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Impact of ration balancing programme on milk production in crossbred dairy animals

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Abstract
A lactation trail was conducted to assess the impact of ration balancing technology on milk production and milk fat percentage in selected dairy cattle by evaluating their nutritional requirement. Twenty crossbreed dairy cows of comparable body weights were selected. The milk yields and fat percentage were recorded, initially for 30 days before implementing Ration Balancing Programme (RBP) and 30 days after implementing Ration balancing Technology. Animals were registered after ear tagging the animals and details like breed, stage of lactation, age of animals, pregnancy stage, calving date, milk yield and fat % recorded in RBP software. Initial nutritional requirement was calculated and available feed ingredients were also recorded along with cost and present feeding quantity. Least cost formulation prepared with the help of software and formulated ration recommended to the dairy farmers by providing physical advisory slips. Average milk yield and fat percentage (per day per animal) in the beginning for one month before starting the trial were 5.15 lit and 4.23 percent respectively. After starting the trial the data of milk yield and fat percentage recorded for one month, which is 6.15 and 4.44% for milk yield and Milk fat respectively, which shows there was positive impact of 1 litter and 0.21% on milk yield and fat percentage respectively. Hence it can be concluded that Ration Balancing Technology improves the milk yield as well as fat percentage of milk in crossbred dairy animals.

Keywords: Ration balancing, milk yield, milk composition, nutritive value

Introduction
In India, dairy farmers mainly feed their animals with crop residues like paddy straw, ragi, groundnut residue, jowar and bajra stovers as basal diet and green fodder like hybrid Napier, bajra, sorghum and Lucerne in the seasons. On the basis of availability and cost, cakes of de-oiled cotton, ground nut, rape seed, Linseed, grains of maize, bajra and Chunni of different grams are also fed to animals in limited quantities. Farmers also feed sugarcane and banana leaves to their animals. Apart from feeding the locally available feed ingredients, the dairy farmers also using compound cattle feed for their animals. However usage of mineral mixture is limited due to the lack of awareness among dairy farmers about the importance of mineral mixture as part of animal diet (Garg *et al*., 2009) [3].

In villages, irregular oestrus cycle and poor conception rate of Artificial Insemination are also being observed which may be attributed to inadequate supplementation of mineral mixture in ration of the animals. In general, animals require different ration (composition in terms of TDN, CP, Ca and P) at different stages of their life. There is lack of awareness among dairy farmers about the feeding on the basis of different life stages, importance of balanced ration and use of minerals in animal diet.

Slow growth of young animals delaying the age of first calving. Further the farmers are unaware about proper feeding practices. The farmers are not essentially feeding chaffed fodder to the animals. Water is also not regularly given to the animals. The productivity data of different categories of animals and the prevailing feeding practices in different areas of India suggest that the productivity of animal is not at par with their genetic potential, which is mainly due to imbalanced feeding. In view of this, it is proposed that a ration balancing advisory services technology will help in improving the productivity and reproductive efficiency of dairy animals by re- appropriating the available feed resources and use of area specific mineral mixture, which will also help in bringing down the cost of milk production.

Ration balancing programme aims to improve production and reproduction of animals through adoption of scientific method of feeding with provision of technical inputs and services to milk producers at their doorstep, thereby improving milk production efficiency and economic return from dairying.

Hence, this study was focused to undertake a study on impact of ration balancing programme on milk production in crossbred dairy animals.

Materials and Methods

The present study was focused on impact of ration balancing programme on milk yields and composition in crossbred animals.

Animals and experimental design

Twenty crossbred milch cows of comparable body weights were selected at Yerravaripalem Taluk of Chittoor District in Andhra Pradesh. These animals were maintained in a well-ventilated stall and animals were milked twice daily (5.30 AM and 6.00 PM) and milk yield were recorded. Cows were weighted on two successive days at the beginning of the experiment after morning milking. The average body weight (BW) of the animals at the start of experiment was 375 Kg.

Cows were fed according to the ration recommended. Nutrient requirements of the cows were fulfilled as per NRC (2001) [5] standards set in the software. The recommended ration was offered in the morning at 5.30 AM and evening 6.00 PM. Water was offered ad lib thrice a day during study period. Commonly used ingredients were Deoiled Rice Bran, Maize, Cotton seed cake, Groundnut cake, Rice polish, Cattle Feed BIS-II, Paddy straw, mineral mixture and salt.

Milk and Fat analysis

Lactation trial was conducted for a period of 60 days. Milk was collected in the morning and evening as analysis was being done for fat % and SNF by Milko Tester.

Results and Discussion

Results of the experiments conducted to study the impact of Ration Balancing Technology on milk production is presented in the Table 1.

