International Journal of Natural and Social Sciences
ISSN: 2313-4461

Effect of urea molasses straw on beef fattening at rural areas in Chattogram district

Nani Gopal Saha[1], Quzi Sharmin Akter[2,3], Md. Reduanul Haque Chowdhury[4], K. M. A. Tareq[4]*, Swapon Kumar Fouzder[5]

[1]Department of General Animal Science and Nutrition, Patuakhali Science and Technology University, Barishal-8210, Bangladesh
[2]Department of Genetics and Animal Breeding, Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Barishal-8210, Bangladesh
[3]Laboratory of Theriogenology, Faculty of Applied Biological Sciences, Gifu University, 1-1 Yanagido, Gifu 501-1193, Japan
[4]Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Barishal-8210, Bangladesh
[5]Department of Poultry Science. Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Barishal-8210, Bangladesh

ARTICLE INFO

Article history

Accepted 19 May 2018
Online release 22 May 2018

Keyword

Urea molasses straw
Fattening
Beef
Chittagong

***Corresponding Author**

KMA Tareq
matareqkh@pstu.ac.bd

ABSTRACT

The experiment was conducted to investigate the cattle fattening programs in rural farmers at Patiya Upazilla in Chittogram District. Data were collected in a questionnaire through personal method in 30 farmers. The parameters studied were the socio-economic condition of the farmers associated with cattle fattening, problems involved in fattening, routine activities, feeding and marketing system and cost benefit analysis. Experiment was conducted to find out the effect of Urea Molasses Straw (UMS) feeding on feed intake, digestibility and growth of indigenous growing bulls. For this purpose, 6 bulls of approximately 2 years of age were randomly selected for 2 treatment groups having 3 replications in each. The socio-economic studies revealed that 30% farmers had their primary knowledge in beef fattening and then 33.33% and 20% had secondary and above secondary knowledge, respectively. About 83.33% farmers had primary and secondary level of education and 16.67% were illiterate. For fattening purposes the farmers used 1-4 bulls in different ages varying from 1-3 years of age. The duration of fattening was 3-6 months. Management condition of all bulls was almost similar. Dry matter intake was slightly higher in case of treated group than that of controlled group. There was a significant ($P<0.05$) difference in both intake and digestibility of crude protein (CP) treated and controlled group. Average live weight gain was higher in treated group than that of controlled group. UMS can be fed for fattening of indigenous bulls in lieu of untreated straw alone, because it enhance to rapid growth and development of the body of animals and earning relatively more of the net profit for people of Chattogram district.

INTRODUCTION

Livestock is recognized as an integral component of rice based agricultural production system in Bangladesh. The economy of the country largely depends on agriculture. Livestock being one of the four components of agriculture (such as crops, livestock, fisheries and forestry) plays a vital role in national economy, contributing about 6.5% of gross domestic products (GDP) and, l3% of total foreign exchange earnings (GOB, 1991). Livestock plays an indispensable role in the traditional agriculture and largely subsistence economy of Bangladesh (Haque, 1992). The landless and marginal farmers largely depend on livestock for their survival (Ahmed, 1992).

The total livestock population in Bangladesh is estimated as 2434, 0.88, 11.55, 30.33, 123.00 and 16.00 million cattle, buffaloes, sheep, goats, chicken and duck respectively (FAO, 1996). Cattle of Bangladesh is an inseparable and integrated part of the agricultural farming systems and it ranks l2th in the world and in the Asian countries, her position is third (Alam et al., 1994). Bangladesh has a higher cattle population than any other countries of European Economic Community (EEC) and distributed with a greater density (2.6 cattle and buffalo heads per hectare) compared to other South-East Asian countries (Assaduzzaman, 1996). Though livestock are huge in number in Bangladesh but in respect of per animal output, they are one of the poorest in the world. It is

How to cite this article: Saha NG, Akter QS, Chowdhury MRH, Tareq KMA and Fouzder SK (2018). Effect of urea molasses straw on beef fattening at rural areas in Chattogram district. International Journal of Natural and Social Sciences, 5(3): 09-15.

