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SELENIUM IN FEEDING GOAT KIDS

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ABSTRACT

Selenium supplementation on goat kids performance and their incorporation into their tissues were studied in a feeding experiment. The experiment lasted 98 days on 15 goat kids and comprised 3 treatments (trials) each on 5 animals: group I, Kids were fed unsupplemented, basal diet served as control, group II, was fed the basal diet supplemented with 2mg/sodium selenitel/head/day, and group III was supplemented with 0.7 mg selenium/head /day added to basal diet.

Results obtained can be summarized as follows:

There was a positive growth response to Se supplementation compared with sodium selenite. No significant differences were observed with the total dry matter intake among the three groups. Selenium supplemented group had the highest values of digestibility coefficients of all nutrients. The nutritive values as TDN and DCP were highest with the Se supplemented group followed by the control group, while the sodium selenite group (SS) recorded the lowest values. Also, Se group (S) had the higher positive nitrogen balance followed by the control and the sodium selenite group. Kids received SS or supplemented rations retained Se in their body more than in the control group.

It was noticed that kids that received Se and control ration had higher protein and lower fat percentage in their carcass cuts than the SS group.

Keywords*:* selenium, sodium selenite, goat kids, growth, carcass

INTRODUCTION

Selenium (Se) was discovered in 1818 by the chemist J. J. Berzelius in Gripsholm, Sweden. He named this new element selenium after “selene” the Greek goddess of the moon. Selenium has long been recognized for its toxic effect on farm animals. Historically, Marco Polo, in 1295, may have been describing chronic selenium poisoning when in. he described a poisonous plant growing in western China, if eaten by their beasts of burden, can cause the hooves of the animals to drop off. In the early 1930s, research demonstrated that presence of selenium in the forage can be poisonous to animals. In the late 1950s, selenium was shown to be an essential nutrient (Mayland *et al.,* 1989).

Selenium is known to be required for animal health (Mayland *et al.,* 1989). It is more readily absorbed when ingested by animals than is selenite, selenate, or selenocystine (National Academy of Science and National Research Council, 1983). Selenium from plant forms is more available to animals than Se from animal forms.

The absorption of inorganic Se in ruminants is significantly poorer than single-stomached animals. This is probably due to the micro-organisms in the rumen, which reduce Se to an insoluble form (hydrogen selenide H_2 Se) and excreted as methylselenide (Mahan, 1999). The rumen micro-organisms can

also form organic selenocompounds (selenocysteine) and incorporate Se into microbial protein.

The main way of Se excretion in ruminant animals is in the faeces and a small percentage in the lungs (Metry and Mashreky, 2001).

Selenium deficiency in domestic livestock is associated with a range of practical and costly problems, including infertility, lowered disease resistance and poor growth efficiency (Lyons, 1999).

Selenium deficiency most frequently occurs during the neonatal and/or post weaning period (Mahan, 1999). During the normal growth of the new born calves about 0.04 µg of Se/ml in plasma would be needed (Van Saun *et al.,* 1989).

There is less satisfactory evidence of an increase in growth rate resulting from oral Se supplementation in cattle (Gleed *et al.,* 1983). However, Davis (1974) observed 15% faster growth rate during the nine months after weaning beef calves which received from one to three doses of 0.05 mg Se/kg weight. Also, Metry *et al.,* (1998) and Metry *et al.,* (1999) reported that body weight gain of weaned buffalo calves improved by 42 gm/day when the calves were injected with 0.125 mg Se/kg weight as sodium selenite over a period of 30 weeks. El-Ayouty *et al.,* (1991 and 1996) mentioned that Se supplementation may improve growth rate in growing Friesian calves.

The efficacy of sodium selenite in eliminating the deficiency, clearly demonstrated that this source of Se could prevent some of the deficiency problems, however, the Se problem still persisted at some level (Metry and Meshreky, 2001).

Therefore the present study was designed to evaluate the efficacy of administration of sodium selenite compared with Se in the diet of goat kids on their growth performance and carcass quality. A second aim of the present study was to determine which form of Se supplementation would be most appropriate to correct the Se balance of the goats.

