FACTORS EFFECTING MEDICINALS PLANT SUPPLEMENTATION ON SOME BLOOD PARAMETERS OF KARADI LAMBS

1-Effect of alkali-treated or untreated barley straw

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ABSTRACT

Twenty four individual Karadi male lambs. weighing 22.3+2.25 kg live weight and 4 months old were used to investigate the effect of two levels of Rosemary (0 and 7.5 g RO/kg DM) fed with either NaOH-treated or untreated barley straw on the diurnal patterns of plasma growth hormone (GH) , serum sugar (SS) , serum urea nitrogen concentration (SUN) serum uric acid (SUA). concentration during 24 h post morning feeding were investigated . The tested groups were fed randomly on one of the following experimental diets . Diet 1 and 2 fed untreated straw supplemented with 0 and 7.5 g/kg DM ,RO respectively ; Diet 3and 4 fed NaOH-treated straw supplemented with 0 and 7.5 g/kg DM , RO respectively , Within 2-3 days before ending the feeding trail , blood samples were taken from the experimental animals to determine GH, SUN, SS and SUA . All diets were associated with post- prandial increases in GH, SS and SUA and decreases in SUN concentration during the first 6 h post morning feeding . SS ,SUN and SUA concentration in lambs received RO was significantly ($P<0.05$) higher than those fed diets without ., While GH was not affected . Lambs fed NaOH-treated straw was significantly ($P<0.05$) increase SS and reduce SUA as compared with those fed untreated straw.

Key word: medicinal plants ,alkali-treated straw, blood parameters , Lambs.

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INTRODUCTION

Its well establish that feed additives such as medicinal plants and probiotics have been improved , growth rate , feed efficiency utilization and carcass characteristics of lambs (Rubeii and Hassan ,2008 , Al-Rubeii et al.., 2009 ,Hassan 2009; Hassan and Hassan ,2009a, Hassan et. al.., 2009abc) . These improvement were associated with changes in some blood parameters such as insulin and growth hormone (Al-Raheem et. al., 1995 and 1996), serum urea nitrogen and uric acid (Hassan and Muhamad ,2009, Hassan and Ariff, 2008) ,total protein and serum sugar (Hassan et. al.., 2009a., Hassan et al.., 2009c). These changes in blood parameters might be affected by different levels and sources of feed additives (Hassan ,2009 , and Hassan et al .,2009a) , basal diets (Hassan et al.,. 2009c) , levels of rumen degradable and un degradable protein (Hassan and Hassan, 2009cd) . sources of roughages (Hassan et al., 2009c) and by different levels of feeding (Hassan et al ., 2009b). Serum urea N (SUN) has been related to efficiency of N use. As excessive protein or rumen degradable protein is consumed, SUN may increase. A positive relationship has been found between SUN and urinary N excretion so that monitoring SUN can help reduce excessive N excretion. The key factor is providing adequate rumen available carbohydrates (Basal diets) to provide the energy for the rumen microbes to convert ammonia into microbial protein. (DAS ,2008) . Therefore, the observed responses and changes in some blood parameters to medicinal plants need more explanation and some possible reasons has this responses may need to explain the beneficial of medicinal plants in the diet (Hassan ,2009) .The data available have not provided precise information to explain the response to medicinal plants. The first part of these studies (Hassan and Hassan , 2009abcd) was conducted to study the main effect of these factors on daily intake ,live weight gain and feed conversion ratio.The objective of this part was conducted to study the effect of these factors on the diurnal patterns of GH, SS,SUN and SUA concentration during 24 h post morning feeding of karadi lambs.

MATERIALS AND METHODS

Animal and its management were explained in the first part of this study (Hassan and Hassan ,2009b) until 63 days of experiment (9weeks). After this period and within 2-3 days before ending the feeding trail , blood samples were taken from the experimental animals to determine GH , SUN, SS and SUA concentration . Animals were fitted with jugular canella and blood samples (3 ml) were drawn into heparin zed syringe before morning feeding (zero time) and 3 ,6 ,9 12 and 24 h post morning feeding. Blood samples were centrifuged and plasma was removed and stored at -20 C o

until analysis for GH, SUN, SS and SUA using a radioimmunoassay technique, international, France. Mean plasma concentration were calculated for all times for each animal within each treatment group. Formulation and chemical composition of experimental diets are shown in table 1.

