Egyptian J. Nutrition and Feeds (2003) 6 (2): 151-161

SOME MINERAL, NITROGEN AND WATER UTILIZATION OF SALT PLANT FED SHEEP AS AFFECTED BY MONENSIN

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SUMMARY

Twenty-six growing lambs were randomly selected and divided into three groups (46.5, 46.0, and 46.5 ±0.94 Kg live body weight for groups 1, 2, and 3, respectively). Animals were fed on previously sun-dried halophytes which were mixed in the ratio of 2:1:1 for *Tamarix mannifera* (Tarfa), *Zygophyllum album* (Ghullam), and *Halocnemum strobulaceum* (Tar'teer), respectively. First diet was the control and consisted of 60% of the growth requirements in the form of concentrate feed mixture (CFM) while Berseem hay (*Trifolium alexandrium)* was offered *ad lib*. Second and third diets had the same 60% CFM and the halophyte mixture was fed *ad lib*. To the second diet 20-ppm monensin (commercial form as sodium salt)/h/d was added for the purpose of enhancing nutrient utilization. Mineral, nitrogen and water metabolism of salt bush fed lambs as affected by monensin was investigated. Feeding experiments followed by a balance trial were conducted for 155 days. Monensin addition to salt plant based-diets caused a reduction in both fecal and urine Ca excretion. Hence, monensin improved Ca utilization. Monensin did not appear to have influenced Na absorption. The effect of monensin on Na utilization may have been masked by the excessive Na content of salt plants. Absorption of K was variable among animal groups due to varied intakes and excretion in different groups. Monensin fed-group had the lowest non-significant, yet positive, nitrogen balance. Digested nitrogen was lower for salt plants fed groups, yet not significantly different from that of control. Monensin had no effect on Zn utilization. Water utilization by sheep fed salt plants and monensin was not different from that of control. It appears that the addition of monensin to the salt plants improved the nutrient utilization.

Keyword: *some minerasl, nitroge, water utilization, salt plant, sheep, monensin*

INTRODUCTION

The use of salt bush plants has found an acceptance under the circumstances of feed shortage especially in coastal areas. Some conservation is placed, however, on that use; high contents of minerals (no less than 20% ash on DM basis) is an example (Fahmy *et al.*, 2001).

Because salt plants are poor quality roughage, many treatments like ensiling, chopping, nutrient enrichment, or any combination of treatments were applied (Khamis, 1988; Fahmy, 1998; and Youssef, 1999). Monensin, as an ionophore, was thought to enhance the nutrient utilization by animals when fed salt plants. Monensin increased feed efficiency of animals and body weight gain as well (Potter *et al.*, 1976).

Several investigators reviewed the mechanisms by which ionophores exert their effects (Schelling, 1984 and Bergen and Bates, 1984). Briefly, ionophores increase propionate, decrease acetate and butyrate. They, also, affect protein metabolism in the rumen. Ruminants

(Davidson, 1984 and Donoho, 1984) absorb 36 to 50% of (^{14}C) monensin. Therefore, another mechanism must be involved (Armstrong and Spears, 1984). However, monensin, as an ionophore, facilitates the passage of ions across cell membranes. It has strong affinity for sodium and potassium ions (Kirk *et al*.., 1985). Monensin may be exerting its effect on minerals either within the rumen or small intestine or by another way through the tissues. Monensin was found to improve the retention of some minerals (Kirk *et al*., 1985).

Therefore, the objective of this study was to investigate mineral, nitrogen and water metabolism of salt bush fed lambs as affected by monensin.

MATERIALS AND METHODS

Feed processing and diet formulation

For the purpose of the experimentation, fresh edible leaves and branches of the halophytic plants were cut off, collected, sun-dried, chopped and packed for later use. Measured amounts of previously sun-dried halophytes were mixed in the ratio of 2:1:1 for *Tamarix mannifera* (Tarfa), *Zygophyllum album* (Ghullam) and *Halocnemum strobulaceum* (Tar'teer), respectively. Previous studies (Khamis, 1988) indicated that air-drying reduced intake of halophytes compared with fresh green state. Therefore, 10% molasses (by weight) was used as an appetizer and taste-improving agent and calculated as a part of concentrate portion.

Diets were balanced according to Kearl, (1982). Three diets were formulated as 40% roughage and 60% concentrates. Chemical composition of different diet ingredients are found in Table (1). First diet was the control and consisted of 60% of the requirements in the form of concentrate feed mixture (CFM) and berseem hay (*Trifolium alexandrium*) *ad lib*. Second (SPM) and third (SP) diets had the same 60% CFM and the halophyte mixture was fed *ad lib*. To the second diet 20-ppm monensin (commercial form) as sodium salt/h/d was added for the purpose of enhancing nutrient utilization.