MATERIALS AND METHODS

The experiment was conducted at Abd-El-Moanam Reyad Village of Al Bustan Area, at Nubaria Experimental Station, belonging to the Animal Production Department, National Research Centre.

The experimental animals and feeding treatment:

Fifteen weaned male Balady goat kids aged 7.0-8.0 months old and weighing about 23.0 kg live body weight (LBW) proved to be free from internal and external parasites were used in the current study.

The experimental kids were divided randomly according to body weight into 3 groups of 5 each. The 3 groups were assigned at random to receive one of the experimental treatments. Animals in the first group received the basal ration without any supplementation (control), while those of the second group were fed the same diet supplemented with sodium selenite as 2 mg/head/day (Na_2 SeO_3, contain 35% Se). Animals in the third group received the same basal diet supplemented with selenium as 0.7 mg/head/day (pure selemium contain 99% Se). All the animals in the 3

groups received their assigned rations individually.

Sodium selenite or selenium was first mixed thoroughly with one kg ground yellow corn which was doubled three times and then mixed with the ingredients and ground using stone mills to yield a powdered form suitable for concentrate feed mixture.

Ration:

The basal ration was a complete feed mixture which was offered at 3% of the live body weight. The complete feed mixture consisted of soyabean meal 15%, yellow corn 20%; wheat bran 21.5 %, groundnut hay 40%, limestone 2% and minerals & vitamins 1.5%.

The chemical composition of the basal ration on dry matter basis is presented in Table (1):

Table (1): Chemical composition of the experimental Ration (% on dry matter basis).

DM	OM	CP	CF	EE	Ash	NFE	Se mg/kg
89.07	88.91	15.36	18.54	4.32	7.59	54.19	0.18

Management:

The ration was fed twice daily at 8.00 a.m. and 16.00. Refusals were recorded once daily. Total feed consumed was recorded weekly. The live body weights of the animals were recorded biweekly through out the experimental period (98 days) before offering the morning ration, and the new allowances were adjusted according to live body weight.

The metabolism trial:

At the end of the experiment three kids from each group were chosen randomly to conduct a digestion trial for estimating nutrients digestibilities, feeding values and nitrogen balance. Animal were placed in metabolic cages for 15 days as a preliminary period followed by seven days total collection period.

The feces samples were dried at 60°C for 72 hrs and then stored in screw-top glass jars prior to chemical analysis according to A.O.A.C (1990) and was acidified. Urine was collected from each animal in a plastic container and was acidified. Fifty ml of 10% sulphuric acid were dropped in each container before the daily collection. A 10% sample of the total daily amount of urine was collected in a glass bottle and a representative amount was collected, mixed, filtered, through a glass wool mat and kept in glass bottles at room temperature to determine urinary nitrogen A.O.A.C.(1990).

The nutritive value of the experimental rations were expressed as total digestible nutrients (TDN) and digestible crude protein (DCP) according to Maynard and Loosli (1969) and McDonald et al. (1975).

The chemical composition of feed ,faeces, urine and the samples of 9,10 and 11th ribs were performed at the Animal Production Department, National Research Centre .

Slaughter method and samples of rib saddle joints:

After the feeding and digestion trials four kids of each group were

weighed and slaughtered after 18h fasting period {Av body weigh were 31, 34.5 and 28.5 kg for group 1,2 and 3, respectively}. Following slaughter and removing the pelt, the offals, thoracic and abdominal organs were removed and weight. The contents of the digestive tract were also removed and their weight was subtracted from the slaughter live weight to obtain empty body weight. Weights of hot carcass and fat were removed and dressing percentages based on fasting and empty body weight were calculated. Carcass were split into fore and hind quarters.

The 9, 10 and 11th rib section was removed from both sides and was physically dissected into lean, fat and bone tissues. The samples were taken in plastic bags for determination of moisture, crude fat (EE), crude protein (CP) and ash according to the methods described by A.O.A.C (1990).

