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Dhawal Kant Yadav
Livestock Production and Management, ICAR-Indian Veterinary Research Institute, Izzatnagar, Bareilly, Uttar Pradesh, India

Ramdev Yadav
ICAR- National Dairy Research Institute, Karnal, Haryana, India

Panch Kishor Bharti
Livestock Production and Management, ICAR-Indian Veterinary Research Institute, Izzatnagar, Bareilly, Uttar Pradesh, India

Corresponding Author:
Dhawal Kant Yadav
Livestock Production and Management, ICAR-Indian Veterinary Research Institute, Izzatnagar, Bareilly, Uttar Pradesh, India

Economic evaluation of treated feed in crossbred dairy cattle in subtropical conditions with specific ingredients

Dhawal Kant Yadav, Ramdev Yadav and Panch Kishor Bharti

Abstract
A total of 24 crossbred animals (8 to 12 months old) were used in the experiment to lower the cost of feeding in crossbred dairy cattle. Animals were divided into four groups at random, each with six animals. Group 1 (Gr-1) consisted of 100% treated residual feed, Group 2 (75% treated feed), Group 3 (50%) treated feed, Group 4 (100%) green fodder, and Group 4 (Control). 1% urea+5% molasses+0.5% salt, 1% urea+5% molasses+1% salt, 1% urea+10% molasses+0.5% salt, 1% urea+10% molasses+1% salt, 5% molasses+0.5% salt, and 10% molasses+0.5% salt, respectively, were applied to the remaining feed F-1, F-2, F-3, F-4, F-5, and F-6. At the farm, the average cost of feeding each animal was 80Rs. In comparison, the feeding costs for the first group in the F1, F2, F3, F4, F5, and F6 groups were 36, 37, 70, 70, 35, and 69 rupees, respectively, under normal circumstances. It resulted in a reduction of 44, 43, 10, 10, 10, 45, and 11 rupees. Respectively. For the second group, the reduction was 30Rs, 29Rs, 10Rs, 9Rs, 30Rs, and 10Rs respectively for the F1, F2, F3, F4, F5, and F6 treatment groups, and for the third group, the reduction was 20Rs, 19Rs, 5Rs, 5Rs, 20Rs, and 5Rs respectively for the F1, F2, F3, F4, F5, and F6 treatment groups. These numbers unequivocally demonstrate that the cost of feeding animals has significantly decreased.

Keywords: Cost, economics, molasses, palatability, urea, and vrindavani are some of the related terms

1. Introduction
35.6% of green fodder, 10.95% of dry agricultural leftovers, and 44% of concentrate feed components are currently in short supply. However, because roughages stay in the rumen for a longer period of time, there is an excess of dry roughages throughout the year. By making use of these resources, animal productivity can be raised without endangering their welfare or health. However, these things call for regular assessment and good procedures. The main foods consumed by large dairy animals are green fodder, dry roughage, and concentrate mixtures. Investment in the dairy industry includes 60–70% of the cost of feeding the animals, therefore if new procedures are employed, there is a significant opportunity to lower the cost of rearing. Sometimes, although rarely, cattle manure is used. In the majority of Indian farms and households, leftover feed is seen as trash and abandoned. The components of this trash vary depending on availability, but generally speaking the leftovers on the northern plains of India consist mostly of maize, sorghum, millets, clover, and Napier grass (Birthal and Jha, 2005) [1]. According to studies (Sahoo *et al*., 2004; Verma *et al*., 2006) [17, 21], when molasses and urea are given to animals with straw, feed intake, digestibility, and palatability of rice straw all rise. Studies that were carried out for this goal involved treating low quality feed with urea, ammonia, and molasses at various inclusion levels, and the results were encouraging. Due to the breakdown of connections between the lignin, hemicellulose, and cellulose, it was found that urea treatment might boost the nutritional content of straw by 46% (Wanapat *et al*., 2009) [22]. According to Singh *et al*. (2014) [20], the feeding procedures employing this feed have also increased the productivity of dairy cows. The majority of earlier research projects, according to a review of the literature, focused on the treatment of dry residues (such as wheat or rice straw) with the addition of urea as nitrogen or molasses as energy sources. However, no study has been done on the treatment of fresh leftover feed with high moisture contents (more than 50%). The nutritional content of leftover feed may be improved by treating it with various urea, molasses, and salt mixtures. When there is little or no available fodder, this improved quality feed is a better option. Without hurting the animals' performance, it also assisted in lowering the cost of feeding the animals.