Experimental design

Twenty-six growing lambs were randomly selected and divided into three groups (9, 9, and 8 animals for groups 1, 2 and 3, respectively). Animal groups were assigned to experimental treatments randomly. Average body weights of experimental groups were 46.5, 46.0, and 46.5 ±0.94 Kg for groups 1, 2, and 3, in order. Feeding experiments followed by a balance trial were conducted for 155 days.

Animals and management

In the balance trial, four animals from each group were randomly selected. Animals were randomly and individually placed in metabolism stalls designed for total collection of feces and urine. Fifteen days were allowed for animals to adapt to the metabolism crates. Animals were offered feeds on individual basis during the metabolism trial. The collection period was seven days. During the collection period, urine, feces, orts as well as samples of feeds offered and refused were collected. Drinking water was also sampled. Twenty-five milliliters of 9 *M* H_2SO_4 solution were added daily to urine collection vessels as a preservative. A 10% aliquot of urine (by volume) was collected daily and immediately frozen for later analysis. Daily urine collections were composited by animal across days, mixed thoroughly, and sampled before freezing. Dried feces were composited daily into sealed plastic bags. Fecal collections were weighed, sampled, and ground. The composite samples of feeds and orts were also sampled and ground. Ground samples were wet washed in nitric acid and perchloric acid. Blood samples were withdrawn from Jugular vein of animals into tubes to which EDTA was added. Blood samples were immediately centrifuged at 4000_{rpm} for 20 minutes. Clear serum was collected and immediately frozen for later analysis.

Analysis

Feeds, orts, feces and urine were analyzed for the selected minerals according to A.O.A.C. (1990).

Data were analyzed statistically using GLM procedures of SAS (1985).. Duncan's multiple test was applied for comparison of means (Duncan, 1955).

Regional characterization

Wadi Sudr (Sudr Valley) of southern Sinai was the area of collection. The soil of this area is known to be loamy sand texture. The total dissolved salts (TDS) of groundwater were estimated to range from 3000 to 4000 ppm. Anon, 1981 reported that the dominant cation in the water was sodium (30 meq/L) and anion was chloride (50 meq/L). He found also that sulfate content was 3.8 meq/L. Mohammed, (1996) reported that soil had calcium as the dominant cation (2.2 meq/100 g) and carbonate as the dominant anion (0.9 meq/100 g).

Dominant naturally growing salt bush shrubs in this area are *Tamarix mannifera* (Tarfa), *Zygophyllum album* (Ghullam), and *Halocnemum strobulaceum* (Tar'teer). In late wet season (spring), the plants have their green edible parts (leaves, and newly formed branches) ready to be grazed by animals after the overgrazing of more palatable plants.

RESULTS AND DISCUSSION

Mineral utilization

Concentrations of macro and microelements of diet components fed to sheep are presented in Table (2). Calcium intake (mg/Kg $BW^{0.75}$) of salt plant-fed animals was higher (Table, 3) ($P<0.05$) for SP and SPM than that of control group. Amount of Ca content (%) was higher in salt plant mixture (Table, 2) than that of hay and CFM, collectively. In a previous study (Fahmy *et al.*, 2001), animals consumed more salt plants than control (hay). Amount of fecal Ca excretion (Table, 3) of SPM group was about twice as much as that excreted by control group, while that of SP group was about three times. Also, Ca excreted in urine of SPM and SP groups was four to five times that excreted in urine of control group. Monensin addition to salt plant based-diets caused a reduction in both fecal and urine Ca excretion. Hence, total Ca excretion of SPM group was lower ($P<0.05$) than that of SP group. The amount of Ca excreted in SPM group as a result of monensin addition was almost as half as that of SP group; which clearly indicate that monensin improved Ca utilization. Expectedly, therefore, amount of absorbed Ca of SPM group was higher, yet not significant, than that of SP group; both were ($P<0.05$) higher than control. Similar results were obtained with Ca balance (Table, 3). Consequently, serum Ca concentrations (mg %) of SPM were twice as much as that of SP group. Control group exhibited a medium value of serum Ca concentration. Kirk *et al.*, (1985) found that monensin supplementation to diets of lambs decreased urinary Ca excretion by about 60% of control. Percentages of urinary Ca excretion relative to intake were 0.74, 1.84 and 2.81% while those of fecal excretion were 28.72, 32.95 and 43.54% for control, SPM and SP groups, respectively. Therefore, monensin caused a reduction in Ca excreted (both fecal and urinary) but not as high percent as that obtained by Kirk *et al.* (1985). Since

Table (1): Chemical composition and feed ingredients of diets fed to sheep.

