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Effects of Adding Different Levels of Salinomycin to Diets of Karakaþ Ram Lambs on Fattening Performance Characteristics

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Abstract: This study was carried out to determine the effects of different levels (0 mg, 40 mg, 60 mg and 80 mg / kg concentrate) of salinomycin on growth performance characteristics approximate 8 months of age 39 Karakaþ ram lambs. was investigated. The lambs were randomly divided into four groups- a control and 3 treatment groups at the beginning of fattening period. The diet given to the control and treatment groups consisted of concentrate and grass hay. Treatment groups received a diet containing 40, 60 and 80 mg salinomycin / kg concentrate during a 53-day fattening period. The lambs were fed ad-libitum after adaptation period to concentrate feed. But chopped alfalfa hay was fed daily 100 g per lamb in a day during the fattening period for groups. The daily live weight gain and feed conversion efficiency values for control and treatment groups were 361.32, 391.20, 392.45 and 334.91 g; 5.21, 4.86, 4.72 and 5.31, respectively. The ffects of salinomycin levels on fattening performance characteristins of Karakas male lambs were not statistically significant. Supplemental salinomycin decreased ($P<0.05$) the serum gylcose level in lambs fed diet containing 80 mg salinomycin / kg concentrate. However, 60 and 80 mg supplemental salinomycin increased ($P<0.05$) serum urea level compared to the control group fed diet without supplemental salinomycin. In conclution, differences among groups in terms of fattening performance characteristics were not found statistically significant, but 40 and 60 mg/kg salinomycin supplementation to diet of Karakas male lambs resulted in numerically improvement in feed conversion efficiency and daily weight gain values.

Key words: Salinomycin, fattening performance, blood parameters and Karakas ram lamb

Introduction

Approximately 87% of Turkey's sheep population (30.3 million heads) consist of fat-tailed breeds, Turkey is one of the leading sheep raising countries in the world. There are many local breeds throughtout the country, with the White Karaman and Morkaraman breeds as the predominant types and comprising about 87 % of the total sheep. Aproximately 3 to 5 % of the sheep in Turkey are considered as improved breeds. The Karakas is a variety of White Karaman. The Karakas is a fat-tailed and has carpet-quality wool, low milk yield and low prolificacy and were found in Northeastern Turkey. Sheep meat (133.000 t) has an important contribution (26%) to red meat production (512 000 t) of Turkey (Anon., 2000). However, as a result of the low meat producing potential of native Turkish sheep meat production from sheep is not sufficient to meeting market demand. Rapid growth and efficient feed conversion are two important factors affecting the efficiency of meat production (Macit, 2002).

Several researches have been done to increase the animal production as word population increased. Because of partially positive effects of ionophore group antibiotics on feeding efficiency, these group additives are commonly used in ruminants feeding (Mc Allister *et al*., 1994). The effect of ionophore varies on the feeding efficiency and living weight in adult ruminants (Naparaja, 1995). Likewise the ionophore group antibiotics and salinomycin decrease the feed consumption and increase the feeding efficiency as well. In addition, salinomycin decreases the formation of lactic acidosis and timpani (Spears, 1990) by increase the proportion of propionic acid in rumen and suppress the formation of butyric acid (Wakita *et al*., 1989).

The objectives of present study are: 1) to determine the best level of salinomycin to be used as supplemental additive in diets of ruminant animals 2) to evaluate the effects of different levels of salinomycine on fattening performance characteristics and some important blood parameters of Karakas male lambs.

Materials and Methods

This study was conducted at the Application and

Research Farm of the Faculty of Agriculture, Yuzuncu Yil University, Van. A total of 39 Karakas male lambs at approximate 8 months of age from Whitekaraman variety were used in present study. The lambs were randomly divided into four groups- a control and 3 treatment groups at the beginning of fattening period. For the 3 days before study period, the lambs were weighed repeatedly after 12 h starvation. The average of the 3 weights was recorded as the inital fattening weight. The diet given to the control and treatment groups consisted of concentrate and alfalfa hay. The control group (n= 10) was fed concentrate without supplemental salinomycin additive and chopped alfalfa hay. Treatment groups such as Group 2 (n=9), Group 3 (n=10) and Group 4 (n=10) received a diet containing 40, 60 and 80 mg salinomycin / kg concentrate and chopped alfalfa hay during a 53-day fattening period, respectively. The concentrate was given to the lambs as ad-libitum after 15-day adaptation period to concentrate feed. But chopped alfalfa hay was fed daily 100 g per lamb in a day during the fattening period for groups. For the 3 days before study period, the lambs were weighed repeatedly after 12 h starvation. The average of the 3 weights was recorded as the inital fattening weight. Feed consumption and body weight of lambs were recorded biweekly. Fresh water was always available for animals. For the 3 days after a 53-study period, the lambs were weighed repeatedly after 12 h starvation. The average of the 3 weights was recorded as the final fattening weight. The chemical composition of concentrate was determined using the method described by Akyildiz (1974). The concentrate mixture had 94.75 % dry matter, 13.10 % crude protein, 10 % crude fibre, 2.19 % ether extract, 3.5 % crude ash and 2550 Kcal ME/ kg.