reported that 75% of the world's cattle population is in the developing countries (Asia, Africa and Latin America), but it contribute only 34% of the beef production (Rahman, 1992). The annual meat production in Bangladesh is about 0.744 million metric ton (FAO, 1997). Whereas beef contribute 0.183 million metric ton of the total meat production (FAO, 1997). Modern technologies, if properly generated through research and adopted in respect of breeding, feeding, management and disease control can raise the production to a much higher extent. For instance, a large number of farmers involved in beef-fattening just before 3 or 4 months of Eid-ul-Azha, when they can sell the animals with profitable prices. Even, some landless people carry out fattening programmer year round as a way of their livelihood.

The main constraint in livestock production in Bangladesh is the acute shortage of feeds and fodder. The major portion of her land is used for rice cultivation and it's by product like rice straw is the only cheapest and available source of feed for our livestock. Straw is the important crop residue, contributes the major portion of the fibrous part of the diet of ruminants in the tropical and subtropical countries. In Bangladesh, out of the total 29.1 million tons of roughages available for ruminants, rice straw contributes around 23.57 million tons (81%) and green grasses only 1.6 million tons (Tareque, 1985). Therefore, rice straw is the basal feed for ruminants with low nutritive value and low digestibility.

Nutritive value of straw can be improved by chemical treatment and supplemented with nitrogen and energy feeds. It was found that if straw is treated with urea and molasses mixture and feed to the animals then both feed intake and digestibility of straw increases (Tareque, 1985). Urea is a non-protein nitrogenous compound that can be used in the ruminant's rations as protein supplement. Rumen micro flora converts urea to protein. Molasses is a sugar mill by product which can be obtained easily and can provide energy, minerals and vitamins very quickly. It adds sweet flavor and odor and has a special value increasing the palatability and efficiency of feed. The use of non-protein nitrogenous component incorporated with molasses is an economical means of providing suitable protein and energy for ruminant. Urea Molasses Straw (UMS) is the suitable feed to incorporate straw with urea and molasses. Therefore, the present study was undertaken with the aim to make a comparative study regarding feed intake, daily live weight gain, digestibility and rural areas in Chittagong district.

MATERIALS AND METHODS

The experiment was conducted in Patiya Upazillz of Chittagong District of Bangladesh. The duration of the study was six months including buying, fattening and selling of the cattle before Eid-ul-Azha, 2017.

Selection of farmers

The farmers were selected who rear cattle or bought cattle for fattening and were able to give information where necessary. Thirty farmers were randomly chosen from Patiya Upazillz of Chattogram Distinct for collecting data to satisfy the objectives.

Data collection

The data were collected in questionnaires through direct interviewing and making personal visits. Before making actual interview, the objectives of the study were explained clearly to the farmers. Then the questions were asked in a very simple manner with explanation whenever necessary.

Housing and management

The house of the animal was two-side open and well ventilated. Gunny bags were hanged over the ventilator to protect the bulls from rainfall and cold wind at night during winter season and rainy days. Every day the floor, manger and water bucket were cleaned thoroughly using phenyl as antiseptic. Fresh drinking water was made available in buckets at all time for ad-libitum drinking. The animals were identified with ear tag. All the animals were stall fed.

Layout of the experiment

The animals were divided into two groups (control and treated group) while each group consists of three bulls.

Experimental ration

The experimental ration was the composition of rice straw, green grass, rice polish, wheat bran, mustard oil cake, molasses, urea, common salt and water. Two different rations were formulated for two groups (control and treated). All the groups were given almost equal amount of concentrate mixture containing of 0.5 kg rice polish, 0.5 kg wheat bran, 0.35 kg mustard oil cake. Common salt was supplied as mineral supplement. Urea-molasses straw + green grass was given to the bulls of treated group and rice straw + green grass was given to the bulls of control group. The ration shows in Tables 4 and 5 was formulated according to Agricultural Research Council (ARC, 1980) method and expected 0.5 kg body weight gain/bull/d.