2. Material and Methods

2.1 Location of study: The study was carried out in the Cattle and Buffalo Farm, ICAR-Indian Veterinary Research Institute, Izatnagar, India, which is situated at 169.2 metres above mean sea level and has coordinates of 28° 22' north, 79° 24' east, and 79° 24' latitude. The area is part of the upper Gangetic plain, and the climate there is subtropical with considerable humidity, especially in the winter. Winter lasts from November to February, while summer lasts from May to August each year. Annual rainfall ranges from 90 to 120 cm, with the majority falling between the months of July and August.

2.2 Plan of the experiment: To lower the cost of feeding, several combinations of treated residual feed with fresh fodder were attempted. The source materials for the waste feed were chaffed fodder such as sorghum, millets, maize, Napier grass, and berseem (clover). The residual feed was treated with six different combinations of urea, molasses, and salt (Table 1) to improve its nutritional content and lower the cost of feeding. Table 1 shows the six distinct urea, molasses, and salt mixtures that are used to cure residual feed.

2.3 Design of experiment: Different combinations of treated leftover feed with fresh fodder was tried to reduce the cost of feeding. The waste feed consisted of chaffed fodder Sorghum, Millets, Maize, Napier grass and Berseem (clover) as raw material. Six combinations of urea, molasses and salt were used for treating the leftover feed (Table 1) to increase its nutritive value and reduce feeding cost.

Table 1: Six different combinations of urea, molasses and salt used for treatment of leftover feed

Basal feed material (on fresh matter basis)	Chemical substance (on dry matter basis of basal feed %)			Treated feed (end product)
	Urea	Molasses	Salt	
Leftover feed	1	5	0.5	F1
	1	5	1	F2
	1	10	0.5	F3
	1	10	1	F4
	Nil	5	0.5	F5
	Nil	10	0.5	F6

2.4 Selection of experimental animals

A total of 24 crossbred animals (8 to 12 months old) were chosen and randomly divided into four groups, each with six animals. Group-1 (Gr-1) consisted of 100% treated residual feed; Group-2 (Gr-2) consisted of 75% treated feed; Group-3 (Gr-3) consisted of 50% treated feed; and Group-4 (Gr-4) or Control consisted of 100% green fodder, without the use of treated feed. Feeding of treated and fresh green fodder was done for seven days in four different amounts (Table-2).

Table 2: Feeding trial utilising various combinations of processed residual feed and green fodder

Feeds	T1 group	T2 group	T3 group	T4 Control
Green: Treated leftover feed	0: 100	25:75	50:50	100:0
Concentrate feed	Provided equally in all groups (As per institute feeding protocol)			

All the 24 animals were weighed before and after each feeding trail and their weight gains were compared after the end of each trial.

2.4. Chemical examination of feed

To determine changes in the nutritional values (crude protein, crude fibre, moisture, dry matter, and ash content), leftover feed was evaluated both before and after treatment. fungi's ability to produce poisons, i.e. Mycotoxin and ochratoxin levels in the treated diet were also examined.

2.5. Animal performance: Weight gain before and after each feeding trail was used to assess animal performance.

2.6. Statistical Analysis

The data obtained from the experiments were analysed using the SPSS 20.0 software package.

3. Results

3.2. Economics of the feed

Using scorecards as shown in Table 3, the economic viability of the treated feed in the various groups was determined.

Table 3: Average feeding cost (in Rupees) of all the treatment groups

Groups	F1 feed	F2 feed	F3 feed	F4 feed	F5 feed	F6 feed
Group 1	37	37	70	70	35	69
Group 2	50	51	71	71	50	70
Group 3	60	61	75	75	60	75
Group 4	80	80	80	80	80	80

The feeding cost chart demonstrates that in the first and second treatment groups, feeding costs were reduced by up to half. Feeding costs were slightly higher in the third treatment group due to a higher molasses cost, but even so, they were still lower than in the control group and were also practical and useful. In terms of feed acceptance, the treatments that combined treated and fresh feed (in a ratio of 50:50 and 75:25) produced the best results without having any negative effects on the growth of the animals.