Blood Samples:

After slaughtering, blood samples were collected in heparinized test tubes and centrifuged at 3000 r.p.m. for 15 minutes. The plasma were collected and preserved in a freezer at (-20°C). Total protein, Albumin, Globulin, Urea, Creatinine, Cholesterol, Total bilirubin, and Alkaline Phosphatase enzyme were determined according to Gowenlock (1998). Selenium in the urine , faeces , feed, and organs were measured with a Varian Spectra AA 220 Atomic Absorption Spectrophotometer equipped with a graphite furnace tube atomizer [GTA] for graphite furnace AAS according to the method of Hoening [1986]

Statistical analysis:

Data were analyzed using the general linear model procedure of SAS (1995).Differences among means were evaluated using Duncan multiple range test (1955).

RESULTS AND DISCUSSION

Apparent digestibility of dry matter (DM), crude protein (CP), ether extract (EE), crude fiber (CF), nitrogen free extract (NFE) and organic matter (OM) for different experimental groups are presented in Table (2). It is worth noting that group 3 (selenium supplemented ration) recorded higher ($P < 0.05$) values of DM, CF and NFE digestibility compared with the other two groups. The same trend was obtained with the CP and EE, however the differences between the three groups were not significant. The nutritive value as TDN and DCP increased with the selenium supplemented ration.

It is clear from Table (2) that kids received Se supplementation recorded the higher values of nutrients digestibility. These results may be attributed to increased microbial protein yield. Lu-Yahua *et al.* (1996) reported that Se supplementation increased the number of rumen pratozoa and hence protozoal protein.

Table (2): Digestion coefficients and nutritive values (%) of the basal diet as affected by dietary Se source fed to goat kids.

Item	Treatments	SE ±

	Control	S. S	S	
DM	73.40^{AB}	68.77^{B}	74.81^{A}	3.160
OM	75.25^{A}	69.45^{B}	76.57^{A}	3.788
CP	71.95	67.11	72.03	2.818
CF	64.60^{AB}	62.06^{B}	66.81^{A}	2.377
EE	70.36	68.27	71.24	1.526
NFE	73.61^{AB}	69.64^{B}	74.80^{A}	2.702
Nutritive values				
TDN	67.17^{AB}	64.40^{B}	68.30^{A}	2.007
DCP	11.05	10.31	11.07	0.433

A,B means with different superscripts in the same row are significantly different (p<0.05)

Results of nitrogen balance are presented in Table (3). No significant differences were observed concerning N intake, faecal N and urinary N. On the other hand N balance was significantly higher (P < 0.05) with S supplemented ration, however the differences between control and S.S ration were not significant. These results could be mainly attributed to the higher of CP digestibility of S ration compared with the other two rations.

Table (3): Nitrogen balance by kids as affected by dietary Se source.

Item	Treatment			SE ±
	Control	S. S	S	
Nitrogen intake, g	20.07	19.66	22.12	1.318
Facal nitrogen ,,g,	6.30	6.10	6.57	0.236
Urinary nitrogen, g	8.91	10.43	8.89	0.883
Nitrogen balance, g	4.86 A^{B}	3.12^{B}	6.66^{A}	1.770
NB/ NI %	24.42^{B}	15.90^{C}	30.00^{A}	7.101
NB/ FN %	79.42^{B}	55.10^{B}	102.66^{A}	23.78
Digested N, g	13.77^{B}	13.56^{B}	15.56^{A}	1.099
Digested N%	68.84	68.78	70.12	0.757

A,B means with different superscripts in the same row are significantly different (p<0.05)

Mean values of daily weight gain, dry matter intake expressed as g/head or kg/100 kg body weight and efficiency of feed conversion are presented in Table (4).

The kids raised on supplemented selenium ration (S) gained weight faster (p < 0.05) than those receiving control or sodium selenite (SS) ration. There were no differences between the control and SS groups (p>0.05). The mean values were 100.68, 98.06 and 118.03 g / head / day for control, SS and S rations respectively.

Table (4): Daily gain, feed intake and feed efficiency of kids as affected by dietary Se source.

