition of Mineral Mixture Supplements "B" Each 100 gm Contain

Vitamin D_3	16000 IU
Vitamin B_{12}	400 MCG
Phosphorus	14.25 GM
Calcium	26.000 GM

Table 3: Composition of Mineral Mixture Supplements "C" Each Kg contains

Minerals	Quantities
Vitamin A	2.500 MIU
Vitamin D_3	0.260 MIU
Vitamin E	14.00 MIU
Biotin	0.400 gm
Niacin	100 gm
Ferrous	25 gm
Copper	5 gm
Manganese	14 gm
Zinc	18 gm
Magnesium	30 gm
Cobalt	0.360 gm
Iodine	0.800 gm
Selenium	0.140 gm
Chromium	0.180 gm
Potassium	60 gm

Result and Discussion

Milk yield was recorded at pre treatment (0 day) and post treatment (45 day). The average milk yield(per day) pre experiment of all six cows was 8.2, 8.3, 9.5, 9.9, 11.3, and 11.6 (lit) with an overall average 9.57 (lit) respectively in T_1(control) group; 11.2, 11.3, 11.4, 11.7, 9.3 and 9.5(lit) with an overall 10.06 (lit) respectively in T_2 (Treatment) group and 9.6, 9.8, 9.5, 9.9, 11.2 and 11.5(lit) with an overall 10.35 (lit) respectively in T_3 (Treatment) group. Average milk yield was post treatment of all six cows was 9.5, 9.5, 10.5, 10.9, 9.3 and 9.7(lit) with an overall average 9.67(lit) respectively in T_1 (control) group; 8.6, 8.7, 10.3, 10.7, 10.2 and 10.5 with 10.3, 10.4, 9.2, 9.7, 10.8, and 11.1(lit) with an overall 10.65(lit) in the T2 (Treatment) group, and 10.3, 10.4, 9.2, 9.7, 10.8, and 11.1(lit) with an overall 10.65(lit) in the T3 (Treatment) group. To see the effect of various mineral mixtures on milk yield in litter different types of variances were analyzed. The milk yield in various groups differ significantly ($P< 0.05$).

Table 4: Impact of various feed supplement on total milk yield during experimental period (in Liter/day)

Cow Numbers	T1		T2		T3	
	0 Day	45 Days	0 Day	45 Days	0 Day	45 Days
1	8.2	9.5	11.2	8.6	9.6	10.3
2	8.3	9.5	11.3	8.7	9.8	10.4
3	9.5	10.5	11.4	10.3	9.5	9.2
4	9.9	10.9	11.7	10.7	9.9	9.7
5	11.3	9.3	9.3	10.2	11.2	10.8
6	11.6	9.7	9.5	10.5	11.5	11.1
Total	57.4	58	60.4	62.8	62.1	63.9
Mean	9.57	9.67	10.06	10.47	10.35	10.65

Table 5: Milk yield mean

	Milk Yield	
	0 Day	45 Days
T_1	9.57	9.67
T_2	10.06	10.47
T_3	10.35	10.65

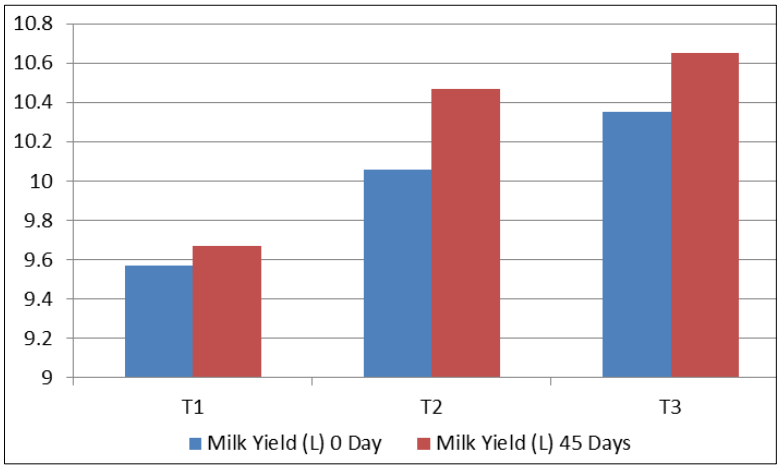

Fig 1: Total milk yield weight on starting day (0^{th}) of feeding and end day (45^{th}) of feeding

Table 6: Milk yield analysis of variance table

Source of Variation	DF	Sum of Squares	Mean Squares	F-Calculated	Significance
Treatment	2	5.029	2.515	2.836	0.07448
Days	1	0.641	0.641	0.723	0.40197
Treatment × Days	2	0.139	0.070	0.079	0.92465
Error	30	26.603	0.887		
Total	35	32.413			

(P<0.05)

Table 7: Two Way Mean Table

	Day 0	Day 45	Mean T
T_1	9.567	9.667	9.617
T_2	10.067	10.467	10.267
T_3	10.350	10.650	10.500
Mean Day	9.994	10.261	

Conclusion

The maximum total milk production was recorded in T3 (Treatment group) at 10.65 lit. T2 (Treatment group) 10.47 lit. Follows. T1 (control group) had the lowest level of 9.67 lit. Days and treatment are not significant in the study's analysis of variance. It can be inferred that mineral mixture type C produces the most milk and is therefore more lucrative than the control treatment. Mineral mixed vitamins were given to cows to help them use their feed more efficiently and produce more milk.

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