4. Discussion

4.1 Animal feeding costs: When the leftover feed was put to use, it was discovered that there was a significant reduction in feeding costs without affecting the performance of the animals during the growing stage, as was seen from the scorecards. The first group of animals had the lowest costs,

but this was because the feed had a higher concentration of urea and was therefore less appetising, while the third group had the highest costs because the molas were more expensive. Due to its low feeding costs, palatability, and moderately positive results, the third group was most highly recommended.

4.2 Proximate analysis of feed: Proximate analysis of feed revealed an increase in nutritional value following each treatment, which was caused by the urea ammoniation of leftover feed, and an increase in the content of carbohydrates, molasses, and ash, which was caused by the presence of minerals in salt and other contaminants in premix. According to Gordon and Chesson (1983) [5] and Sarwar *et al*. (2010) [19], who discovered higher crude protein and total protein content of barley or wheat straw being treated with 4% urea, the content of crude protein and crude fibre has increased. The outcomes are consistent with those reported by Saadullah *et al*. (1980) [15], who found that rice straw's crude protein content increased from 2.9 to 5.9% when treated with 3% urea and to 6.7% when treated with 5% urea. Bulls fed urea-treated straw had elevated ruminal NH3-N levels, according to Hassan *et al*. (2011) [16]. While wheat straw was urea-ammoniated by Fike *et al* (1995) [3] and Dass *et al* (2000) [2], who found an increase in crude protein, Prasad *et al*. (1998) [13] observed increased digestible protein and digestible nutrients in rations containing either stacked or baled urea-treated rice straw. Only molasses and salt were used in treatments five and six, and because of their pleasant aroma and golden brown colour, their palatability was noticeably superior. According to Sahoo *et al*. (2002) [16], urea-treated wheat straw had the highest levels of organic matter, neutral detergent fibre, and hemicellulose digestibility. Similar findings have been reported in other publications, including Manyuchi *et al*. (1992) [9], Nisa *et al*. (2004) [11], Sarwar as al. (2004) [18], and Jabbar *et al*. (2008) [7].

4.3 Evaluation of animal performance: Initial and final weights of the animals were not statistically different, but F3 and F5 feed treatment groups showed significantly lower weight gains than the other three groups, which may be attributable to the treated feed's lower palatability compared to fresh green fodder. The same performance in Gr-2 may be attributable to the control group's higher nutritional values, acceptability, and greater palatability of the diet (Garg *et al*., 2006) [4]. However, in the current study, feed palatability was taken into account for performance evaluation together with weight gain. Kilic and Emre (2017) [8] revealed that the digestibility of wheat and soybean straw may be improved upon using specific additions. According to Mishra *et al*. (2012) [10], supplementing urea molasses block boosted cows' milk production, live weight, and body score considerably. Similarly, crossbred heifers (Pathak *et al*., 2015) [12] and lambs (Rath *et al*., 2001) [14] showed improved feed acceptability after being treated with molasses.

5. Conclusions

It was economical and practical to treat leftover feed using various ratios of urea, molasses, and salt. This process also boosted nutritional qualities by increasing the amount of crude protein and fibre without producing mycotoxins or ochratoxin-like fungi toxins. In comparison to the control group, the animals fed a diet that contained 50% treated feed and 50% fresh green forage gained weight equally well and at a very low cost. The surplus feed can be effectively used to feed to different classes of dairy animals on farms to reduce the cost of rearing them and may also be a better option during a time of low fodder production.

6. Statements of interest

Regarding the subject matter of this research, the authors disclose no conflicts of interest.