Item	Treatment			SE ±
	Control	S.S	S	

Initial BW, Kg	23.17	22.83	23.00	0.139
Final BW, Kg	33.03	32.44	34.57	1.099
Daily DMI, g	831.67	846.67	845.00	8.221
Gain, Kg	9.87^{B}	9.16^{B}	11.57^{A}	1.238
Daily gain, g	100.68^{B}	98.06^{B}	118.03^{A}	10.853
DMI/ 100 BW/day	2.90	3.01	2.89	0.067
TDN g/h/day	558.18	535.16	580.55	22.696
DCP g/h/day	91.83	87.22	93.54	3.269
Feed conversion:				
Kg DMI/Kg gain	8.22	8.63	7.12	0.781
Kg TDN/Kg gain	5.52	5.76	4.64	0.589
Kg DCP/ Kg gain	0.91	0.94	0.75	0.102

A,B means with different superscripts in the same row are significantly different (p<0.05)

The present results is in agreement with those of Gleed *et al.* (1983) who found that there was an increase in growth rate resulting from oral Se supplementation in ruminants. Also, Metry *et al.* (1998) and Metry *et al.* (1999) reported that body weight gain of weaned buffalo calves improved when the calves were injected with Se. Ryssen *et al*. (1999) indicated also that Se supplementation improved the growth of the lambs. On the other hand, Reffett *et al.* (1987) found that the growth rate of calves were not affected by Se supplementation. Selenium supplemented ration recorded a higher value of gain compared with Se as sodium selenite. These results are in accordance with those of Mahan. (1999) who reported that Se may play an important role in animal production than sodium selenite form.

Results presented in Table (4) show that the dry matter intake calculated as g/h/day for control, S.S and S groups were 831.67, 846.67 and 845.00 respectively. The corresponding TDN g/h/day intake for the same groups were 558.18, 535.76 and 580.55, respectively. The S group recorded the highest value of TDN and DCP intake. but the differences among the three groups were not significant.

Table (4) presents mean values of feed conversion (kg intake / kg body weight gain). The results showed that there were no significant differences among the feeding conversion values of the kids of different treatment groups. The disappearance of the significant may be due to great individual variation within treatment. The data, however, may suggest that the kids reared under S supplemented ration were more efficient in feed utilization than those received S.S and control ration.

The concentration of Se in goat kids tissues (meat, liver, kidney and hair) is shown in Table 5. Supplemented groups receiving sodium selinite or selenium in their ration, recorded higher ($P < 0.05$) values of selenium in their different organs compared with control goats, especially in kidney, hair and liver. Although the statistical analysis revealed significant differences among the three treatments, yet the numerical differences were very small indicating that Se deposition in the meat of the supplemented groups was safe for human consumption.

Table (5): Mean values of selenium in organs of kids as affected by

dietary Se source.

Organs	Treatment			SE ±
	Control	S. S	S	
Meat mg/kg	0.04^{B}	$0.05\ A^{B}$	$0.06\ ^{A}$	0.010
Liver mg/kg	0.08^{B}	0.17^{A}	0.20^{A}	0.062
Kidney mg/kg	0.15^{C}	0.29^{B}	0.38^{A}	0.116
Hair mg/kg	0.02^{C}	0.04^{B}	0.07^{A}	0.025

A,B means with different superscripts in the same row are significantly different (p<0.05)

The results concerning the Se intake, excreted Se and Se balance are shown in Table (6). Selenium retention was higher (P < 0.05) when the Se was supplemented as Se rather than when sodium selenite was added as dietary Se source. As the dietary level of Se increased, urinary Se excretion also increased. These results were in agreement with that obtained by Mahan and Parrett (1996); who found that when the dietary sodium selenite level increased the urine was the main route of excretion, whereas faeces was the major excretion route when the Se form was fed.

Table (6): Selenium balance by kids as affected dietary Se source.

Item	Treatment			SE
	Control	S. S	S	
Se Intake, mg/kg	0.15^{B}	0.77^{A}	0.85^{A}	0.244
Urinary Se, mg/kg	0.01^{B}	0.02^{A}	0.05^{A}	0.021
Fecal Se, mg/kg	0.01^{B}	0.03^{B}	0.05^{A}	0.012
Se balance, mg/kg	0.13^{B}	0.72^{A}	0.75^{A}	0.217

A,B means with different superscripts in the same row are significantly different (p<0.05)

Concerning the concentration of Se in different organs. The results indicated that kidney tissue has one of the highest priorities for Se deposition followed by liver Tissue. These result was agreed with that obtained by Liu et al. (1995) who reported that the kidney has highest concentration of selenium followed by liver heart and muscle tissues. On the other hand, Mahan (1999) showed that liver tissue has highest concentration of selenium followed by kidney tissue

Data in Table (7) showed that differences in the average empty body weight of kids fed control, SS and Se rations, there were non significant differences among the three groups. The same trend was obtained with the measurements of nek, forequarter and hind quarter percentage.

