

## **Effect of Feed Supplemented with urea Molasses Mineral Blocks on Activity of Serum AST, ALT and Levels of Total Protein, Glucose, Triglyceride, Total Lipid, Total Cholesterol in Lambs**

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### **Summary**

Recent studies reported that feed supplemented with urea molasses mineral blocks (UMMB) increases microbial activity and fermentation of rumen. In addition, there is also an increase in nitrogen, minerals, and energy supplies. The aim of this study was to investigate the effect of UMMB on activity of serum AST, ALT and levels of total protein, glucose, triglyceride, total lipid, total cholesterol.

In this study 18 male lambs of 8 months of age were used. First, second and third groups were named as straw, straw + UMMB, straw + UMMB + 100g barley as ad libitum, respectively. On the 1st, 15th and 30th days of the feeding trial, blood samples were taken with jugular vein puncture and the sera were prepared. Results of this study showed that no differences between groups were determined in activities of serum AST, ALT and levels of total protein, glucose, triglyceride, total cholesterol trial among three groups. An increase ( $p<0.05$ ) in total lipid level was observed in the straw +UMMB and in the straw +UMMB +barley group, depending on time.

**Keywords:** Lamb, Urea-molasses Mineral Block, AST, ALT, Total Protein, Glucose, Total Lipid, Total Cholesterol, Triglyceride

### **Kuzularda Üre Melas Mineral Bloğu Kullanılarak Yapılan Beslemenin Serum AST, ALT Aktivitesi ile Total Protein, Glukoz, Trigliserid, Total Lipid ve Total Kolesterol Düzeylerine Etkilerinin Araştırılması**

### **Özet**

Son yıllarda yapılan çalışmalarda üre-melas mineral blokları (ÜMMB) kullanılarak yapılan beslemenin rumen fermantasyonunu ve mikrobiyal aktiviteyi ayrıca azot, enerji ve mineral takviyesini artırdığı rapor edilmiştir. Bu çalışmada ÜMMB'nun serum AST, ALT aktivitesi ile total protein, glukoz, trigliserid, total lipid ve total kolesterol düzeyine etkilerini araştırmak amaçlanmıştır. Araştırmada materyal olarak 18 adet 8 aylık kuzu kullanılmıştır. Saman, saman + ÜMMB ve saman + ÜMMB + 100g arpa kırması şeklinde üç grup oluşturulmuş ve kuzular ad libitum beslenmiştir. Denemenin 1, 15 ve 30. günlerinde V. jugularisten kan numuneleri alınmıştır. Çalışma sonunda serum AST, ALT aktivitesi ile total protein, glukoz, trigliserid ve total kolesterol düzeyinde fark gözlenmemiştir. Saman+ ÜMMB grubu ile saman+ ÜMMB+ arpa grubunda ise zamana bağlı olarak bir artış ( $p<0.05$ ) gözlenmiştir.

**Anahtar sözcükler:** Kuzu, Üre-Melas Mineral Blokları, AST, ALT, Total Protein, Glukoz, Total Lipid, Total Kolesterol, Trigliserid.

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## INTRODUCTION

In sheep feeding, using of a best formulated ration provides animals to have a good performance and prevents metabolic disorders as well as improves and protects reproductive functions<sup>1</sup>. Digestion in rumen is dependent on the activity of micro-organisms, which require energy, nitrogen, minerals and a medium with an appropriate pH<sup>2</sup>. Poor quality forages such as straws have insufficient nitrogen, sugar, starch and minerals to meet microbial requirements. One of the most efficient ways of increasing digestion of poor quality forages is supplementation of nitrogen and minerals in the form of UMMB<sup>3</sup>.

The aim of this study was to evaluate the effect of UMMB, on the activity of serum AST, ALT and levels of total protein, glucose, triglyceride, total lipid, total cholesterol.

## MATERIALS and METHODS

In this study, 18 male lambs of 8 months of age were used. Clinical examinations of lambs were performed at the beginning of the trial, and their health situations were recorded. The lambs were assigned into 3 equal groups of 6 lambs each. After 10

days of adaptation period, lambs were fed individually for 30 days with straw alone (Group I), with straw + urea molasses mineral block (Group II), with straw + urea molasses mineral blocks + 100g barley as ad libitum (Group III). Formulation of urea molasses that were used in the feeding trial is shown in Table 1. Blood samples were collected from the V. jugularis of animals on the 1st, 15th, 30th days of the feeding trial. Immediately after collection, blood sera were prepared and stored at -24°C until analysis. AST and ALT activities were determined by the method of Reitman-Frankel<sup>4</sup>, levels of total cholesterol by the method of Leffler<sup>5</sup>, levels of total lipid by the method of Kunkel Fenol<sup>5</sup>. Levels of triglyceride, total protein and glucose were analysed by the commercial kits, colorimetrically.

