Online Journal of Animal and Feed Research
Volume 1, Issue 5: 182-185 (2011) *ISSN 2228-7701*

HEMATOBIOCHEMICAL DYNAMICS AND BODY WEIGHT GAIN OF BLACK BENGAL GOAT FOLLOWING UREA MOLASSES BLOCK (UMB) SUPPLEMENTATION

F.M.A. HOSSAIN[1*], M.R. HASNATH[1], M.S. KABIR[2]

[1]Department of Dairy and Poultry Science, [2]Department of Animal Nutrition & Livestock Management; Faculty of Veterinary and Animal Science; Sylhet Agricultural University; Sylhet-3100, Bangladesh

*Email: fmhossainvet@yahoo.com

ORIGINAL ARTICLE

ABSTRACT: *Black Bengal goats supplemented with urea molasses block (UMB) resulted in body weight gain and significantly increased (P<0.05) in various hematobiochemical parameters like total erythrocyte count, packed cell volume, hemoglobin concentration, serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvic transaminase (SGPT) level as compared to controlled group; whereas, erythrocyte sedimentation rate was not varied in either group.*

Keywords: *Black Bengal goat, body weight gain, hematobiochemical, UMB.*

INTRODUCTION

Bangladesh harboring 34.4 millions of goat of which 90% goats are Black Bengal (Husain et al., 1998) and reared for poverty alleviation, self-employment, food supply and increase of skin export (Islam and Huque, 2002). Goats ranked as second most population in aspect of total contribution of livestock, in Bangladesh (FAO, 2002) though they contribute our GDP with poor production both milk and meat due to their poor genetic makeup and improper nutrition. Nutritional status of goat is very poor in Bangladesh due to shortage of feeds and fodder both in quality and quantity (Hossain et al., 2003). Farmer cannot spare land for fodder production for goat. More than 70% of the rural peoples are directly or indirectly engaged in agriculture and goats are generally reared as scavengers in Bangladesh (Huq et al., 1990). Molasses and urea supplementation with available energy and nitrogen may upgrade the energy and ammonia levels in the rumen (Freitas et al., 2003; Mancini et al., 1997). Urea molasses straw supplementation in goat accelerates body weight gain, alterations in hematological values (Drowdy and Matrone, 1968), biochemical parameters like SGOT, SGPT etc. (Tiwari et al., 2010). This study was conducted to reveal such body weight gain and hematobiochemical changes due to UMB supplementation of Black Bengal goats in Bangladesh.

MATERIALS AND METHODS

Animals and Feedings

The study was conducted for 40 days on twenty Black Bengal goats of Government Goat Development Farm, Sylhet; Bangladesh. The laboratory procedures were completed jointly in the laboratory of Dairy and Poultry Science, Sylhet Agricultural University, Sylhet; and Supreme Diagnostic Centre, Dhaka-1207, Bangladesh.

Experimental goats

A total of 20 female goats (*Capra hircus*) were divided equally as A (control) and B (experimental) and the average body weights of these animals were 12-13kg and their ages ranged from 12 to 16 months. Goats were kept in semi-intensive system with grazing and supplied *ad-libitum* clean fresh drinking water throughout the experimental period.

UMB preparation

Composition of Urea Molasses Block (UMB) is given in Table 1. Ingredients for making UMB were purchased from local market at Sylhet town. UMB were prepared according to Sansoucy (1995).

To cite this paper: Hossain, F.M.A.; Hasnath, M.R and Kabir, M.S. 2011. Hematobiochemical dynamics and body weight gain of Black Bengal goat following urea molasses block (UMB) supplementation. *Online J. Anim. Feed Res.*, 1(5): 182-185.
Journal homepage: http://www.ojafr.ir

Urea Molasses Block (UMB) feeding

Experimental goats supplemented with urea molasses block (UMB) orally at the dose of 200gm/head/day as divided into half equally and offered in the morning and in the evening for 42 days along with normal concentrates and grazing status.

Table 1 - Formula for making Urea Molasses blocks (composition in %)

Ingredients	Percentage
Molasses	45
Urea	15
Mineral mixture	10
Quick lime	12
Sodium bentonite	3
Rice polish	10
Common salt	5
Total	100

Performance and Blood determination

Body weight of the animals: The body weight of each of the animal (goat) was measured with the help of balance and weight box at 0 day and every 7 day intervals during the experimental period (42 days). The body weight of the animal was taken before feeding in morning and expressed in kilogram (kg).