7. Acknowledgements

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8. References

1. Birthal PS, Jha AK. Various economic losses due to various constraints in dairy production in India, Indian J of Anim. Sci. 2005;75(12):1470-1475.
2. Dass RS, Mehra UR, Verma AK. Nitrogen Fixation and In-Situ dry matter and fibre constituents' disappearance of wheat straw treated with urea and Boric Acid in Murrah buffaloes, Asian-Aust. J Anim. Sci. 2000;13(8):1133-1136.
3. Fike GD, Simms DD, Cochran RC, Vanzant ES, Kuhl GL, Brandt RT. Protein Supplementation of Ammoniated Wheat Straw: Effect on performance and Forage Utilization in Beef Cattle, J Anim. Sci. 1995;73:1595-1601.
4. Garg MR, Mehla AK, Singh DK. Advances in in the production and use of urea molasses mineral blocks in India, A technical manual of NDDB, Anandpart 2006;4:22-27.
5. Gordon AH, Chesson A. The effect of prolonged storage on the digestibility and nitrogen content of ammonia-treated barley straw, Anim. Feed Sci. Technol. 1983;8(2):147-153.
6. Hassan Z, Shahzad MA, Nisa M, Sarwar M. Replacing concentrate with wheat straw treated with urea molasses and ensiled with manure, Asian-Aust. J Anim. Sci. 2011;24(8):1092-1099.
7. Jabbar MA, Muzafar H, Khattak FM, Pasha TN, Khalique A. Simplification of urea treatment method of wheat straw for its better adoption by farmers, South African J Anim Sci. 2008;39(5):58-61.
8. Kilic U, Emre G, Effects of Some Additives on In Vitro True Digestibility of Wheat and Soybean Straw Pellets, Open Life Sci. 2017;12:206-213.
9. Manyuchi, B, Orskov ER, Kay RNB. Effect of feeding small amounts of ammonia treated straw on degradation rate and intake of untreated straw. Anim. Feed Sci. Technol. 1992;38:293-304.
10. Mishra AK, Reddy GS, Ramakrishna YS. Participatory on-farm evaluation of urea molasses mineral block as a supplement to crossbred cows for dry season feeding in rain-fed agro-ecosystem in India, Livestock Res. Rural Develop, 2012, 18(2)
11. Nisa M, Sarwar M, Khan MA. Influence of adlibitumfeeding of urea treated Wheat straw with or without corn steep liquor on intake, in situ digestion kinetics, Nitrogen Metabolism and nutrient digestion in Nili-Ravi buffalo bulls. Aust. J Agric. Res. 2004;55:229-236.

12. Pathak R, Jaiswal RS, Thakur TC, Joshi YP, Paudy H. Effect of feeding ammonia treated baled wheat straw with different levels of concentrate on nutrient utilization and growth of cross bred heifers. Indian J Anim. Sci. 2005;5:252-255.
13. Prasad RDD, Reddy MR, Reddy GVN. Effect of feeding baled and stacked urea treated rice straw on the performance of crossbred cows, Anim. Feed Sci. Technol. 1998;73:347-352.
14. Rath S, Verma AK, Singh P, Dass RS, Mehra UR. Performance of growing lambs fed urea ammoniated and urea supplemented wheat straw based diets. Asian Australian J Anim. Sci. 2001;14(8):1078-1084.
15. Saadullah M, Haque M, Dolberg F. Unpublished data DANIDA/Bangladesh Agricultural University Straw Treatment Programme; c1980. p. 1979-1980
16. Sahoo B, Saraswat ML, Haque N, Khan MY. Chemical treatment of wheat straw on intake and nutrient utilization in sheep, Indian JAnim Sci. 2002;72(12):1162-1165.
17. Sahoo A, Elangovan AV, Mehra UR, Singh UB. Catalytic Supplementation of Urea-molasses on Nutritional Performance of male buffaloes, Asian Australian J Anim Sci. 2004;17(5):621-628
18. Sarwar M, Khan MA, Nisa M. Effect of organic acids or fermentable Carbohydrates on digestibility and nitrogen utilisation of urea-treated wheat straw in Buffalo bulls. Aust. J Agric. Res. 2004;55:223-228
19. Sarwar M, Shahzad MA, Nisa M, Afzal D, Sharif M, Saddiqi HA. Feeding value of urea molasses treated wheat straw ensiled with fresh cattle manure for growing crossbred cattle calves. Trop Anim Health Prod; c2010. DOI:10.1007/s11250-010-9745-5
20. Singh S, Mishra AK, Singh JB, Rai SK, Baig MJ, Biradar N, *et al*, Water requirement estimates of feed and fodder production for Indian livestock vis a vis livestock water productivity. Indian J Anim Sci. 2014;(84)10:1090-1094.
21. Verma AK, Singh P, Dass RS, Mehra UR. Impact of feeding urea ammoniated and urea supplemented wheat straw on intake and utilization of nutrients in crossbred cattle, Indian J Anim. Sci. 2006;76(6):46-470.
22. Wanapat M, Cherdthong A. Effects of treating rice straw with urea or urea calcium hydroxide upon intake, digestibility, rumen fermentation and milk yield of dairy cows, Asian-Australian J Anim. Sci. 2009;12:294-299.