At the end of the study period, blood samples were taken from Vena jugularis of lambs to analysis serum colesterol, protein, glycose and urea level byusing oto analyzer att biochhemistry laboratuary of Medical School of Yüzüncü Yýl University.

Data were analysed using SAS (1998) package programme. Significant differences between means were detected using Duncan's multiple range test (Duzgunes *et al.*, 1987).

Results and Discussion

Inital live weights, daily weight gains, final live weights, daily feed intakes, feed conversion efficiency values and some blood parameters of Karakas male lambs were presented in Table 1, 2 and 3, respectively.

İnitial live weights of male lambs were 36.55, 35.82, 35.10 and 36.65 kg for control (Group 1) and treatment (Group 2, Group 3 and Group 4) groups, respectively. The differences among groups in inital live weights were not significant. At the end of a 53-day study period, the means of total live weight gain and final live weights were 19.70 and 55.70 kg for Group 1; 20.73 and 56.56 kg for Group 2; 20.80 and 55.90 kg for Group 3 and 17.75 and 51.45 kg for Group 4, respectively. and 17.75 kg, respectively. Supplemental salinomycin to diets of lambs did not affected final live weight and total weight gains of the lambs. Overall daily weight gains for groups were determined 361.32, 391.20, 392.45 and 334.91 g, respectively. While the effects of 60 and 80 mg/kg salinomycin added to diets of lamb groups during 0 to 14 day-periods on daily live weight gain of lambs were higher than that of control group, daily live weight gain obtained within 43-53 days was lower ($P<0.05$) than those of Group 1, Group 2 and Group 3. Differences among groups in daily weight gain were insignificant. It was reported that adding salinomycin to consantrated feed of especially young ruminant animals had positive effect on final live weight and daiyl weight gain and feed conversion efficiency values (Bolat *et al.*, 1995; Horton *et al.*, 1983; Ilieva *et al.*, 1984; Komiewicz *et al.*, 1985; Schlolaut *et al.*, 1983).

During the a 53-day study period, average daily feed consumptions and feed convertion efficiency values of Karakaþ lambs were obtainned 1.88 kg and 5.21 for Group 1; 1.90 kg and 4.68 for Group 2; 1.85 kg and 4.72 for Group 3 and 1.78 kg and 5.31 for Group 4, respectively. The differences among groups in terms of daily feed intake and feed conversion efficiency values were statically insignificant (Table 2). In daily feed consumption, there was a decrease in the group fed diet containing 80mg salinomycin per kg, but there was an improvement in feed convertion efficiency of Group 2 and Group 3. Although a reseach conducted on fattening lambs indicated that rations including high amount of ionophore antibiotik (106mg/kg) did not effect the fattening performances characteristics of lambs (Jelinek *et al.*, 1984), some researcher reported that supplemental salinomycin had a positive effect on fattening performance characteristics such as feed convertion efficiency and daily weight gain of lambs (Ilieva *et al.*, 1984; Komiewicz *et al.*, 1985). In a research conducted on beef cattle, it was observed that salinomycin increased total live weight gain and improved feed convertion

Table 1: The mean (±S. E.) For live weights and daily live weight gains of control and treatment groups at various periods