Blood collection: For the hematobiochemical examination, blood samples were collected aseptically with sterile syringe and needle from the jugular vein of two groups of animals (goat). Approximately 5ml of blood was collected from each animal and was transferred immediately to a clean, dried test tube containing anticoagulant (EDTA) at a ratio of 1:10 for the hematological studies and were performed within five hours after collection of blood. Approximately another 5ml of blood was collected from each animal and was transferred immediately to a clean, dried test tube which was used to collect of serum for biochemical studies.

Hematological examination: Following the method described by Lamberg and Rothstein (1977) total erythrocyte count (TEC) haemoglobin content (Hb), packed cell volume (PCV), erythrocyte sedimentation rate (ESR).

Biochemical examination: Blood sera biochemical parameters SGOT and SGPT were detected from the goat's serum by the use of specific test kit and analyze in a diagnostic centre.

Statistical analysis

Data obtained from the experiment were calculated and expressed as Mean ± SE on body weight and hematological parameters (e.g. TEC, Hb concentration, PCV and ESR) and biochemical parameters (e.g. AST and ALT) were analyzed statistically using students paired T-test.

RESULTS AND DISCUSSION

Effects of UMB feeding on body weight of goats

The changes observed in the body weight of goats after UMB feeding are presented in Table 2. The goats treated with (UMB) showed increased body weight. Significantly (P<0.05) higher weight gain was recorded in group B on day 21 and significantly (P<0.01) higher weight gain was recorded in group B on day 28 consecutively up to day 42. The increased body weight was highest (14.39Kg) in experimental group B on day 42; on the other hand it was only 13.58kg in controlled group A on the same day.

Table 2 - Effects of UMB on body weight (kg) in goats

Groups	Treated with	Body weight (kg)						
		0 day	7 day	14 day	21 day	28 day	35 day	42 day
A	Controlled (normal grazing)	12.87±0.04	12.95±0.02	13.13±0.02	13.38±0.07	13.49±0.06	13.56±0.02	13.58±0.04
B	UMB normal grazing	12.61±0.02	12.91±0.03	13.30±0.04	13.61*±0.03	13.91**±0.02	13.72±0.49*	14.39±0.01**

The values are expressed as the Mean ± SE of 6 animals in each group; * = Significant at (P<0.05), ** = Significant at (P<0.01).

Effects of UMB feeding on haematological parameters of goats

The observed effects of UMB feeding on hematological parameters are presented in Table 3. TEC was higher in significantly at (P<0.05) in UMB supplemented group compared to the control group. The hemoglobin concentration increased significantly at (P<0.01) and PCV were also increased significantly at (P<0.05) due to UMB supplementation and there was no change in ESR value.

To cite this paper: Hossain, F.M.A.; Hasnath, M.R and Kabir, M.S. 2011. Hematobiochemical dynamics and body weight gain of Black Bengal goat following urea molasses block (UMB) supplementation. *Online J. Anim. Feed Res.,* 1(5): 182-185.
Journal homepage: http://www.ojafr.ir

Table 3 - Hematological parameters of different groups of goats and comparison by Dunnett's test		
Hematological parameters	Mean ± SE in the different treatment groups	
	Group-A (control)	Group-B (experimental)
TEC (million/mm^3)	12.59±0.02	13.08±0.01*
Hb (gm%)	8.49±0.01	10.46±0.01**
PCV (%)	25.75±0.85	27.25±0.48**
ESR (mm in 1st hr)	0	0
The values represent the mean ± SE of 6 animals in each group; * = Significant at p<0.05), ** = Significant at (p<0.01),		

Effects on biochemical parameters

The effect of urea molasses block (UMB) on biochemical parameters was presented in Table 4. From the table, it could be depicted that serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvic transaminase (SGPT) values increased significantly (P>0.01) in the UMB supplemented goats, compared with those of controlled.

Table 4 - Biochemical parameters of different groups of goats and comparison by Dunnett's test		
Biochemical parameters	Mean ± SE in the different treatment groups	
	Group-A (control)	Group-B (experimental)
SGOT/AST IU/L	112.51±0.91	136.47±0.89**
SGPT/ALT IU/L	52.91±0.90	65.75±0.86**
The values represent the Mean ± SE of 6 animals in each group, ** = Significant at (P<0.01).		