Table1. Ingredients and chemical composition of concentrate diets, untreated (UTS) and treated barley straw (TS).

Rosemary additives	Without RO	With RO
Concentrate diet no	1	2
Ingredients (g/kg DM)		
Barley	490	490
Yellow corn	390	382.5
Soybean meal	100	100
Rosemary Officinals	—	7.5
Salt	10	10
Min. & vit. mix.	10	10
Chemical Composition g/kg DM		
DM (g/kg fresh)	946	945
OM	918	918
TN	21.38	21.39
CF	50.8	50.8
EE	34	34
NFE	700	700
ME (MJ) *	12.4	12.4
Type of barley straw	Untreated straw	Treated straw
Chemical composition g /kg DM		
DM (g/kg fresh)	945	956
OM	867	859
TN	5.9	6.0
Neutral detergent fiber (NDF)	804	786
Acid detergent fiber (ADF)	515	506
Hemi cellulose	288	278
Cellulose	412	424
Lignin	104	82
In vitro DM digestibility (%)I	43.1	60.8
In vitro OM digestibility (%)	45	64
ME (MJ) *	6.8	10.5

*ME (MJ/ kg DM) = 0.012 CP +0.031 EE+0.005 CF +0.014 NFE (MAFF,1975).

Statistical analysis

Data was statistically analyzed using Completely Randomized Design Model (CRD) procedure by (SAS,2001). Duncan's multiple range test was used to determine the significance of differences between treatments means Duncan (1955).Analysis of variance was carried out on all data .

RESULTS

The total daily intake of all nutrients , live weight gain and blood parameters are presented in table 2 . The total daily intake of all nutrients and live weight gain were not statistically significant among treatments . There were not significant differences in GH concentration among treatments, except those lambs given treated barley straw without RO (diet 3) was significantly ($P<0.05$) reduced GH as compared with other treatments. The SUN differences were not significant ($P>0.05$) among lambs fed untreated or treated barley straw. However, Lambs received untreated straw supplemented with RO (diet 2) shown a considerable increase ($p<0.05$) in SUN as compared with diet 1 and with other treatments ($P<0.05$). RO supplementation of lambs fed either treated or untreated straw were significantly ($P<0.05$) resulted in an increase SUA as compared with those without RO supplementation .However, SUA of lambs fed treated straw was significantly ($P>0.05$) lower than those fed untreated barley straw. RO supplementation of lambs fed either treated or untreated straw were resulted in a significant ($P<0.05$) increase in SS as compared with those without RO supplementation .In contrast ,SS of lambs fed treated straw was significantly ($P<0.05$) higher than those fed untreated barley straw.

The diurnal patterns of GH, SUN, SUA and SS, concentration during 24 h post morning feeding are shown in Figure 1,2.3 and 4 respectively.

Table 2 **.** *Initial and Final live body weight, daily gain and some blood parameters concentrations.*

Type of Barley straw (TS)	Untreated straw		NaOH treated straw		Significance of mean effects		
Level of RO (LRO)	No RO	With RO	No RO	With RO	SEM	L RO	TS
Diet no.	**1**	**2**	**3**	**4**			
Initial live weight (Lw, Kg)	22.54	21.6	22.94	22.34	2.25	NS	NS
Final Lw (Kg)	35.2	34.36	35.92	35.3	3.02	NS	NS
Live- weight gain (g/day)	200	202	206	205	21.2	NS	NS
Daily DM intake (g/ $kgW^{0.75}$)	909	876	942	885	89	NS	NS
Daily TN intake (g/ $kgW^{0.75}$)	1.28	1.28	1.32	1.289	0.036	NS	NS
Daily ME (MJ/ $kgW^{0.75}$)	0.782	0.793	0.867	0.827	0.047	NS	NS
Growth hormone (ng / ml)	2.07^{a}	2.03^{a}	1.61^{b}	2.45^{a}	0.489	NS	NS
Serum sugar (mg /dl)	60.8^{c}	67^{b}	66.9^{b}	76.4^{a}	3.030	*	*
Serum urea N (mg /dl)	17.8^{c}	22.4^{a}	19.6^{b}	19.8^{b}	2.831	*	NS
Serum uric acid (mg /dl)	0.66^{b}	0.83^{a}	0541^{c}	0.74^{a}	0.302	*	*

* $P< 0.05$, NS, not significant

Means within rows with different superscripts are significantly different ($P<0.05$, $P<0.01$).