Periods	Group 1 $\bar{x}$ ±$s_{\bar{x}}$	Group 2 $\bar{x}$ ±$s_{\bar{x}}$	Group 3 $\bar{x}$ ±$s_{\bar{x}}$	Group 4 $\bar{x}$ ±$s_{\bar{x}}$	P
			Live weight (kg)		
Inital weight	36.55±1.43	35.82±1.51	35.10±1.43	36.65±1.43	NS
14 day	39.58±1.65	39.72±1.74	39.26±1.65	37.80±1.65	NS
28 day	44.67±1.94	44.91±2.05	45.48±1.94	42.65±1.94	NS
42 day	50.68±2.13	51.50±2.25	52.29±2.13	47.86±2.13	NS
53 day	55.70±2.21	56.56±2.33	55.90±2.21	51.45±2.21	NS
Total gain	19.15±1.25	20.73±1.31	20.80±1.25	17.75±1.25	NS
			Daily live weight gain (g)		
0-14 days	216.43±43.18a	278.57±45.52ab	297.14±43.18b	294.63±43.18b	*
15-28 days	363.57±46.20	370.63±48.70	444.29±46.20	346.43±46.20	NS
29-42 days	429.29±46.86	470.63±49.40	522.14±46.86	372.17±46.86	NS
43-53 days	456.36±43.37a	459.60±45.72a	282.93±43.37b	326.36±43.37b	NS
0-53 days	361.32±23.51	391.20±24.78	392.45±23.51	334.91±23.51	NS

a, b: Means with different letters within the same column were different (P<0.05); NS: P>0.05

Table 2: The means (±S.E.) For daily feed intake and feed conversion efficiency values of Karakas lambs at various periods

Periods	Group 1	Group 2	Group 3	Group 4
		Daily feed intake (kg)		
0-14 days	1.48	1.40	1.35	1.37
15-28 days	1.76	1.84	1.78	1.76
29-42 days	2.13	2.09	2.05	1.98
43-53 days	2.25	2.38	2.25	2.06
0-53 days	1.88	1.90	1.85	1.78
Feed conversion rate (total feed intake / total body weight gain)				
0-14 days	6.84	4.01	5.01	4.61
15-28 days	4.83	4.96	4.96	5.08
2-42 days	5.20	4.43	4.43	5.33
43-53 days	4.93	5.18	5.18	6.31
0-43 days	5.21	4.86	4.86	5.31

Table 3: The means (±S. E.) Of cholesterol and proteins glucose and urea levels in blood samples of Karakas lambs

Groups	n	Cholesterol $\bar{x}$±$S_{\bar{x}}$	Protein (g/dl) $\bar{x}$±$S_{\bar{x}}$	Glucose (mg/dl) $\bar{x}$±$S_{\bar{x}}$	Urea (mg/dl) $\bar{x}$±$S_{\bar{x}}$
P					
Group 1	10	52.00±3.33	5.88±0.96	73.40±5.15a	13.60±1.60b
Group 2	9	61.60±3.33	4.60±0.96	64.40±5.15ab	18.00±1.60ab
Group 3	10	56.20±3.33	3.74±0.96	63.80±5.15ab	22.20±1.60a
Group 4	10	58.60±3.33	5.46±0.96	54.40±5.15b	19.80±1.60a

a, b: Means with different letters within the same column were different (P<0.05); NS: P>0.05; *: P<0.05

efficiency of animals (Talug and Karaayaz, 1999). Differences among groups in levels of cholesterol and protein in blood samples were statistically insignificant (Table 3). When looked at blood glucose level, there were no significant differences among groups fed diets containing different levels of salinomycin. However, difference between the Group 1 and the Group 4 was statistically significant (P<0.05). In addition, there were no significant differences among groups in terms of urea levels in blood of lambs whereas the differences among the Group 1 and the Group 3 and Group 4 were statistically significant (P<0.05). The levels of cholesterol, protein and glucose obtained from present study were found normaly levels. It was reported that cholesterol levels of

sheep were 50-140 mg/dl (Turgut, 2000) and 52-76 mg/dl (Imren and Sahalý, 1994). The protein and glucose levels in blood were similar in ruminant animals as 6-8 mg/dl and 45.6-82.0 mg/dl, respectively. The blood urea level was found lower than normaly level reported for ruminant animals as 44.9-50.0mg/dl (Ersoy and Baysu, 1986). It was reported that the addition of salinomycin to diet of ruminant animals increased the serum glucose and urea levels and decreased the protein level (Demirel and Dastan, 2000).

In conclution, differences among groups in terms of fattening performance characteristics were not found statistically significant, but 40 and 60 mg/kg salinomycin supplementation to diet of Karakas male lambs resulted in numerically improvement in feed conversion efficiency and daily weight gain values.