**Statistical Analysis:** Statistically significant differences among the groups was compared with one-way ANOVA which is followed by Tukey's t-test. Statistical analysis was performed by Minitab (Minitab Inc.).

## RESULTS

During clinical examinations, animals appeared clinically normal. Serum AST, ALT activities and

**Table 1.** Ingredient Composition of Urea Molasses Mineral Blocks

**Table 1.** Üre Melas Mineral Bloğunun Besin içeriği

Forage Material	Molasses	Bran	CSC	Urea	DERZ	Salt	Vit./Mineral	Total
%	35	23	14	10	10	7	1	100

CSC Cotton Seed Cake

**Table 2.** Serum AST and ALT activities and Glucose, Total Protein, Triglyceride, Total Lipid, Total Cholesterol levels in Lambs.

**Table 2.** Kuzularda Serum AST, ALT Aktivitesi ile Glukoz, Protein, Trigliserid, Total Lipid, Total Kolesterol Düzeyleri.

Groups n=6	Days	AST (IU)	ALT (IU)	Glucose (g/dl)	Protein (g/dl)	Triglyceride (g/dl)	T.lipid (g/dl)	T.cholesterol (g/dl)
Straw	1 Day	80.3±7.0	125.30±10.8 <sup>a</sup>	59.1±3.44 <sup>1</sup>	8.0±0.45	0.23±0.04	159.2±22.4 <sup>4</sup>	31.7±7.9
	15 Days	82.0±6.7	138.0±6.5 <sup>1a</sup>	41.32±3.2 <sup>2</sup>	7.67±0.62	0.30±0.04	73±39.9	22.7±4.2
	30 Days	84.0±9.2	94.3±4.7 <sup>2</sup>	53.11±2.6 <sup>1a</sup>	7.33±0.21	0.31±0.09	257±110	34.0±1.4
Straw +UMMB	1 Day	69.33±3.4	105.5±6.83	58.42±6.42	7.83±0.40 <sup>12</sup>	0.24±0.05	52.2±10.9 <sup>1b</sup>	44.7±4.8
	15 Days	72.0±4.7	113.17±6.84 <sup>1b</sup>	48.93±4.65	9.0±0.26 <sup>1</sup>	0.32±0.04	204.3±79.8 <sup>1</sup>	53.9±4.1
	30 Days	67.3±5.4	96.83±6.98	43.65±2.52 <sup>1b</sup>	7.17±0.40 <sup>2</sup>	0.26±0.04	401.5±46.1 <sup>2</sup>	53.9±4.1
Straw +UMMB +Barley	1 Day	74.4±6.0	105.17±4.76	53.27±4.13	8.0±0.45	0.22±0.02 <sup>1</sup>	168.2±41.1 <sup>1a</sup>	41.9±5.5
	15 Days	82.5±8.1	100.50±7.24 <sup>1b</sup>	46.01±4.64	7.5±0.34	0.26±0.03 <sup>12</sup>	270.5±33.6 <sup>1</sup>	48.0±6.1
	30 Days	75.8±9.7	89.6±5.64	41.41±2.93 <sup>1b</sup>	7.67±0.67	0.33±0.03 <sup>2</sup>	486.7±25.7 <sup>2</sup>	49.4±3.1

Means with different superscripts (a,b) were statistically significant ( $p < 0.05$ ) between the groups.

Means with different superscripts (1,2) were statistically significant ( $p < 0.05$ ) between the days.



Glucose, Total Protein, Triglyceride, Total Lipid, Total Cholesterol levels are shown in Table 2.

Straw group had a decrease in serum ALT activity depending on time. However, no difference in serum AST activity was determined.

Glucose and total protein levels no difference in serum.

By the 30th day, an increase in level of serum triglyceride ( $p < 0.05$ ) was observed in the straw +UMMB +barley group. An increase ( $p < 0.05$ ) in total lipid level was observed in the straw +UMMY and in the straw +UMMB +barley group, depending on time. However, by the 30th day, there were no statistical significant differences among three groups. In the same way, no statistical changes in total cholesterol levels were found between groups or days.

## DISCUSSION

Optimizing the growth, increasing the benefit from forages and controlling the animal metabolism in an effective way provide a positive improvement in food animal industry which is an industry branch in many countries. However, in sheep feeding deficiency of nitrogen and minerals are as bad as the poor quality forages. In this study, UMMB was used in addition to straw for supplementation of nitrogen and minerals and the effects of UMMB on serum AST, ALT and levels of total protein, glucose, triglyceride, total lipid, total cholesterol were investigated. Recent studies reported that feed supplemented with UMMB increases microbial activity and fermentation of rumen. In addition, there is also an increase in nitrogen, minerals and energy supplies which are taken by organism<sup>6,8</sup>.