Preparation of Urea Molasses Straw (UMS)

At first urea, molasses and straw were weighed out separately. A polyethylene sheet was spread over the soil, then the straw was scattered on the polyethylene sheet. Urea was then put in a dish and dissolved thoroughly with water. Molasses was added with urea solution and mixed thoroughly by a stick. Urea molasses solution was poured into a watering can from the dish and sprayed over the straw and mixed properly by hand. This was left for half an hour and then fed to the animals.

Feed intake

Every morning and evening before feeding the animals, each feed was weighed carefully and total quantity of feed supplied to individual animals was recorded. From the second day of feeding trial, before supplying feed to the animals, the amount of refusals of the feed of the previous day was collected, weighed and recorded. The feed refused by each individual animals during 24hours was deducted from the feed supplied to the animals on dry matter basis and was recorded as the daily dry matter intake by the animal.

Digestibility trial

In order to find out the digestibility of feeds a conventional digestion trial was conducted for a period of seven days towards the end of the experiment. The amount of feed supplied to each animal during 24hours was recorded. Representative feed samples and left over feeds were collected daily and stored in polythene bags for proximate analysis.

Live weight measurement

Weekly live weight was recorded by using weighing scale to estimate live weight gain of the experimental bulls. It was performed weekly at 7:30am every Thursday before any feed offered.

Chemical analyses

All the samples of feed and meat were prepared well and sub-sampled for determining the DM and the rest were preserved for subsequent chemical analyses.

Dry matter

The samples were weighed and dried in an oven at a temperature of 100°C till the constant weight was attained. Similarly 20g of meat sample was weighed and placed into an oven at the initial temperature of 65°C. After 24hours, the temperature was increased to 100°C, the sample was placed into the oven up to getting constant weight.

Organic matter

Organic matter was determined by ashing 1g sample in a muffle furnace at 550°C for 64 hours.

Nitrogen

Nitrogen (N) content of all the samples was determined by Kjeldahl method. Digestion of a 1 g sample with concentrated sulphuric acid (H_2SO_4) in the presence of I g mixed catalyst and distilled into two percent boric acid solution and titrated with 0.1N Hydrochloric acid for nitrogen content.

Statistical analyses

The statistical design followed in this experiment was Randomized Block Design (RBD) with multiple observations per cell. T-test, F-test and

Regression analysis were also performed in this study with the help of the computer software SPSS.

RESULTS AND DISCUSSION

Socio-economic condition of the farmer

In this study six characteristics of the respondents were selected to find out the socio economic condition of the farmers. The selected characteristics included age, level of education, family size, land size, annual income and occupation which are showed in Table 1. The majority (56.67%) of the respondents were middle aged category, (26.67%) young and (16.67%) adult. The highest proportion (33.33%) of the respondents had secondary level of education while 30% and 20% had primary and above secondary level of education respectively. Only 16.67% respondents had no schooling i.e., illiterate. In case of family size 60% of the respondents belong to medium sized family which was representative of typical family size of Bangladesh. This result is similar to the findings Hashem et al (1999). Hashem et al. (1999) investigated the cattle fattening programs of rural farmers in different districts of Bangladesh through field survey. They observed that 51.2% farmers had primary level education and 28% had no education. About 6l.4% farmers used cattle of 2-3years of old and 32.2% farmers used cattle of 1-2years. About 70.4% farmers used bull calves and 5.2% used female calves. About 71.20% farmers had an average 2 cattle head for fanning and 28.80% farmers had an average 3 cattle head. Fattening periods of 3-6 months and 7-12 months were reported by 42% and 30% farmers, respectively. About 86.40% farmers financed their fattening business by themselves. The major categories (36.67%) of the farmers belong to medium class which was representative of typical land size of Bangladesh. In case of annual income most of the farmers (43.33%) belong to medium category and small and high annual income observed only 16.67% and 33.33%, respectively.

Table 1
Percentage of the respondents belongs to age, level of education, family size, land size, annual income and occupation.