Item		CP	CF	ADF	NDF	Ash	EE	NFE
	DM	DM basis, %						
CFM*	89.0	17.9	26.7	40.6	71.9	6.6	2.92	45.88
Berseem hay	87.6	17.9	28.9	45.0	57.02	13.6	2.12	40.68
Tamarix mannifera	51.5	7.6	23.0	33.3	49.0	22.3	3.5	43.6
Zygophyllum album	36.0	6.4	16.0	31.4	44.9	26.9	4.4	50.6
Halocnemum strabilaceum	60.0	6.5	14.3	22.8	41.8	29.1	3.0	47.1
Mix of salt plants	75.0	6.5	21.9	31.8	49.36	23.3	1.35	51.42

***Concentrate feed mixture contains: 35% corn, 30% undecrticated cotton seed cake, 25% wheat bran, 6% molasses, 3% limestone, and 1% mineral salt.**

Table (2): Macro and micro mineral contents of feed ingredients fed to growing sheep.

	Macro elements, %				Micro element, ppm
Item	**N**	**Na**	**K**	**Ca**	**Zn**
CFM	2.86	0.4	1.20	0.33	401
Berseem hay	2.35	2.17	1.30	1.33	261
Tamarix mannifera	1.22	2.6	0.8	1.44	385
Zygophyllum album	1.02	2.84	0.9	3.47	433
Halocnemum strabilaceum	1.04	7.0	1.65	2.45	997
Mix of salt plants	1.04	3.76	1.02	2.10	551

Table (3): Calcium (Ca) utilization of growing sheep fed diets containing salt plants and monensin.

Item	Control	SPM	SP	±SE
Calcium intake,				
mg/Kg BW	186^{b}	303^{a}	350^{a}	24.2
mg/Kg $BW^{0.75}$	484^{b}	789^{a}	914^{a}	62.6
Calcium excretion, mg/Kg $BW^{0.75}$				
Fecal	139^{c}	260^{b}	398^{a}	37
Urine	3.59^{b}	14.5^{a}	19.9^{a}	2.45
Total	142.6^{c}	274.5^{b}	417.9^{a}	39.5
Absorbed Ca				
mg/Kg $BW^{0.75}$	345^{b}	528^{a}	516^{a}	30.3
% of intake	71.3	67.0	56.5	
Calcium balance,				
mg/Kg $BW^{0.75}$	341^{b}	514.5^{a}	496.1^{a}	28.2
% of intake	70.5^{a}	65.2^{a}	54.3^{b}	
% of absorbed	98.9^{a}	97.3^{b}	96.1^{b}	
Serum Ca, mg%	10.9^{ab}	16.4^{a}	8.2^{b}	1.41

a, b and c: values bearing different superscripts at the same row differ significantly ($P<0.05$)
SP = Salt plants, SPM= salt plants with monensin

two of the diets (SPM and SP) were salt plants and high in ash content than control, the excretion of Ca was higher than control and so was intake. The differences between SPM and SP, however, were not significant. Greene *et al.*, (1967) found monensin to increase Ca absorption when fed to lambs but they attributed that increment to increased Ca intake. This is true and agrees with the results obtained in our present study.

One of the primary roles of monensin is to increase the activity of Na-K pump (Smith and Rozengurt, 1978). It was found to increase the concentrations of Na outside and K inside the cell (Pressman, 1976). Therefore, it was important to study Na and K metabolism of salt plants as affected by monensin. Sodium (Na) intake of salt plant-fed groups was, logically, higher than control group (Table, 4). Fahmy, (1998) found Na intake to vary from 805 to 1507 mg/Kg $BW^{0.75}$ for silages made of a mixture of salt plants; a range close to that obtained in the present study. Fecal Na excretion was not different among groups, while urine sodium excretion of salt plant-fed groups was higher ($P<0.05$) than that of control group. Therefore, the total Na excretion was higher for salt plant-fed groups. However, absorbed Na was lower in control group ($P<0.05$) than salt plant-fed groups. Monensin did not appear to have influenced Na absorption, as there was no significant differences between SPM and SP groups. Lambs fed diets consisting of ground corn and cotton seed hulls had increased ($P>0.1$) Na absorption when supplemented with 20 mg/Kg monensin (Kirk *et al.*, 1985) as did Starnes *et al.*, (1984) when monensin was fed to steers. In our present study, the significant level was set at $P<0.05$, which means higher test sensitivity. If significant level was set at a level similar to that set by those authors, it would have been different. However, the effect of monensin on Na utilization may have been masked by the excessive Na content of salt plants. Sodium is excreted, mainly through urinary system. Sodium excreted via urine of salt plant fed animals was 2.5 times more than that of control. Monensin made no difference in Na excreted in urine. However, Na balance was the least for the group fed monensin. Monensin-fed group had the lowest ($P<0.05$) Na balance resulting from the excessive excretion of sodium through the urinary system relative to its low Na intake. Serum Na concentrations (Table, 4) was lower ($P<0.05$) for SPM group than other groups.