Serum growth hormone concentration(GH) : All diets were associated with post-prandial increases in GH concentration (Figure.1).The highest level for GH concentration ,appeared during 0-3 h and 3-6 h after feeding for treated and untreated barley straw diets respectively ,then maintained at lower level of concentration during the second 12 h after feeding.

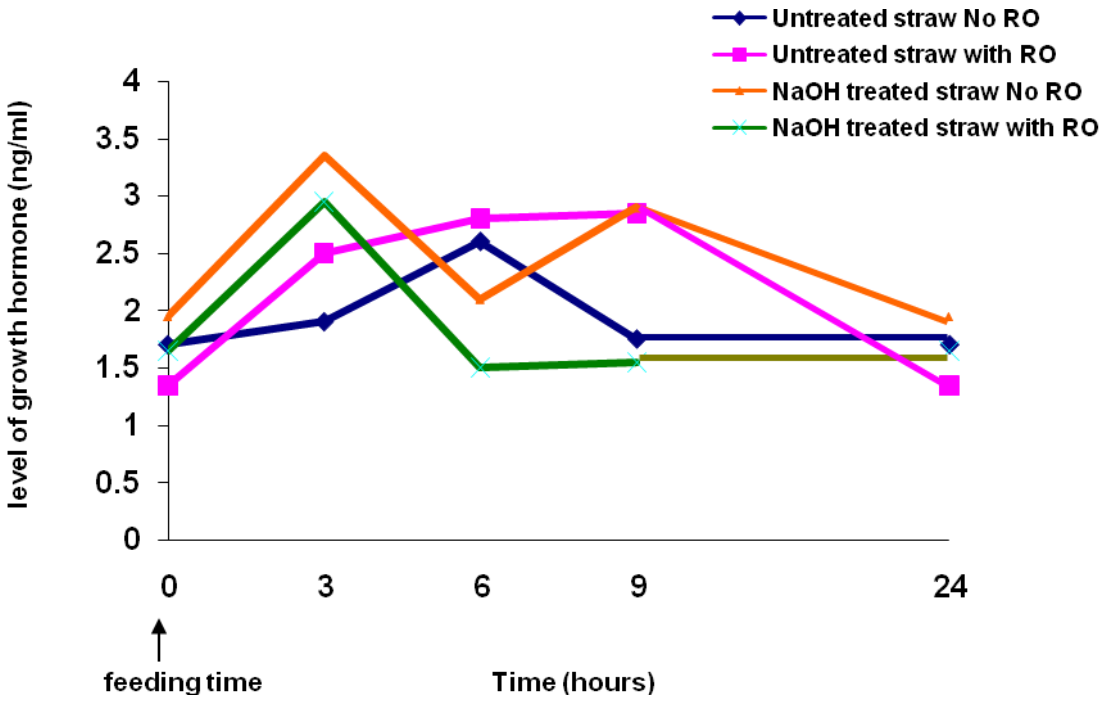

Figure 1. Growth hormone concentration as affected by Rosemary officinal fed with either NaOH- treated or untreated barley straw basal diets.

Serum urea nitrogen concentration (SUN) : All diets were associated with post- prandial decreases in SUN concentration during the 0-6 h post feeding (Figure. 2). The lowest mean values for SUN concentration appeared to be within 6-9 h after morning feeding; then slightly increased during the second 12 h post feeding.