Parameters	Categories	Total farmers (%)
Age	Young age (up to 35 years)	26.67
	Middle age (36-50 years)	56.67
	Old age (above 50 years)	16.67
Education	Illiterate (no Schooling)	16.67
	Primary level (1-5)	30.00
	Secondary level (6-10)	33.33
	Above secondary (>10)	20.00
Family size	Small (2-4members)	26.67
	Medium (5-8 members)	60.00
	Large (>8 members)	13.33
Land size	Marginal (up to 20 decimal)	10.00
	Small (21-70 decimal)	26.27
	Medium (71-300 decimal)	36.67
	Large (above 300 decimal)	26.67
Annual income	Marginal (Tk. 20000-30000)	06.67
	Small (TK. 31000-50000)	16.67
	Medium (TK. 51000-100000)	43.33
	High (above TK. 100000)	33.33
Occupation	Agriculture	56.67
	Business	36.67
	Labor selling	0.00
	Others	06.67

Table 2
Average nutrients intake (kg/day).

Attributes	Controlled group	Treated group
Dry matter (DM)	4.44±0.33	4.75±0.36
Digestible day matter intake	2.88±0.35	2.92±0.13
Crude protein (CP)	0.28±0.04	0.53±0.05**
Crude fiber (CF)	0.51±0.06	0.75±0.05
Ether extract (EE)	0.17±0.05	0.09±0.02**
Nitrogen free extract (NFE)	1.04±0.10	1.38±0.08**

**Indicates significant at 1% level (P<0.01)

Table 3
Digestibility co-efficient (%) of proximate components of the experimental diets.

Attributes	Controlled group	Treated group
Dar Matter (DM)	64.86±1.51	63.89±1.34
Crude Protein (CP)	66.67±4.11	71.62±1.84
Crude Fiber (CF)	43.97±2.79	47.90±1.66
Ether Extract (EE)	80.95±1.06	69.23±2.16**
Nitrogen Free Extract (NFE)	64.60±3.84	68.32±0.67**

**indicates significant at 1% level (P<0.01)

Table 4
Nutritive value of proximate components of the experimental diets by different groups of animals.

Nutritive value (g/100g DM)	Controlled group	Treated group
Digestible Dar Matter (DDM)	53.83±1.70	51.11±1.84
Digestible Crude Protein (DCP)	5.20±0.74	9.25±1.53*
Digestible Crude Fiber (DCF)	9.5±1.43	9.99±1.37
Digestible Ether Extract (DEE)	3.24±0.79	1.56±0.62*
Digestible Nitrogen Free Extract (DNFE)	19.38±1.62	24.14±3.00*

*indicates significant at 5% level (P<0.05)

Table 5
Weekly body weight gains (kg) of bulls during the experimental period for 21 weeks.

Attributes	Controlled group	Treated group
Initial body weight	95.33±12.74	95.33±6.83
Final body weight	150.17±9.78	169.23±3.06*
Total body weight	54.83±6.45	73.90±4.36*
daily body weight	365.33±42.85	492.67±29.09*

*indicates significant at 5% level (P<0.05)

The annual income of marginal categories was observed only 6.67%. From the above results it was also observed that the annual income was highest when the farm category was large and marginal farmers earn less money from their marginal land property. Out of the farmers 56.67% were involved in agriculture, 36.67% in business and only 6.67% involved in other occupations. The income of the farmers is an important indicator of how much he can invest in his fattening business. Usually the person who has more income can invest more in fattening. This may be support the findings of Hossain (2002) and Huq *et al.*, (1997).

Proximate composition of the feed ingredients

The values for apparent digestibility of different nutrients of diets are presented in Table 3. These

results showed that digestibility's of DM for the 2 diets were almost similar, with a tendency of slightly higher value for control diet than that for treated diet. Ether extract (EE) digestibility of treated diet was significantly (P<0.01) lower than that of the control diet. However, the individual COD % of DM, CP, CF and NFE are statistically insignificant in the case of both diets of bulls. The authors also suggested that the results urea and molasses treatment on rice straw decreased the dry matter and silica contents but increased in the crude protein content (Manurag and Zulbardi, 1996).