Effects on Milk Yield and Milk Fat

The ration balancing programme implementation showed that there was an increase in daily milk yield from 0.0 to 3 kg (Average of 1 kg/animal/day) and fat level in milk from 0.0 to 0.6 g/kg (Average of 0.21 g/kg) in dairy crossbred animals (Fig.1). Feeding the balanced ration to low yielding cows increased (p<0.05) milk yield and its milk fat level. Medium yielding cows had improved (p<0.05) milk yield and milk fat level. The ration cost decreased by 27% (Initial cost was Rs.91.96/day/animal and Cost after Ration Balancing was Rs.67.42, Fig 2) in the cows fed balanced rations. There was an average increase in net daily income of farmers by Rs.24.5 per animal due to the increase in milk yield and milk fat level, as well as decrease in cost of feeding. Similar kinds of results were observed by Garg *et al.* 2009 [3]; Kannan and Garg, (2009) [3]. Reported that the RBP implemented showed that there wsas an increase in daily milk yield from 0.2 to 1.2 kg and fat level in milk from 1.0 to 9.0 g/kg in cows. The ration cost decreased by 5 to 11% in cows fed balanced rations. There was an average increase in net daily income of farmers by 6 to 60% per animal due to the increase in milk yield and milk fat level, as well as decrease in cost of feeding (Garg *et al*. 2012) [2].

Table 1: Impact of ration balancing programme on milk yield, milk fat (%) and ration cost

Milk Yield and Milk Fat Recording Details														
*E-Early, M-Mid & L-Late		Lactation stage*	Avg. Milk (kg/day/animal)			Avg. Fat (%)			Avg. Ration Cost (Rs/Kg Milk)			Avg. Ration Cost (Rs/day/animal)		Increase in net Income (Rs/day/animal)
Sl. No.	Animal Tag ID		Before	After	Change	Before	After	Change	Before	After	Change	Before	After	
1	380040542590	M	6.00	6.00	0.00	3.80	4.30	0.50	11.79	12.09	0.30	70.75	72.53	-1.78
2	380040186543	E	6.00	7.00	1.00	3.80	4.40	0.60	15.50	15.37	-0.12	92.98	92.24	0.74
3	380040186986	E	5.00	6.00	1.00	4.30	4.70	0.40	13.58	12.98	-0.60	67.90	64.89	3.00
4	380040542761	E	5.00	7.00	2.00	4.60	4.70	0.10	14.95	13.75	-1.20	74.75	68.77	5.98
5	380040186667	E	5.00	6.00	1.00	4.40	4.90	0.50	14.09	12.83	-1.26	70.45	64.15	6.30
6	380040186907	M	4.00	5.00	1.00	4.10	4.20	0.10	14.75	13.07	-1.68	59.00	52.29	6.72
7	380040186430	E	6.00	8.00	2.00	4.00	4.30	0.30	13.92	12.04	-1.88	83.50	72.24	11.26
8	380040186601	E	4.00	6.00	2.00	4.00	3.80	-0.20	19.54	14.48	-5.06	78.14	57.90	20.24
9	380040542247	E	6.00	8.00	2.00	3.70	3.70	0.00	15.50	11.94	-3.55	92.98	71.66	21.32
10	380040186428	M	3.00	3.00	0.00	4.20	4.60	0.40	24.08	16.56	-7.52	72.25	49.69	22.56
11	380040542932	M	3.00	3.00	0.00	4.60	4.60	0.00	23.17	15.48	-7.69	69.50	46.43	23.07
12	380040186508	M	4.00	4.00	0.00	4.50	4.40	-0.10	20.44	14.07	-6.37	81.75	56.28	25.47
13	380040186612	M	4.00	5.00	1.00	4.80	4.90	0.10	20.88	14.28	-6.59	83.50	57.13	26.37
14	380040186884	M	6.00	6.00	0.00	4.30	4.60	0.30	17.75	12.17	-5.58	106.50	73.05	33.46
15	380040186417	M	7.00	7.00	0.00	4.20	4.80	0.60	17.21	10.96	-6.25	120.50	76.73	43.77
16	380040186997	E	5.00	5.00	0.00	4.30	4.50	0.20	22.94	13.80	-9.14	114.72	68.99	45.72
17	380040542258	E	7.00	10.00	3.00	3.60	3.70	0.10	19.00	12.30	-6.70	132.98	86.09	46.89
18	380040186758	E	6.00	8.00	2.00	4.40	4.60	0.20	20.71	12.53	-8.19	124.28	75.16	49.12
19	380040186873	E	4.00	5.00	1.00	4.70	4.60	-0.10	27.13	14.81	-12.32	108.53	59.25	49.28
20	380040186268	E	7.00	8.00	1.00	4.30	4.50	0.20	19.18	11.86	-7.32	134.28	83.01	51.27
			5.15	6.15	1.00	4.23	4.44	0.21	18.31	13.37	-4.94	91.96	67.42	24.54