Parameters indicating potassium (K) utilization are present in Table (5). Intakes of K by different groups were almost similar (402, 405, and 437 mg/Kg BW for control, SPM, and SP groups, respectively). The SP fed group recorded higher K intakes but not statistically different. Fecal K excretion was higher ($P<0.05$) in the control group compared to SPM. Absorption of K was variable among animal groups due to varied excretion in different groups. The monensin fed group exhibited a medium value for the K absorption. Monensin did not affect K absorption significantly in comparison with other groups. Therefore, intake related K absorption values were similar. Control and monensin fed groups excreted less K in urine than SP group (Table, 5). Total potassium excretion was not significantly different among animal groups. Balance of potassium exhibited positive value for all groups. Balance of potassium exhibited the same trend as other parameters. Serum potassium concentrations had higher ($P<0.05$) value for SPM group than control group.

Zinc (Zn) intake of control group was lower ($P<0.05$) than salt plant-fed groups

Table (4): Sodium (Na)utilization of growing sheep fed diets containing salt plants and monensin.

Item	Control	SPM	SP	±SE
Sodium intake,				
mg/Kg BW	409^b	509^{ab}	592^a	32.7
mg/Kg $BW^{0.75}$	1068^b	1325^{ab}	1546^a	83.9
Sodium excretion, mg/Kg $BW^{0.75}$				
Fecal	281	238	247	22.2
Urine	471^b	1005^a	1047^a	157
Total	752^b	1243^a	1294^a	161
Absorbed Na				
mg/Kg $BW^{0.75}$	787^b	1087^a	1299^a	80.1
% of intake	73.7	82.0	84.0	1.82
Sodium balance,				
mg/Kg $BW^{0.75}$	316^a	82^b	252^a	31
% of intake	29.6	6.2	16.3	
% of absorbed	40.2	7.6	19.4	
Serum Na, mg%	431^a	371^b	421^a	9.53

a and b: values bearing different superscripts at the same row differ significantly (P<0.05)
SP = Salt plants, SPM= salt plants with monensin

Table (5): Potassium (K) utilization of growing sheep fed diets containing salt plants and monensin.

Item	Control	SPM	SP	±SE
Potassium intake,				
mg/Kg BW	402	405	437	12.8
mg/Kg $BW^{0.75}$	1049	1054	1138	30.2
Potassium excretion, mg/Kg $BW^{0.75}$				
Fecal	276^a	212^b	227^{ab}	14.8
Urine	712^a	754^{ab}	904^b	54.8
Total	988	966	1130	58.1
Absorbed K,				
mg/Kg $BW^{0.75}$	733^b	841^{ab}	911^a	27.4
% of intake	73.7	79.8	80.0	
Potassium balance,				
mg/Kg $BW^{0.75}$	61^a	87.5^a	8^b	41.2
% of intake	5.5	8.2	0.80	
% of absorbed	7.43	10.2	1.14	
Serum K, mg%	24.5^b	26.7^a	25.5^{ab}	0.51

a and b: values bearing different superscripts at the same row differ significantly (P<0.05)
SP = Salt plants, SPM= salt plants with monensin

(Table, 6). Amounts of excreted Zn via different routes were not significantly different. Both absorbed Zn and Zn balance were positively higher for salt plant-fed groups than control. Kirk *et al.*, (1983) found monensin to decrease fecal Zn excretion and increased ($P<0.05$) Zn absorbed. In the present study, fecal Zn excretion of salt plant fed animals was higher ($P<0.05$) and so was Zn excretion via urinary system. Salt plant fed animal groups had higher Zn intake and excretion who kept the significance level between them and control with respect to Zn absorption and balance. Absorbed Zn as related to intake did not differ significantly among groups indicating that monensin had no effect on Zn utilization. Serum Zn concentrations were higher for SP group.