The mean values for digestible nutrients such as DCP, DCF, DEE and DNFE are shown in Table 4. The table showed that digestibility % of DM was 53.83±1.70 and 51.11±1.84 percent for the bulls of control and treated groups respectively. DCP was 5.20±0.74 and 9.25 ±1.53 percent; DCF was 9.5±1.43 and 9.99±1.37 percent, DEE was 3.24±0.79 and 1.56±0.62 percent; DNFE was 19.38±1.62 and, 24.4±3.00 percent, respectively. Tabre-4 leads to the conclusion that DCP of the bulls of treated groups is significantly (P<0.05) higher and DEE of the bulls of treated groups is significantly (P<0.05) lower than that of the control group. Barnah et al., (1992) observe the effect of urea and molasses treatment of paddy straw on its chemical composition and nutritive value in crossbred calves.

Dry matter intake of the UMS diet was higher than that of untreated straw diet (control) which is shown in Table 2. This could be due to the softening of fibrous portion of straw by soaking making it more palatable to the animals (Akbar, 1992). Another reason could be that because the treatment of straw increased the readily available nitrogen source for the microbes in the rumen resulting in higher microbial activity and rapid fermentation and rate of passage of digests (Islam, 1989). This might have led to increased intake of feed. This explanation has been supported by the higher crude fiber digestibility of treated straw (UMS) than that of untreated straw. The higher CP content of the soaked straw diet might have caused higher microbial activity in the rumen resulting in higher feed intake than that of untreated straw (control) diet. The average intake, nutrient digestibility and nutritive value of the diet were expected to be higher in treated group than that of control group. Huque and Chowdhury (1999) concluded that UMS increases digestion and intake in association with reduced methane production in the rumen and that such a mixture (JMS) may be the best way of feeding molasses and urea to ruminants fed on straw.

Growth performance

Growth performance of experimental bulls under control and treated groups is shown in Table 5. Average daily body weight gain (g) of control and treated groups were 365.33±42.85 and 492.67±29.09 g respectively. Comparing the average live weight of the bulls of control and treated group's shows that UMS has a positive effect on the live weight but this effect is found after some weeks of supplying UMS to the bulls. Since the average live weight (132.95 kg) of bulls of the treated group is higher than the average live weight (123.75 kg) of bulls of the control group, thus an opinion could be drawn that UMS increases the live weight of the bulls significantly (P<0.05). Chowdhury and Huque (1998) observed daily live weight changes during the experimental period were 292, 125 and 19 g, respectively for UMS, UGS and US. Chowdhury and Huque (1998) concluded that supplementation of readily fermentable N (urea) alone is not enough to optimize rumen function and that a source of readily fermentable energy is also required. Rice gruel, as a fermentable energy source, is less effective than molasses in removing the restriction on voluntary intake and provided less amino acids of microbial origin for absorption from the small intestine. More substrate for protein synthesis and gluconeogenesis was available for growth in bulls supplemented with molasses than rice gruel. Colpan et al., (1995) reported that male Limousin x Jersey beef cattle, from 12 to 18 months old in 2 groups of 6 each were fed on a diet containing 80% sugar beet pulp and 15% wheat straw, or that diet supplemented with l.5% zeolite. Average live weight at the end of feeding was 333.25 and 354.80 kg, respectively, and average daily gain, 1132 and 12469g. This result is similar to the findings Chowdhury and Hugut (1998).

CONCLUSION

The result of present study showed that beef fauening business depends on the socio economic and the factors related to cattle fattening, so these consideration. The results show that roughage intake as well as total DM intake of the bulls on UMS based diet was significantly higher than that of the bulls of controlled group. Crude protein and nitrogen free extract intake was significantly higher in bulls feeding UMS. Average live weight gain is higher in treated group than the controlled group. The result exhibits that average 4.13 kg increasing of live weight for each cm increasing of heart girth. The amount of income could be increased when beef fattening programmer is practiced by the farmers household level and they can give labor and feeds animals from their own source. Therefore, UMS can be fed for fattening of indigenous bulls in lieu of untreated straw alone, because it enhance to rapid growth and development of the body of animals and earning relatively more of the net profit for people of Chattogram district.