References

Akyildiz, A. R., 1974. Yemler Bilgisi Laboratuvar Kilavuzu. A.Ü. Ziraat Fak. Yay., No: 895, 213s, Ankara.

Anonymous, 2000. Statistical Yearbook of Turkey, State Institute of Statistics Prime Ministry Republic of Turkey, Ankara.

Bolat, D., S. Deniz, E. Baytok, T. Aksu, H. Arikan, 1995. Merada beslenen kuzulara arpaya ilave olarak pamuk tohumu küspesi ve salinomycin verilmesinin besi performansi ve karkas özelliklerine etkisi. Hay. Araþ. Derg., 5: 59-63.

Demirel, M., M. Dastan, 2000. Akkaraman erkek toklularinin karma yemlerine katilan monensin, lasalocid ve salinomycinin rumen sivisi ve kan parametreleri üzerine etkisi. International Animal Nutrition Congress'2000, 4-6 September, s: 277-285, Isparta.

Düzgüneþ, O., T. Kesici, O. Kavuncu, F. Gürbüz, 1987. Araþtirma ve Deneme Metotlari (Istatistik Metotlari-II). Ankara Üniversitesi Ziraat Fak. Yay., 1021, 381s, Ankara.

Ersoy, E., N. Baysu, 1986. Biyokimya. Ankara Üniversitesi Veteriner Fakültesi Yay., No: 408, 989s, Ankara.

Horton, G. M. J., M. J. Farmer, K. A. Bassendowski, G. M. Steacy, 1983. Rumen fermantation and digestibility in steers as influenced by level of intake and monensin. Can. J. Anim. Sci., 8: 855-860.

lieva, I., S. Koyumdzhiev, A. V. Lechuev, G. Ichev, I. Ionova, G. Monov, V. Peneva, 1984. Effect of monensin and salinomycin supplements to mixed feeds for fattening lambs. Nutrition Abs. and Rev. Ser. B, 54: 2820.

Imren, H. Y., M. Sahali, 1994. Veteriner Iç Hastaliklari. Medisan Yayin Evi. Seri No:17: 353-358, Ankara.

Jelinek, P., A. Mikulik, J. Zelenka, I. Helenova, S. Zilavska, 1984. The effect of a high dose of monensin on some fattening and carcass traits of lambs. Anim. Breed. Abst., 52: 3964.

Komiewicz, A., S. Zalewska, A. Folta, 1985. Effect of monensin and salinomycin on the fattening of lambs. Nutrition Abs. And Rev. Ser. B: 55-5773.

Macit, M., 2002. Growth and carcass characteristics of male lambs of the Morkaraman breed. Small Rum. Res., 43:191-194.

Mc Allister, TA., S. M. S. Moustafa, K. J. Cheng, C. J. Newbold, N. Mc Kain, R. J. Wallace, 1994. Effect of salinomycin on fermentation and nitrogen metabolism in the artificial rumen. Conj. Anim. Sci., 74: 575-578.

Nagaraja, T. G., 1995. Ionophores and Antibiotics in Ruminants (In) Biotechnology in Animal Feeds and Animal Feeding. RJ Wallace and A Chesson (Editors), Weinheim. New York Basel Combridge, Tokyo.

S.A.S., 1998. PC SAS User's Guide. Statistics. SAS Inst. Inc., Cary, N.C.

Schlolaut, W., K. Agde, G. Wachendorfer, 1983. Untersuchungen über wachstumsorfördemde effekte von salocin R bei schafleammem. Tierarztliche, Umschau, 38, 12: 923-924.

Spears, J. W., 1990. Ionophores and nutrient digestion and absorption in ruminants. J. Nutrition, 120, 6: 632-638.

Talug, M., K. Karaayaz, 1999. Ruminantlarin beslenmesinde yem katki maddesi olarak antibiyotik kullanimi. Uluslararasi Hayvancilik'99 Kongresi 21-24 Eylül, Izmir.

Turgut, K., 2000. Veteriner Klinik Laboratuvar Teþhis. Bahçivanlar Basim San. ISBN 975-94595 : 885-895, Ankara.

Wakita, M., R. Sakauchi, S. Hoshino, 1989. Salinomycin alters cellular fatty acid composition of mixed rumen bacteria and genuse *Entodinium* ciliates. J. Gen. Appl. Microbiol., 35: 327-331.