DISCUSSION

UMB supplementation in Black Bengal goats revealed highest body weight gain average (14.39Kg) as compared to untreated goats (13.58 kg) at the end of experiment of 42 days ad this findings are very corroborated with Saddul and Bodoo (2001), where they reported better response in terms of daily live weight gain (56gm) in weaned kids feeding UMB with a daily concentrate (42gm/day) in combination with cotton seed cake showed. The present results also concur with the findings of Vatta et al., (2007); Ali (1992) in goat, who observed an increased body weight by urea feeding. This increased body weight may be related with the improved intake and digestibility of roughages. Leng (1990), Singh et al. (1999) and Kawas et al. (1999) also reported body weight gain improvement in their experiment on goats.

Increase of haematological parameters in present findings resemble to that of Drowdy and Matrone (1968) in sheep who reported that haematological values increased significantly by using urea supplement. Wenzlaf and Erhardt (1991), who reported the increased hemoglobin concentration in lambs treatment with urea. Mburu et al. (1994) reported the increase of hemoglobin by administration of urea in East African goat. Martson et al. (1998), Ali (1992) also reported that the TEC, Hb% and PCV were increased which was similar with the present study.

Increase of hematological parameters in present findings resemble also with that of Tiwari et al. (2010) in goat kids who reported that SGOT and SGPT values increased significantly by using urea molasses mineral block supplement. Significant increase in serum SGOT activity in UMMB treated goats suggests an increased respiratory burst and mitochondrial involvement, as SGOT is chiefly a mitochondrial enzyme resulting from acute and chronic liver injury (Hassanein, 2004). Since SGPT is one of the specific assayable liver enzymes, its elevated level in the study may indicate hepatic damage caused by oral administration of UMB (Sharma, 1996; Tennant, 1997). Although it is difficult to point the damage to any particular organ by UMMB, but increased levels of aminotransferases in buffaloes may be attributed to liver damage (Sihag et al., 2009) as it is the primary organ of biotransformation of UMMB.

Except slight toxicity (resulting increased SGOT and SGPT), use of urea was useful in improving the general health condition of goat if they are supplemented in proper rate and ratio. To minimize the toxicity and get comprehensive result the duration of the experiment should be prolonged more than 6 weeks. Further study should be carried out including more parameters.

CONCLUSION

Urea molasses block (UMB) supplementation in Black Bengal goats in Bangladesh will be the key feeding system for the development of sustainable goat production scheme in Bangladesh during scarce period of feeds. As UMB supplementation enhances the body weight and hematolobiochemical Physiology of Black Bengal goats, so it can be advised to the farmers through the proper authority.

ACKNOWLEDGEMENT

The author representing high gratitude to technicians of Supreme Diagnostic Centre, Dhaka-1207, Bangladesh to permit him to conduct all the hematobiochemical tests of this research.

To cite this paper: Hossain, F.M.A.; Hasnath, M.R and Kabir, M.S. 2011. Hematobiochemical dynamics and body weight gain of Black Bengal goat following urea molasses block (UMB) supplementation. *Online J. Anim. Feed Res.,* 1(5): 182-185.
Journal homepage: http://www.ojafr.ir

REFERENCES

Ali A (1992). Performance of lambs fed urea molasses blocks vs. concentrate. Journal of Animal Science, 12: 28-32.

Drowdy RP and Matrone G (1968). Urea supplementation in sheep. Journal of Nutrition, 95:191-201.

FAO (2002). Food and Agriculture Organization of the United Nations. Production Year Book. Rome. Italy, Vol. 56.

Freitas SGD, Patino HO, Muhlbach PRF and Gonzales FHD (2003). Effects of multinutrient blocks supplementation of calves on digestibility, intake and ruminal parameters. Revista Brasileira de Zootecnia, 32(6): 1508-1515.

Hassanein T (2004). Mitochondrial dysfunction in liver disease and organ transplantation. Mitochondrion, 4: 609-620.

Hossain ME, Shahjalal M, Khan MJ and Hasanat MS (2003). Effect of dietary energy supplementation on feed intake, growth and reproductive performance of goats under grazing condition. Pakistan Journal of Nutrition, 2(3): 159-163.