REFERENCES

Ahmed N (1992). Problems and prospects of Livestock in Bangladesh. In proceedings work of Livesock Development in Bangladesh. 16-18 July, BLRI. 8-14.

Ahmed R and Dolberg F (1979). Unpublished data, National Integrated Rural Development project NIRDP/DANIDA, Noakhali, Bangladesh.

Akbar MA (1992). Methods of urea incorporation in straw and their etTects on performance of buffalo heifers. Asian Australasian Journal of Animal Sciences 5:545-548.

Alam J, Akleruzzaman M, Rahaman A and Ahmed Z (1994). Comparative performance of local and crossbred cows in Bangladesh. Indian Journal of Dairy Science 47:112-117.

Assaduzzaman M (1996). Livestock sector. Economic Development and poverty Alleviation. A keynote paper presented at the seminar on small scale Livestock Farming opportunities for self-Employment and poverty Alleviation on the occasion of the 5th National convention of the Bangladesh Pashupalan Samity, August 22.

Chowdhury SA (1999). Effect of graded levels of mustard oil cake supplementation on intake, nutrient digestibility, microbial N y,reld of adult cannulated native (Bos indiczsl bulls fed rice straw. Asian Australasian Journal of Animal Sciences 12:715-722.

Chowdhury SA and Huque KS (1998). Effect of molasses or rice gruel inclusion to urea supplemented rice straw on its intake, nutrient digestibilities, microbial N yield, nitrogen balance and growth rate of native (*Bos indicus*) growing bulls. Asian-Australasian Journal of Animal Sciences 14:145-151.

Colpan, ISD, Tuncer AG, Onol and Yildiz G (1995). The effects of zeolite on fattening performance and carcass characteristics of Limousin x Jersey (F_1) crossbred bulls. Lalahan Hayvancilik Arastirma Enstitusu Dergisi 35:26-43.

FAO (Food and Agriculture Organization of the United Nations) (1997). Production Year Book, 50. Rome, Italy.

FAO (Food and Agriculture Organization of United Nations) (1996). Production Year Book, FAO statistics series, Rome, Italy 50:135.

GOB (Government of Bangladesh) (1991). Report of the Task Forces on Bangladesh Development strategies of the 1990's, University Press Limited, Dhaka, Bangladesh 2-4.

Haque S (1992): Livestock Development in Bangladesh: Some reflections. In proceedings work of Livestock Development in Bangladesh. 16-18 July, BLRI. 1991, 15-24.

Hashem MA, Moniruzzaman M, Akhter S and Hossain MM (1999). Cattle fattening by rural farmers in different districts of Bangladesh. Bangladesh Journal of Animal Science 28:81-88.

Hossain S (2002). Socio-economic upliftment of rural poor through cattle fattening. M.S. Thesis, Department of Animal Science, BAU, Mymensing, Bangladesh.

Huq MA, Mondal MMH, Collard RY and Haq MA (1997). Integrated Farming Development Project in Bangladesh. First Annual Report (1995-96). pp. l8-19.

Islam MA (1989). Effect of different methods of urea incorporation in straw based diets on intake, feed digestibility and growth rate of buffalo calves. M.Sc. Thesis, Department of Animal Nutrition, Bangladesh Agricultural University, Mymensingh.

Manurung T and Zulbardi M (1996). The improvement of rice straw quality by urea molasses treatment. Journal-Ilmu'Ternak-dan-Veteriner 2: 33-37.

Rahman MS (1992). Dairy Development in Bangladesh. Proceedings of Fourth National conference. Bangladesh Animal Husbandry Association 84-88.

Tareque AMM (1985). Bangladesh pashupushti bartaman porishthiti o samashyaboli. Bangladesh Pashusampad unnayan-Neeti o Kowshal, BARC, Dhaka.