Nitrogen utilization

Table (7) shows data on nitrogen metabolism in sheep fed diets containing salt plants and monensin. Nitrogen intake was higher ($P<0.05$) for control group. Monensin fed group had the lowest nitrogen intake. Crude protein intake was higher for control group (Fahmy *et al.*, 2001) but not significantly (14.6, 13.3, and 14.0 g/Kg $BW^{0.75}$ for control, SPM, and SP, respectively). Digested N was not different among animal groups, whereas N balance was higher for both control and SP groups. Monensin fed-group had the lowest, yet positive, nitrogen balance. Total serum nitrogen concentrations were close among groups.

Water utilization

Water utilization by sheep fed salt plants and monensin is shown in Table (8). Absolute water intake (mg/Kg BW) was not different even when animals were fed salt plant, neither was water intake (ml/g DMI). Excreted water was not different among animal groups, neither was water balance. Khamis, (1988) found that sheep and goats consumed more free water when fed *Halonemum strobilaceum* silage compared to *Zygophyllum album, Tamarix aphylla and Atriplex halimus* silages. The differences existing between the results of Khamis, (1988) may be due to the differences in the form of diets fed. On the other hand, water excretion as percentage of water intake was almost constant in sheep and ranged from 59.2 to 66%; a range close to that obtained in the present study. Fahmy, (1998) found water excretion not to differ significantly among different silages of halophytic plants.

Conclusively, excretion of all minerals examined in the present study under the effect of salt plants was higher and ranged from two to five times more than that of control (a traditional diet) regardless of the presence of monensin. One reason for that excessive excretion of minerals is the higher contents of these minerals in salt plants compared with Berseem hay. The higher feed intake from salt plant mixture that was not due to their palatable taste but to the addition of molasses has added to that mineral load imposed on animals. Minerals may have existed in a form that was not bio-available to animals. The increased fecal excretion of minerals in salt plant fed animal groups over control could be evidence. On the other hand, the excessive excretion of minerals in the urine might be explained on the basis that the absorbed amounts of these minerals could have been burdensome on the homeostasis in the blood of these animals. Getting rid of this heavy burden through urine may be the only plausible way for animals. On the other hand, monensin effects that were detected by other investigators (e.g. Kirk *et al.*, 1985) were masked in the present study by the excess amounts of minerals. This also

Table (6): Zinc (Zn) utilization of growing sheep fed diets containing salt plants and monensin.

Item	Control	SPM	SP	±SE
Zinc intake,				
mg/Kg BW	11.9^{b}	15.8^{a}	17.3^{a}	0.18
mg/Kg $BW^{0.75}$	31.2^{b}	41.2^{a}	45.2^{a}	2.05
Zinc excretion, mg/Kg $BW^{0.75}$				
Fecal	2.57^{b}	4.51^{a}	4.71^{a}	0.47
Urine	0.07	0.07	0.12	0.017
Total	2.64	4.58	4.83	0.47
Absorbed Zinc,				
mg/Kg $BW^{0.75}$	28.7^{b}	36.7^{a}	40.4^{a}	1.78
% of intake	91.7	88.9	89.7	
Zinc balance,				
mg/Kg $BW^{0.75}$	28.6^{b}	36.6^{a}	40.4^{a}	1.77
% of intake	91.5	88.8	89.4	
% of absorbed	99.8	99.7	99.7	
Serum Zn, µg/ml	0.85^{b}	0.66^{b}	1.22^{a}	0.12

a and b: values bearing different superscripts at the same row differ significantly ($P<0.05$), SP = Salt plants, SPM= salt plants with monensin

Table (7): Nitrogen (N) utilization of growing sheep fed diets containing salt plants and monensin.

Item	Control	SPM	SP	±SE
No of animals	4	4	4	
Live Body Weight, kg	46.5	46.0	46.5	0.94
Nitrogen intake,				
mg/Kg BW	896a	814b	861ab	25.7
mg/Kg BW0.75	2339.8a	2119.9b	2248.4ab	60.0
Nitrogen excretion, mg/Kg BW0.75				
Fecal	821	755	821	29.3
Urine	896a	904a	757a	42.3
Total	1717	1659	1578	57.5
Digested Nitrogen				
mg/Kg BW0.75	1518.8	1364.9	1427.4	
% of intake	64.9	64.4	63.5	
Nitrogen balance,				
mg/Kg BW0.75	622.8a	460.9b	670.4a	54.7
% of intake	26.6	21.7	29.8	
% of digested	41.0	33.8	47.0	
Serum total N., mg/Kg BW0.75	56.4	55.7	56.7	

a and b: values bearing different superscripts at the same row differ significantly ($P<0.05$) SP = Salt plants, SPM= salt plants with onensin

Table (8): Water utilization of growing sheep fed diets containing salt plants and monensin.