Huq ME, Rhaman MM and Miah MAM (1990). A study on the relationship between Management Practices Followed by the goat Raisers with some of their Selected Characteristics in a Selected Area of Satkhira Upazila. Bangladesh Journal of Animal Science, 19(1-2): 21-31.

Husain S, Amin MR and Islam ABMM (1998). Goat Production and its Breeding Strategy in Bangladesh. Proceeding of First National Workshop on animal Breeding held on 26 November. Bangladesh Agricultural University, Mymensingh, pp. 17-36.

Islam RM and Huque QME (2002). Proceeding of the workshop on poverty alleviation through goat production: National programme (27 april-23 May, 2002), Bangladesh Livestock Research Institute, Savar, Dhaka.

Kawas JR, Schacht WH, Olivares E and Lu CD (1999). Effects of grain supplementation on the intake and digestibility of range diets consumed by goats. Small Ruminant Research, 34: 49-56.

Lamberg SL and Rothstein R (1977). Laboratory Manual of Hematology and Urinalysis. Avi. Publishing Company, Inc, Westport Connecticut, U.S.S.R. pp. 471-479.

Leng RA (1990). Factors affecting the utilization of 'poor-quality' forages by ruminants particularly under tropical conditions. Nutrition Research Reviews, 3: 277-303.

Mancini V, Lebzein P, Reinhardt R and Flachowsky G (1997). Studies on the influence of differently treated molasses/urea mxts. vs. soybean meal on parameters of rumen fermentation, duodenal nutrient flow and in sacco degradation of maize silage and wheat straw in non lactating dairy cows. Animal Research and Development, 46: 75-86.

Martson HR, Lines EWS and Thomas RG (1998). Urea supplementation in ruminants nutrition. American Veterinary Medical Association, 90: 171-175.

Mburu JN, Kamau JMZ, Badamana MS and Mbugua PN (1994). Use of urea in relation to hemoglobin concentration in small East African goats. Bulletin of Animal Health and Production in Africa, 42(2): 141-146.

Saddul S and Bodoo AA (2001). Response to urea molasses blocks as a supplement in the diet of goats. Food and Agricultural Research Council, Reduit, Mauritus, pp. 245

Sansoucy R (1995). New developments in the manufacture and utilization of multinutrient blocks. World Animal Review, 82: 78-83.

Sharma GD (1996). Experimental urea toxicity in sheep. Indian Veterinary Journal, 73(9): 991-994.

Sihag ZS, Punia BS, Berwal RS and Sihag S (2009). Influence of Feeding Urea Molasses Mineral Block (UMMB) Blood parameters in Buffaloes. Indian Journal of Animal Nutrition, 26(1): 56-60.

Singh P, Verma AK, Dass RS and Mehra UR (1999). Performance of pashmina kid goats fed oak (*Quercus semecarpifolia*) leaves supplemented with a urea molasses block. Small Ruminant Research, 31(3): 239-244.

Tennant BC (1997). Hepatic function in clinical biochemistry in domestic animal. 5th Edn. (Eds : Kaneko, J.J., Harvey, J.W. and Bruss, M.L.) Academic Press, San Diego, pp. 327-352.

Tiwari SP, Angan R, Samiran M and Gendley MK (2010). Subchronic toxicity study of urea molasses mineral Block in goat kids. 3rd International Scientific Conference on Small Ruminant Development, Hurghada, Egypt. Egyptian Journal of Sheep & Goat. Science, 5(1): 323-333.

Vatta AF, de Villiers JF, Gumede SA, Smith MF, Stenson MO and Harrison LJ (2007). Benefits of urea-molasses block supplementation and symptomatic and tactical anthelmintic treatments of communally grazed indigenous goats in the Bulwer area, Kwazulu-Natal Province, South Africa, 78(2): 81-89.

Wenzlaf O and Erhardt G (1991). Effect of urea molasses administered on erythrocyte parameters and growth rate in lambs of different breeds. Berliner and Munchener Tierarzt liche Wochen Schrift, 103(7): 239-244.

To cite this paper: Hossain, F.M.A.; Hasnath, M.R and Kabir, M.S. 2011. Hematobiochemical dynamics and body weight gain of Black Bengal goat following urea molasses block (UMB) supplementation. *Online J. Anim. Feed Res.,* 1(5): 182-185.

Journal homepage: http://www.ojafr.ir