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Feed conversion efficiency in early lactating Kankrej cattle at organised farm

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ABSTRACT

A study was conducted to investigate feed conversion efficiency in early lactating Kankrej cattle at Livestock Research station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. The variables such as average dry matter intake, milk yield and milk composition were evaluated in forty nine lactating Kankrej cows over the period of 30 days. The mean dry matter intake was 9.71±0.08 kg/d. The average milk yield and energy corrected milk were 12.45±0.35 and 14.27±0.47 kg/d, respectively. Feed conversion efficiency was 1.48±0.05 in Kankrej cows.

Key words: Dry matter intake, Feed conversion efficiency, Kankrej cow, Milk yield

The economic potential of livestock mainly depends upon feed conversion efficiency of the animals. Feed conversion efficiency is a simple measure to determine the relative ability of animal to turn feed nutrients into milk and/or milk components. Feed conversion efficiency is the kilograms of milk produced per kilogram of dry matter intake. For livestock products, about two-thirds of this increased demand will need to be met by improving the production efficiency of feed, both forages and concentrate feeds (FAO, 2012). The monitoring of feed efficiency has become not only an economic marker in dairy farming, but also an excellent environmental marker (Hutjens, 2010). Moreover, feed conversion efficiency is receiving more attention as feed costs have increased. Feed efficiency is highly variable among dairy cows and this variation can have a significant impact on economic performance (Linn *et al*., 2009). Feed conversion efficiency also has implications for environmental concerns. If diary animals can more efficiently convert feed into milk, then less manure volume and manure nutrients should be produced. High feed conversion efficiency (> 2.0) in early lactation can actually indicate a problem that animals are losing too much weight, possibly leading to metabolic disorders. Moreover, in an FAO (2012) symposium (Makkar and Beever, 2013) and several authors highlighted the importance of characterizing dairy production systems with a focus on feed efficiency.

Kankrej is one of the dual purposes indigenous breed of India having home-track in north Gujarat, which is good for milk production and bullocks are very powerful/ strong and suitable for draft purpose. During the year 2017 average lactation milk yield of Kankrej cow was 2523.33 litres in 305 days at Livestock Research Station, Sardarkrushinagar (Anonymous, 2018). However, information about feed conversion efficiency in lactating Kankrej cow is very meager. Therefore, this study was conducted with the aim to estimate the feed conversion efficiency in early lactating Kankrej cows at Livestock Research Station, Sardarkrushinagar.

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MATERIALS AND METHODS

The experiment was carried out at Livestock Research Station, Sardarkrushinagar. Forty nine lactating Kankrej cows (21 days after calving) were used in this experiment for 30 days. The animals were fed as per ICAR (2013) feeding standards to meet the nutrient requirements. Cows were fed with fixed quantity of concentrate pellets and cotton seed cake along with measured amounts of green and dry fodder. Left over was recorded daily. All the experimental animals were reared under standard management practices with free access to fresh and clean drinking water. The feeds and fodder used in the experiment were analyzed for chemical composition *viz.* dry matter, crude protein, crude fiber, ether extract and total ash (AOAC, 2007).

All cows were milked twice a day (morning 4:00 a.m. and evening 4:00 p.m.) and individual milk yield and milk constituents of each cow were recorded daily. Milk fat, solid not fat (SNF), protein and lactose were determined by using EKOMILK Ultra Pro Milk Analyzer (Everest Instruments Pvt. Ltd.). The energy corrected milk (ECM) yield was calculated as:

ECM = 0.327 x Milk yield (kg) +12.95 x Fat yield (kg)+7.20 x Protein yield (kg)

Feed efficiency was calculated as:

Feed efficiency was calculated as: ECM/(Dry matter intake (kg))

RESULTS AND DISCUSSION

The chemical composition of feeds and fodders fed to experimental animals is given in Table 1. The crude protein content in pellet feed, cotton seed cake, green maize and jowar hay was 18.59, 22.44, 5.37 and 4.20%, respectively.

Table 1 Chemical composition (on % DM basis) of feeds and fodders

Parameters (%)	Concentrate Pellet	Cotton Seed Cake	Green Maize	Jowar Hay
Moisture	4.45	6.11	84.4	10.20
Crude protein	18.597	22.44	5.37	4.20
Crude fibre	6.58	10.43	32.53	32.3
Crude fat	2.43	5.75	1.42	1.40
NFE	64.15	54.01	51.11	53.30
Total ash	8.25	7.37	9.57	8.80

Various milk parameters in lactating Kankrej cows presented in Table 2. The overall mean dry matter intake was 9.71±0.08 kg/d. Similarly, Raval *et al.,* (2013) reported average dry matter intake of 10.03±0.04 kg/d in lactating Kankrej cows. The average milk yield and energy corrected milk were 12.45±0.35 and 14.27±0.47 kg/d, respectively. Feed conversion efficiency was 1.48±0.05 in Kankrej cows. Vallimont *et al.,* (2011) and Arndt *et al.,* (2015) reported feed conversion efficiency of 1.03 and 0.98, respectively in commercial dairy farms. As all the cows were in peak lactation, we found better milk yield and feed efficiency in Kankrej cows. Moreover, high yielding animals are more energetically efficient, since the most part of the ingested energy is diverted to the mammary gland for production of milk, in relation to maintenance (Linn *et al.,* 2007). The average fat content in Kankrej cow milk was 4.08±0.09%. Earlier studies also reported similar range of fat percentage in Kankrej cow milk (Patel *et al.,* 2017; Joshi *et al.,* 2018).

Table 2 Feed intake and various milk parameters in early lactating Kankrej cows (n=49)

Sr No.	Parameters	Mean±SE
1	Dry matter intake (kg/d)	9.71±0.08
2	Average milk yield (kg/d)	12.45±0.35
3	Energy corrected milk (kg/d)	14.27±0.47
4	Feed conversion efficiency	1.48±0.05
5	Milk fat (%)	4.08±0.09
6	Milk SNF (%)	8.24±0.08
7	Milk lactose (%)	4.39±0.04
8	Milk protein (%)	3.34±0.03

CONCLUSION

By above study, it is concluded that feed conversion efficiency at second month of lactation in Kankrej cattle was 1.48 at Livestock Research Station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat.

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