Table (8) showed, also that the average value of dressing percentages based on empty body weight did not vary among treatment. The results obtained in Table (8) indicated that group 2 (SS) had higher (P > 0.05) values of internal and total fat than the other two groups. Concerning weight of liver, heart, lung, spleen and kidney weight, the three groups recorded fluctuating values.

Table(7): Carcass characteristics of goat kids as affected by dietary Se source

Item	Treatment			SE
	Control	S. S	S	
Fasting BW Kg	31.0	32.07	31.86	3.014

Empty BW Kg	24.07	24.07	24.18	0.958
Hot carcass W Kg	15.16	15.66	15.14	1.904
Dressing 1	48.90	48.18	47.52	3.787
Dressing 2	62.98	65.06	62.61	5.781
Neck	0.95	0.86	0.92	0.085
%,from hot carcass, wt	6.29	5.54	6.93	0.479
Fore quarter kg	8.19	8.20	7.93	1.094
%,from hot carcass, wt	54.02	52.36	52.38	1.093
Hind quarter kg	6.02	6.60	6.29	0.783
%,from hot carcass, wt	39.71	42.15	41.55	1.112

A,B means with different superscripts in the same row are significantly different (p<0.05)

1. **Based on fasting weight**
2. **Based on empty weight**

Table (8): Carcass Offal's of slaughtered kids as affected by dietary Se source

Item	Treatment			SE
	Control	SS	S	
Fasting body BW. Kg	31.0	32.5	31.86	3.014
Hot carcass weight kg	15.16^{A}	15.66^{A}	15.14^{B}	1.904
Head. Kg	1.92	1.93	1.90	0.072
%	6.19	5.59	5.96	0.389
Pelt, Kg	1.70	1.73	1.70	0.017
%	5.48^{B}	5.01	5.34	0.475
Four legs Kg	0.77^{B}	0.78^{B}	0.88^{A}	0.061
%	2.4^{B}	2.26^{B}	2.76^{A}	0.444
Full digestive tract Kg	8.4^{B}	11.00^{A}	9.81^{B}	1.595
%	27.10	31.88^{A}	28.42^{B}	2.469
Empty digestive Tract Kg	2.20	2.78	2.13	0.401
%	7.09	8.06	6.69	0.572
Liver g	510^{A}	552^{A}	500	619.78
Heart g	227^{A}	227^{A}	210^{B}	20.21
Lungs g	340^{A}	357^{A}	325^{B}	27.610
Kidney g	90	99	85	9.504
Spleen g	59^{B}	73^{A}	60^{B}	7.371
Kidney fat g	393^{B}	490^{A}	410^{B}	57.813
Internal fat g	580^{B}	1300^{A}	800^{B}	374.699
Total fat g	973^{B}	1790^{A}	1210^{B}	430.351
%	3.14^{B}	5.19^{A}	4.02^{B}	1.028

A,B means with different superscripts in the same row are significantly different (p<0.05)

Mean weights of sample rib joint, dissected components of these joints and standard errors of mean are given in Table (9). Significances of the different treatments are shown in the same Table. It is apparent from the present results that adding Se to the diets of kids had significant effects on weights and percentage of muscle compared with the kids received SS in

their ration. It is interesting, however, to note that fatty tissue percentage was significantly higher ($P < 0.05$) in the carcass cuts of the kids received ration supplemented with SS than the control and Se rations. This finding may indicate that kids reared under ration supplemented with SS were able to deposit more fatty tissues in their bodies than those reared under Se ration.

The results obtained in tables (10 and 11) showed that control and S group recorded highest ($P < 0.05$) values of CP%. The chemical composition of meat and bone (Tables 10 and 11) indicated that control and S groups recorded the higher ($P < 0.05$) values of CP compared with SS group; however the later group showed higher ($P < 0.05$) values of EE and ash percentage than the other two groups.

