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EFFECT OF UREA MOLASSES STRAW ON BEEF CATTLE FATTENING AND INCOME GENERATION OF SMALL SCALE FARMERS IN *HAOR* AREAS

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Abstract

Beef cattle fattening is a potential income generating enterprise for the small scale farmers' in *haor* areas. Thus, the experiment was conducted with the aim to observe the effect of urea molasses straw for fattening bull and contribution to the income generation for small scale farmers in *haor* areas. The experiment was conducted at the Noagaon village under South Sunamganj Upazila of Sunamganj district from January to April 2017. Ten farmers were selected for rearing and each farmer reared one bull (2-3 years old) for fattening. Two groups of animals, treatment group treated with Urea Molasses Straw (UMS) in diet and control group without UMS supplementation, were laid out with five replications in each group. Data on body weight gain and profitability data were collected and analyzed as Completely Randomized Design (CRD). Feeding of urea molasses straw with the dietary feed had shown a positive effect on weight gain. After the end of the experimental period, mean body weight gain (g $day^{-1}animal^{-1}$) for the treatment and control group were measured as 496.41 and 236.62 g, respectively. The body weight gains of these both feeding groups were insignificant during the first fifteenth days of the experimental period, however, the difference was significant ($p<0.05$) for the rest of the experimental period. Moreover, higher gross margin was found in the treatment group (Tk. 14,310) than the control group (Tk. 3,810). Therefore, a significant growth performance with a profitable income for the small scale farmers' of *haor* areas might be promising from beef cattle fattening by dietary urea molasses straw treatment.

Keywords: Bangladesh, body weight, profitability, dietary, farmers.

Introduction

Bangladesh, as a developing country, is one of the most densely populated countries in the world with an estimated population of 1238.4 person/km^2 (United Nations, 2017). The ruminant animal population of Bangladesh is currently estimated to comprise 25.7 million cattle, 0.83 million buffaloes, 14.8 million goats, 1.9 million sheep (DLS, 2016) and the livestock sector contributing to GDP comprises 1.6% (BER, 2017). The livestock sector is a part and parcel for the major source of protein and livelihood improvement (Rahman *et al.,* 2014) for the human population. To meet the Sustainable Development Goals (SDGs), improved food security is prerequisite with precision livestock farming (Pérez-Escamilla, 2017; Scholten *et al.,* 2013). In Bangladesh, beef cattle plays a significant role for fulfilling protein demand, employment opportunities, income generation, and utilization of agricultural waste and as savings for farmers and potential commodities of livestock agribusiness to economic development (Sarma and Raha, 2015). In recent years, the demand for beef production in Bangladesh is rapidly increasing. Thus, beef cattle fattening for small scale farmers in Bangladesh has become popular as an important agribusiness (Sarma and Ahmed, 2011; Baset *et al.,* 2003). Beef cattle fattening is a for the rural farmers to satisfy animal protein requirement. Locally available natural feed resources are another key advantage for the successful beef cattle fattening program during the Eid-ul-Azha festival (Hossain *et al.,* 2016; imported/other means animal from India. However, it is stopped in the recent past and the demand is increasing day by day. Urea is a safer and cheaper form of ammonia which is produced by decomposing of urea by urease enzyme. Rahman *et al.,* 2012). During Eid-ul-Azha, the second biggest religious festival for the Muslims, nearly 40 lakh cattle potential and important sector were eligible for sacrifice and Urea Molasses Straw was meant for rapid beef cattle fattening noticeable in Bangladesh (Seraj, 2017). A good percentage of demand is fulfilled by