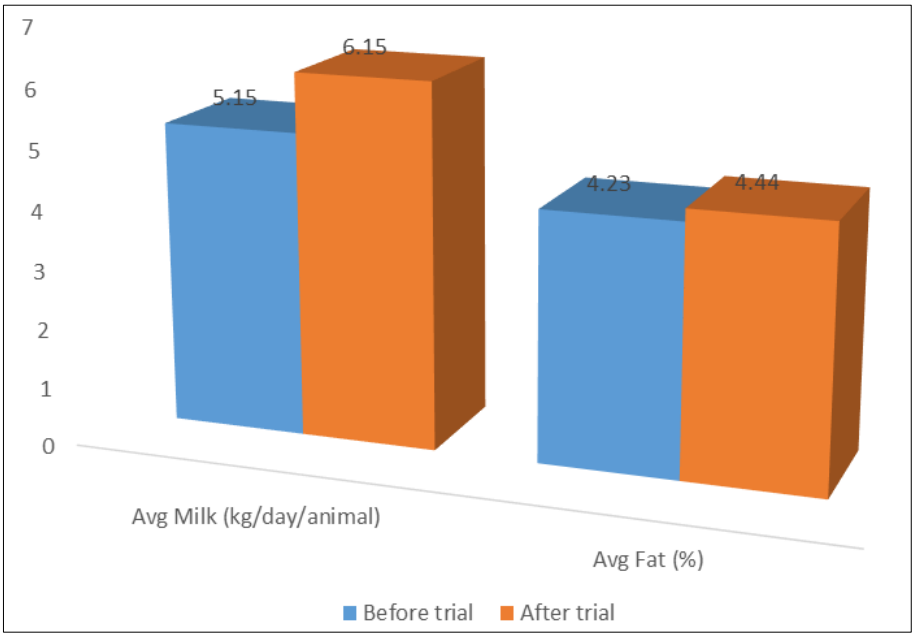

Fig 1: Impact of Ration Balancing programme on Milk Yield and Milk Fat%

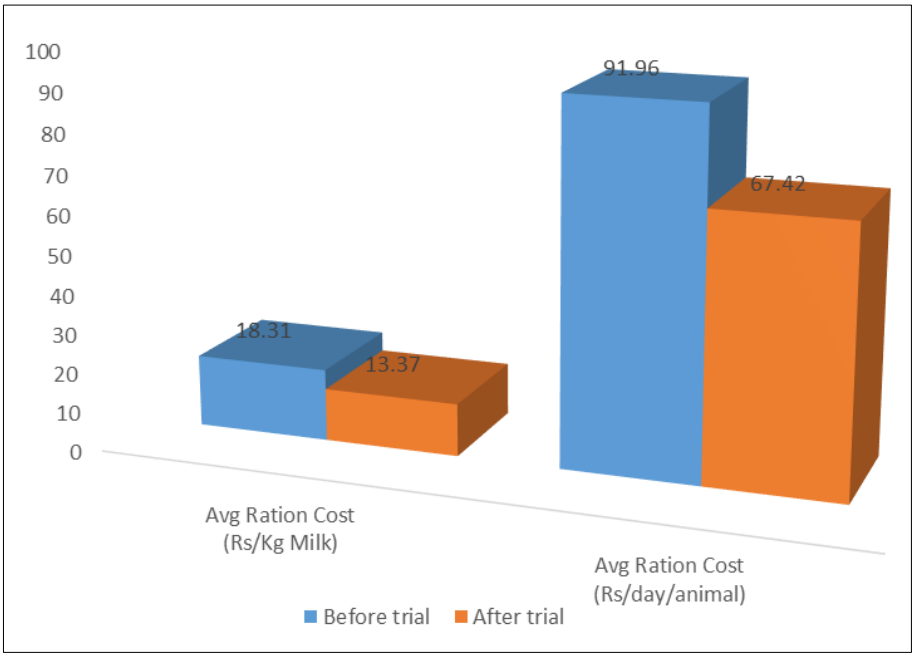

Fig 2: Impact of Ration balancing programme on Ration Cost per Animal and per Kg of Milk

Conclusion

In the present study, after implementing ration balancing technology, it has been observed that there is 19% increase in milk production and 5% increase in fat percentage. Our results also demonstrated that by efficient utilization of locally available feed resources with the help of ration balancing technology, a dairy farmer may increase their net income per day per animal by 27% from dairy farming due to reduction in cost of feeding and increase in milk and fat.

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