Table (9): Effect of dietary Se source on carcass quality of kids

Item	Treatment			SE±
	Control	SS	S	
Ribs weight (9,10,11), g	838^{B}	940^{A}	810^{C}	147.109
Meat weight, g	538	492	517	65.919
Meat % of ribs	64.55^{A}	52.72^{B}	63.83^{A}	6.409
Fat weight, g	132^{B}	253^{A}	126^{B}	75.941
Fat % of ribs	15.59^{B}	26.95^{A}	15.43^{B}	6.097
Bone weight, g	168^{B}	191^{A}	168^{B}	31.879
Bone % of ribs	19.87	20.33	20.74	0.343
Meat: Fat ratio of ribs	4.18^{A}	1.96^{B}	4.14^{A}	1.153
Meat: Bone ratio of ribs	3.32	2.60	3.08	0.386
Bonless meat, % *	80.13	79.67	79.26	0.343
Coefficient of meat **	4.11	3.93	3.82	0.099

A,B,C means with different superscripts in the same row are significantly different (p<0.05)

*** (Meat ^{w} + Fat ^{w})/ ribs weight * 100**

**** (Meat ^{w} + Fat weight)/ Bone. w * 100**

Table (10): Chemical composition of mixed meat and fat of kids as affected by dietary Se source

Item	Treatment			SE ±
	Control	S. S	S	
CP, %	79.60^{A}	67.07^{B}	75.67^{A}	6.408
EE, %	15.23^{B}	27.45^{A}	20.34^{B}	6.137
Ash, %	5.18^{A}	5.48^{A}	3.99^{B}	0.788

A,B means with different superscripts in the same row are significantly different (p<0.05)

Table (11): Chemical composition of bone of kids as affected by dietary Se Source

Item	Treatment			SE ±
	Control	S. S	S	
CP, %	37.99^{A}	33.48^{B}	38.28^{A}	2.691
EE, %	20.52^{B}	22.11^{A}	19.81^{B}	1.178

Ash, %	41.49^{B}	44.40^{A}	41.91^{B}	1.573

A,B means with different superscripts in the same row are significantly different (p<0.05)

Table (12) shows values of blood plasma parameters of the different experimental kids goats. It can be seen from the present study, that through the values of cholesterol tended to increased with group received SS, however, the differences among the three groups were non-significant.

Table (12): Mean Values of some blood plasma blood parameters of kids as affected by dietary Se source

Blood constituents	Treatments			SE ±
	Contral	SS	S	
Total protein (gm/dL)	7.02^{B}	7.08^{B}	7.91^{A}	0.356
Albumin (gm/dL)	3.48	3.72	4.06	0.214
Globulin (gm/dL)	3.54	3.41	3.85	0.162
Total bilirubin (gm/dL)	0.38	0.42	0.52	0.057
Urea (mg/dL)	37.52	38.96	42.08	1.659
Creatinine (mg/dL)	0.75	0.75	0.72	0.019
Cholestrol (mg/dL)	80	90	81	5.508
Alkaline Phosphatase (u/L)	91	97	98	3.786

A,B means with different superscripts in the same row are significantly different (p<0.05)

Regarding the effects of Se supplementation on total protein, albumin and globulin, no significant change was detected among the three groups, however, the Se supplementation group recorded the highest values. These results agree with that obtained by Lu – Yuhua, *et al.,* (1996) who attributed the increase in total protein in goats orally supplemented with Se to the increase of rumen bacterial protein and protozoal protein as well as the concentration of rumen ammonia-N.

Concerning the parameters of bilirubins, urea and creatinine levels, there were non-significant differences among the three groups. Results indicated that Se supplementation in feeding goat kids has no deleterious effect on liver or kidney functions.