Occurrence of a number of biochemical reactions and continuation of life is all supported by enzymes. For this reason, changes that occur in enzyme activities are considered to be as an indicator of the health of an organism<sup>9</sup>. Liver is the terminal controlling organ of the metabolism. By measuring the metabolic activity of liver, determination of functional events could be estimated. AST and ALT are the specific enzymes of liver which are increased in the plasma by destruction of cell-membrane and cell necrose in acute liver diseases<sup>10</sup>. In the present study, no change in AST and ALT activities was found of the feeding trial among three

groups.

Urea taken in to the rumen is converted to ammonia and carbon-dioxide by the action of micro-organisms in the rumen. Following this, protein synthesis is started with formated ammonia (11). It has been reported that ruminants synthesized more urea with the supplementation of UMMB<sup>8</sup>. In the study of Hosamani et al.<sup>8</sup>, no differences in levels of serum total protein. Likewise in this study, levels of serum total protein did not different among three groups.

In ruminants, carbohydrates are fermented to volatile fatty acids and energy is supplied almost entirely from these fatty acids. However, this does not necessarily mean that ruminants do not require glucose. Glucose is required for the maintenance of nerve tissue, retina, germinative epithels, heart and the synthesis of lactose<sup>11</sup>. In this study, serum glucose levels in straw+ UMMB+ barley group were lower than in straw group on 30th day ( $p < 0.05$ ). Debasis and Singh<sup>6</sup>, reported that no change in serum glucose levels was found in cows.

Fat contents of ration modify levels of triglyceride, total lipid and total cholesterol in blood<sup>12</sup>. In this study, by 30th day an increase ( $p < 0.05$ ) in total lipid level was observed in the straw +UMMB and in the straw +UMMB +barley group, depending on time. No changes in concentrations of triglyceride and total cholesterol were found among three groups.

It was reported that feed supplemented with UMMB increases microbial activity and fermentation of rumen, and there is also an increase in nitrogen, minerals and energy supplies that are received by organism. Result of this study showed that no differences were determined in activities of serum AST, ALT and levels of total protein, glucose, triglyceride, total cholesterol trial among three groups. An increase ( $p < 0.05$ ) in total lipid level was observed in the straw +UMMB and in the straw +UMMB +barley group, depending on time.

## REFERENCES

- 1 **Johnson CL:** Nutrition of the high-yielding dairy herd. *Irish Grassland and Animal Production Assoc J*, 21, 116-22, 1987.
- 2 **Moss AR:** Methane production by ruminants-literature review of I. Dietary manipulation to reduce methane production. II. Laboratory procedures for estimating methane potential of diets. *Nutr Abstr Rev*, 64, 785-806, 1994.

- 3 **Garg MR, Gupta BN:** Effect of supplementing urea molasses mineral block lick to wheat straw based diet on digestibility of nutrients and N balance. *Indian J Dairy Sci*, 46, 247-52, 1993.
- 4 **Richterich R:** Clinical Chemistry, Teory and Practice S. Kargel, Basel (Switzerland). Academic Press, 321-431, New York and London, 1969.
- 5 **Ersoy E, Baysu N:** Pratik Biyokimya. Ankara Univ Vet Fak Yay - 372. Ankara, 1981.
- 6 **Debasis D, Singh GP:** Effect of cold process monensin enriched urea molasses mineral blocks on performance of crossbred calves fed a whead straw based diet. *Animal Feed Sci and Technol*, 103, 51-61, 2003.
- 7 **Campling RC, Freer M, Balch CC:** Factors affecting the voluntary intake of food by cows. 3- The effect of urea on the voluntary intake of straw. *Br J*, 16, 115, 1962.
- 8 **Hosamani SV, Mehra UR, Dass R:** Effect of different planes of nutrition on urea molasses mineral block intake, nutrient utilization, rumen fermentation pattern and blood profile in Murrah buffaloes (*Bubalus bubalis*). *Animal Feed Sci and Technol*, 76,117-28, 1998.
- 9 **Kuchmar JF, Moss DW:** Enzymes. In, Nobert WT (Ed): Fundamentals of Clinical Chemistry. WB Saunders Company. Philadelphia, 562-698,1982.
- 10 **Duman C, Erden BF:** Birinci basamak sađlık hizmetine yönelik biyokimyasal laboratuvar verilerinin kısa yorumu. *STED*, 13(7): 256-262, 2004.
- 11 **Bolukbasi FM:** Fiziyooloji Ders Kitabı. Ankara Univ Vet Fak Yay - 413. Ankara, 1989.
- 12 **Febel H, Husveth F, Veresegyhazy T, Andrasofszky E, Varhegyi I, Huszar S:** Effect of different fat sources on in vitro degradation of nutrients and certain blood parameters in sheep. *Acta Vet Hung*, 50(2):217-29, 2002.