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Rice straw, a type of basal feed, has poor digestibility and nutritive value alone. To improve the nutritive value of straw along with increasing feed intake, digestibility, and palatability, chemical treatment with the use of molasses and urea is significant and above all enhanced nitrogen content of straw will then be used for protein synthesis by rumen microbes (Banerjee. 1998; Barnah *et al.,* 1992). The growth rate of young cattle, in the traditional method, was found to be 100-200 g $day^{-1}animal^{-1}$, however, it can be improved to 300-400 g day^{-1} by upgrading feeding technique (Akbar *et al.,* 1990). Protein source on the diet is needed for the growth rate of animals (Banerjee. 1998). UMS, for beef cattle fattening rather than untreated straw alone, can improve the growth of animal as well as contribute income generation *(Saha et al.,* 2018). In the *haor* areas, however, beef cattle fattening yet reaches up to the mark although the available natural feeds are the key resources for the small scale poor farmers. Flood, a natural disaster, inundates causes a significant handicap for the people of *haor* areas. Moreover, farmers graze cattle in the field on the dry and wet season supplied untreated rice straw is insufficient to their requirements as well as lacking supplementary feed attributes poor health along with a drop of average production. Majority of the rural people do not have proper knowledge on beef cattle fattening (Saha *et al.,* 2018) and yet to concern that it could be a plausible source of income generation for small scale farmers' in the *haor* areas. Therefore, the experiment was conducted with the aim to observe body weight gain of the indigenous bulls by UMS in diet and profitability analysis of beef cattle fattening in small scale farmers in *haor* areas.

Materials and Methods

The experiment was conducted at the Noagaon village under South Sunamganj Upazila of Sunamganj district during the period from January to April 2017. There were two groups, treatment group treated with Urea Molasses Straw (UMS) and control group without treated with UMS. The experiment was laid out in CRD with five replications in each group. Ten farmers were selected in the village and each farmer reared one bull for fattening. Age of all the bulls was about 2-3 years. During the experimental period, there was no suspected disease condition developed to the experimental animals. Body weight gains were recorded at 2 weeks interval. All the parameter for economic analysis and statistical analysis were carefully taken. Body weight was measured by the heart-girth method using the following formula:

$$\text{Weight of bull (lb)} = (L \times G^2)/300$$

Where, G for heart girth and L for the body length from the shoulder point to point of buttock. The factor 0.4536 was multiplied to convert these pounds into kilogram.

Preparation of urea molasses straw (UMS)

The required amount of urea (3%), molasses (15%) and straw (82%) were weighed out separately (Table 1). A polythene sheet was spread on the ground and a small amount of chopped straw was spread on the sheet. Urea was dissolved with water (half of the weight of straw) and molasses was added and mixed thoroughly. Urea molasses solution was sprayed over the straw and mixed properly by hand, left for drying and then preserved and fed to the animals within a week (Rahman *et al.,* 2009)

Table 1. Preparation of 100 kg urea molasses straw for the bull fattening

Ingredient	Quantity (%)
Urea	<3
Molasses	15
Rice straw	82

Feeding and water supply of experimental bull

During the experimental period, there was a sufficient amount of green grass available in the field. So the main source of feed for the cattle was pasture land. In addition, urea treated straw was supplied to the treatment group for the better digestibility of feed. The urea treated straw was divided into two halves; one half provided at morning and the rest half in the evening and maximum of two kg urea treated straw was supplied for each bull per day. All the experimental animals fed almost the same feeding bases on their treatment and control strategies. It was also mentioned that maximum doses of urea were not more than 50 g per day. The experimental bulls were fed in the following way:

UMS group: Urea-molasses treated straw + rice straw (ad-libitum) + green grass (ad-libitum),
Control group: rice straw (ad-libitum) + green grass (ad-libitum).
Fresh and clean water were provided all time in ad-libitum.

Vaccination and deworming of the experimental animals

Vaccines were provided against Foot and Mouth disease, Anthrax and Black Quarter to the experimental animals subcutaneously at 6 ml, 1 ml and 5 ml doses respectively. Vaccines were collected from District Livestock Office manufacturing by Livestock Research Institute (LRI) at Mohakhali Dhaka. Proper cooling temperature (4^0C to 8^0C) was maintained during transportation and preservation. One week interval of each particular vaccine was given to avoid antigenic competition of different vaccines to the experimental animals. Deworming medicine, a combination of Triclabendazole and Levamisole at 10 mg kg^{-1} body weight were administered orally and repeated after fourteen days interval.

Statistical Analysis

Data on body weight gain and profitability were analyzed by Completely Randomized design (CRD).

Results and Discussion

Initially, the average body weight of the control group and treatment group were measured as 76.06 and 75.41 kg, respectively. After the supplementation of urea molasses treated straw in the cattle dietary feed, the mean body weight gains of fattening bulls were measured. In respect to the control and treatment groups, average body weights were recorded as 117.64 and 96.23 kg, respectively at 90 days of experimentation. During the experimental period, overall body weight gain (g $day^{-1}animal^{-1}$) for the control and treatment group was 236.62 and 496.41 g, respectively. Feeding of urea molasses straw with the dietary feed has a positive effect on weight gain. The body weight gains of these both feeding groups were insignificant during the first 15 days of the experimental period (15-30 January), however, the difference was significant for the rest of the experimental period (Table 2).