It could be concluded that adding pure selenium to the ration of the kids may improve growth performance, digestibility coefficients and carcass traits of the animals compared with sodium selenite or control groups

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السلينيوم في تغذية جداء الماعز

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استخدم في هذا البحث عدد ١٥ من الجداء النامية وقسمت هذه الجداء إلي ثلاثة مجاميع متساوية في الوزن كل مجموعة تحتوي علي ٥ جداء المجموعة الأولي كانت تغذي علي العليفة المتكاملة (كونترول) والمجموعة الثانية كانت تغذي علي العليفة المتكاملة بالإضافة إلي سلينات الصوديوم بنسبة ٢ ملج لكل رأس يومياً والمجموعة الثالثة كانت تغذي علي العليفة المتكاملة بالإضافة إلي السلينيوم بنسبة ٠,٧ ملجم لكل رأس

يومياً. واستمرت التجربة ٩٨ يوم ثم اجري في نهاية التجربة تجارب هضم استمرت لمدة ٢١ يوم منهم ١٤ يوم تمهيدي و ٧ أيام للجمع كذلك تم ذبح ثلاثة حيوانات من كل مجموعة وأخذ عينات الدم وعينة من الأعضاء الداخلية والعضلة العينية لتقدير القياسات عليها من حيث خصائص الذبيحة وتركيز السلينيوم في هذه الأعضاء.

وأهم النتائج المتحصل عليها فيما يلي:

1- كان معدل النمو اليومي أعلي في المجموعة المغذاه علي السلينيوم بالمقارنة بباقي المجموعتين.
2- لم توجد أي فروق معنوية بين الثلاثة مجاميع بالنسبة للغذاء المأكول وكذلك بالنسبة لكفاءة تحويل الغذاء والقيم الهضمية المأكولة المحسوبة علي أساس ومركبات كلية مهضومة وكذلك البروتين المهضوم.
3- بالنسبة لمعاملات الهضم أظهرت المجموعة المغذاه علي السلينيوم تفوقاً واضحاً في كل معاملات الهضم واتبعتها المجموعة المغذاه علي العليفة الكونترول وانعكس هذا بالإيجاب علي القيم الغذائية المحسوبة علي أساس مركبات مهضومة كلية وبروتين مهضوم.
4- بالنسبة لميزان الأزوت فقد أظهرت الثلاثة مجاميع ميزاناً موجباً مع تفوق المجموعة المغذاه علي السلينيوم ولم توجد فروق معنوية بين مجموعة الكونترول والمجموعة المغذاه علي سيلينات الصوديوم.
5- بالنسبة لتركيز السلينيوم في الأعضاء وعينة اللحم المأخوذة من العضلة العينية فكانت النسب أعلي في المجموعتين المغذاه علي السلينيوم وكذلك سيلينات الصوديوم بالمقارنة بالمجموعة المغذاه علي عليفة الكونترول وهذا ينطبق أيضا علي تركيز السلينيوم في الكبد والكلي وشعر الجداء كذلك أظهرت النتائج أن أعلي تركيز للسلينيوم كان في الكلي ثم الكبد.
6- أظهر ميزان السلينيوم أن المحتجز من السلينيوم في جسم الجداء كان أعلي قيمة في المجموعتين الثالثة والثانية (سلينيوم ، سيلينات صوديوم) بالمقارنة بالمجموعة المغذاه علي عليفة الكونترول.
7- كانت نسبة الدهن أعلي في ذبائح الحيوانات المغذاه علي سيلينات الصوديوم بالمقارنة بالمجوعتين الأخرتين كذلك وجد أن نسبة اللحم أعلي في ذبائح الحيوانات المغذاه في مجموعة الكونترول والمغذاه علي السلينيوم وبالنسبة للمحتوي من العظام فلم توجد فروق معنوية بين الثلاثة مجاميع.
8- كانت نسبة البروتين أعلي في ذبائح الحيوانات المغذاه علي العليفة الأساسية وكذلك المغذاه علي السلينيوم بالمقارنة بالمجموعة المغذاه علي سيلينات الصوديوم.

من هذا البحث يمكن استنتاج ما يلي:

يمكن إضافة السلينيوم إلي علائق جداء الماعز بالنسب المقررة وهذا يمكن أن يؤدي إلي زيادة في معدل نمو جداء الماعز وتحسين كفاءة تحويل الغذاء وتحسين صفات الذبيحة دون الخوف من زيادة نسبة السلينيوم في لحوم الجداء مع عدم تعرض الإنسان للتسمم نتيجة التغذية علي هذه اللحوم.