Item	Control	SPM	SP	±SE
Free water intake, ml/g DMI	1.87	1.75	1.75	0.053
Total water intake				
ml/Kg BW	62	61.9	67.3	2.8
ml/Kg BW0.82	123	123	134	6.21
Water excretion				
ml/Kg BW	30.7a	36.1ab	41.1b	2.21
ml/Kg $BW^{0.82}$	61.1	71.8	82.1	4.31
% of intake	39.3	45.2	47.8	1.62
Water balance,				
ml/Kg BW	46.0	43.7	45.1	1.73
ml/Kg $BW^{0.82}$	91.9	87.1	89.9	3.21
% of intake	60.7	54.1	52.2	1.62

a and b: values bearing different superscripts at the same row differ significantly ($P<0.05$)
SP = Salt plants, SPM= salt plants with monensin

might be due to a shift in rumen metabolism of these animals since the presence of such amounts in the rumen at one time may affect the microbial community. Additionally, these plants contain variable concentrations of anti-nutritional factors. The improved utilization of Ca might be due to an increase in the efficiency of absorption but not through making it biologically available to the animals.

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الاستفادة من بعض المعادن و النيتروجين و الماء عند تغذية الأغنام على النباتات الملحية مع استخدام المونسين

صلاح عبد العاطى عطية إسماعيل ، عفاف محمود فايد ، عبد الفتاح عفيفي فهمي

قسم تغذية الحيوان والدواجن – مركز بحوث الصحراء – المطرية – القاهرة

قسم عدد ٢٦حمل نامي عشوائيا على ثلاثة مجموعات (٤٦,٥ ، ٤٦، ٤٦ ± ٠,٩٤ كجم وزن حي للمجاميع ١و٢و٣ على التوالي). تم تغذية الحيوانات على نباتات ملحية سبق تجفيفها هوائيا (الطرفة و الجلام و الطرطير) و خلطت بنسبة ٢ : ١ : ١ على الترتيب ، اعتبرت العليقه الأولى للمقارنة و تكونت من ٦٠% من الاحتياجات (الحافظة بالإضافة إلى احتياجات ١٢٠ جم نمو) و هى عبارة عن علف مركز ودريس برسيم إلى حد الشبع وتكونت العليقه الثانية و الثالثة من ٦٠% علف مركز كالعليقة الأولى و مخلوط النباتات الملحية إلى حد الشبع . وتم إضافة المونسين للعليقة الثانية بتركيز ٢٠ جزء في المليون / للرأس / يوم و ذلك بغرض تحسين الاستفادة من المواد الغذائية المأكولة .

تم دراسة التمثيل الغذائي للمعادن و النيتروجين و الماء بالنسبة للأغنام المغذاة على النباتات الملحية و المننسين ، وتم إتباع تجارب التغذية بتجارب هضم و استمرت التجربة كاملة لمدة ١٥٥ يوم و أظهرت النتائج إن أضافه المونسين إلى النباتات الملحية كعليقه أساسيه أدى إلى نقص في كلا من الكالسيوم الخارج في البول و الروث ومن ثم فان المونسين يحسن الاستفادة من الكالسيوم .

لم يظهر المونسين تأثير على امتصاص الصوديوم و ذلك لزيادة نسبة الصوديوم بالنباتات الملحية ، بينما كان امتصاص البوتاسيوم مختلفا بين المجاميع الثلاثة نتيجة اختلاف المأكول و الخارج في البول و الروث . المجموعة المغذاة على المونسين أظهرت اقل ميزان نيتروجين موجب فى حين ان النيتروجين المهضوم للمجموعات المغذاة على النباتات الملحية لم يختلف اختلافا معنوياً عن مجموعه المقارنة . كذلك لم يؤثر المونسين على الاستفادة من الماء فى الأغنام المغذاة على النباتات الملحية .

ومن ذلك يظهر أن أضافه المونسين إلى النباتات الملحية يحسن من الاستفادة من بعض العناصر الغذائية .