Table 2. Comparison of mean body weight gain per day of fattening bulls

Groups	Initial body weight (kg) (Mean±SE)	Final Body weight (kg) (Mean±SE)	Mean body weight gain (g day^{-1})						
			15-30 Jan	31 Jan -14 Feb	15 Feb – 01 Mar	02-16 Mar	17-31 Mar	01-15 Apr	Overall (Mean±SE)
UMS group	75.409±1.10	117.64 ±2.75	351.75	409.05	457.92	502.33	547.12	565.64	496.41± 27.22
Control group	76.06±2.65	96.23 ±3.04	205.24	216.71	229.67	241.62	249.47	245.62	236.62± 2.55
LS			NS	*	*	*	*	*	

* = Significant at 5% level of probability and NS=Not-significant.

The mean body weight gains $day^{-1}animal^{-1}$ of the treatment group were much higher in comparison to the control group. The weight gain was 351.75 g $day^{-1}animal^{-1}$ at initial fifteenth days (15-30 January) and it was continued till the end of the experiment (565.64 g $day^{-1}animal^{-1}$) in the treatment group. On the other hand, in the control group, body weight gains were increased but in comparison to the treatment group, it was much lower. It was observed that 205.24 g $day^{-1}animal^{-1}$ at an initial time but 245.62 g $day^{-1}animal^{-1}$at the final of the experiment (Table 2). The highest growth rate was observed in the treatment group (565.64 g $day^{-1}animal^{-1}$) while the lowest in the control group (245.62 g $day^{-1}animal^{-1}$). One possible explanation could be the availability of natural feed with their high nutritive value in the *haor* areas as well as continuous supply of molasses and urea mixed straw (UMS) may synchronize the supply of energy and amino acids at the tissue level which brings the necessary changes in the hormonal level for better growth and feed conversion efficiency (Chowdhury and Huque, 1995). According to Saha *et al.* (2018), the daily average body weight gained by treatment group was 492.67 g supports the result of this study, however, the higher result was found in case of the control group (365.33 g $day^{-1}animal^{-1}$). More or less similar results were found in the report of FSES (1996), where the highest growth rates were recorded in different urea treated straw based diets (450.54 g $day^{-1}animal^{-1}$). In another study, Hoffman *et al.* (1993) recorded that the body weight increased about 351.24 g $day^{-1}animal^{-1}$ and Salinas *et al.* (1983) found about 415.21 g $day^{-1}animal^{-1}$. These findings were much lower than the present study. It may be due to the availability of green grass in the research area. Rahman *et al.* (2009) reported the maximum weight gain 676.57 g $day^{-1}animal^{-1}$ by feeding urea treated straw, which was higher than the present findings.

Profitability analysis

Total expenditure and gross return were calculated (Table 3). The total expenditure was included as the cost of initial price of the animal, feed, vaccination, and other management. The gross return included mostly the sale price of animals. The total variable cost was Tk. 34,190 in UMS feeding group and Tk. 33,690 in control group per cattle. The gross returns were Tk. 48,500 UMS feeding group and Tk. 37,500 for the control group (Table 3). So, the higher gross margin was found in the treatment group (Tk. 14,310) than the control group (Tk. 3,810). Therefore, profitability of beef cattle fattening might be increased significantly in *haor* areas through supplementation of urea molasses straw in the diet.

Table 3. Profitability analysis between UMS group and Control group of fattening bulls

Parameter	UMS group	Control group
Initial price of animal (Tk.)	30,000	30,000
Feed cost (Tk. animal^{-1}day^{-1})	46	40
Feed cost (Tk. animal^{-1} 90day^{-1})	4,140	3,600
Vaccination cost (Tk.)	20	20
Miscellaneous (Tk.)	30	30
Total expenditure	34,190	33,690
Weight gain of cattle (kg)	42.232	20.174
Selling price of animal (Tk.)	48,000	37,000
Selling price of cow dung(Tk.)	500	500
Gross return (Tk.)	48,500	37,500
Gross margin (Tk.)	14,310	3810

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