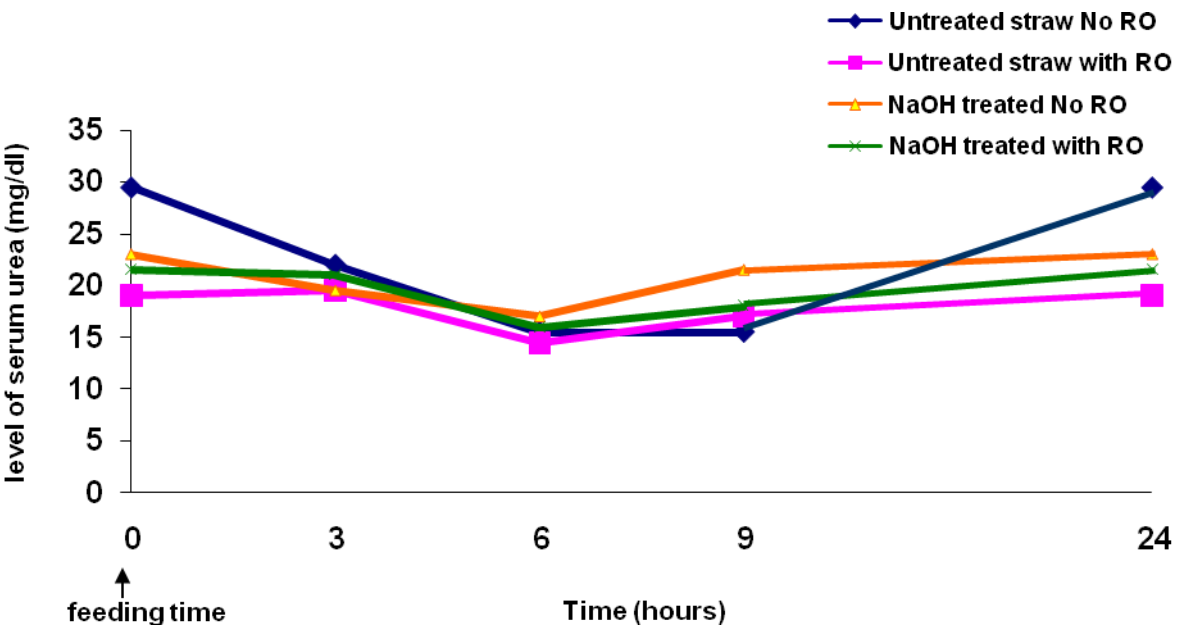

Figure 2. Serum urea nitrogen concentration as affected by Rosemary officinal fed with either NaOH- treated or untreated barley straw basal diets.

Serum uric acid concentration (SUA) : All diets were associated with post- prandial increases in SUA during the first 6 h after feeding (Figure. 3), except for lambs fed diet 1(0.52 mg/dl) which slightly decreased during the first 9 h after feeding, then rapidly increased during the second 12 h after feeding .The highest value for SUA concentration appeared to be within 2-4 h post morning feeding associated with lambs fed diet 3.

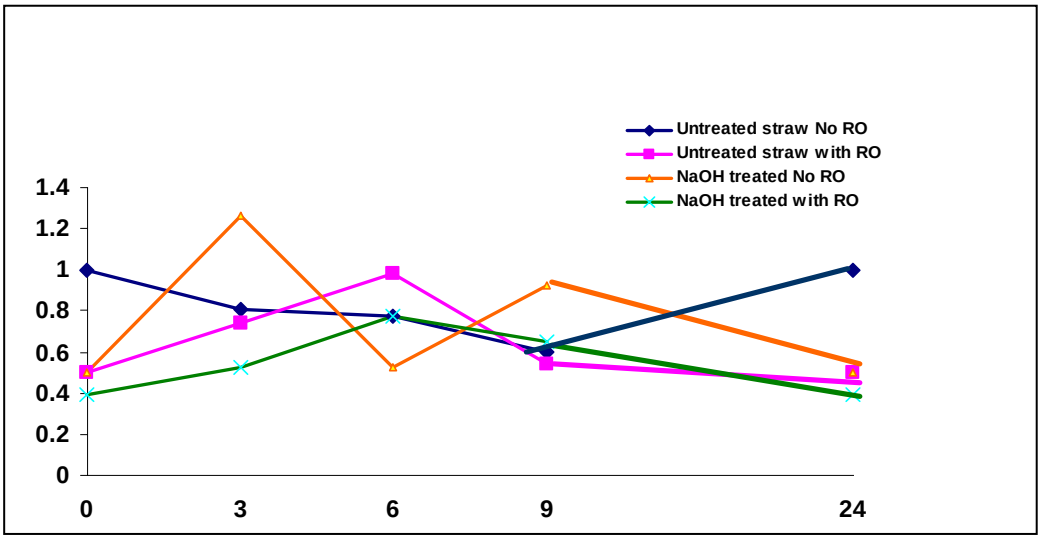

Figure 3 Serum uric acid concentration as affected by Rosemary officinal fed with either NaOH- treated or untreated barley straw basal diets.

Serum sugar concentration (SS) : All diets slightly increased SS concentration during the first 9 h after feeding, then slightly decreased to the maintained at lower concentration during the second 12 h after morning feeding (Fgure.4). Except for lambs fed diet 3, SS concentrations was declined during the first 3 h after feeding, then increased to reach a maximum concentration at 9 h after morning feeding.

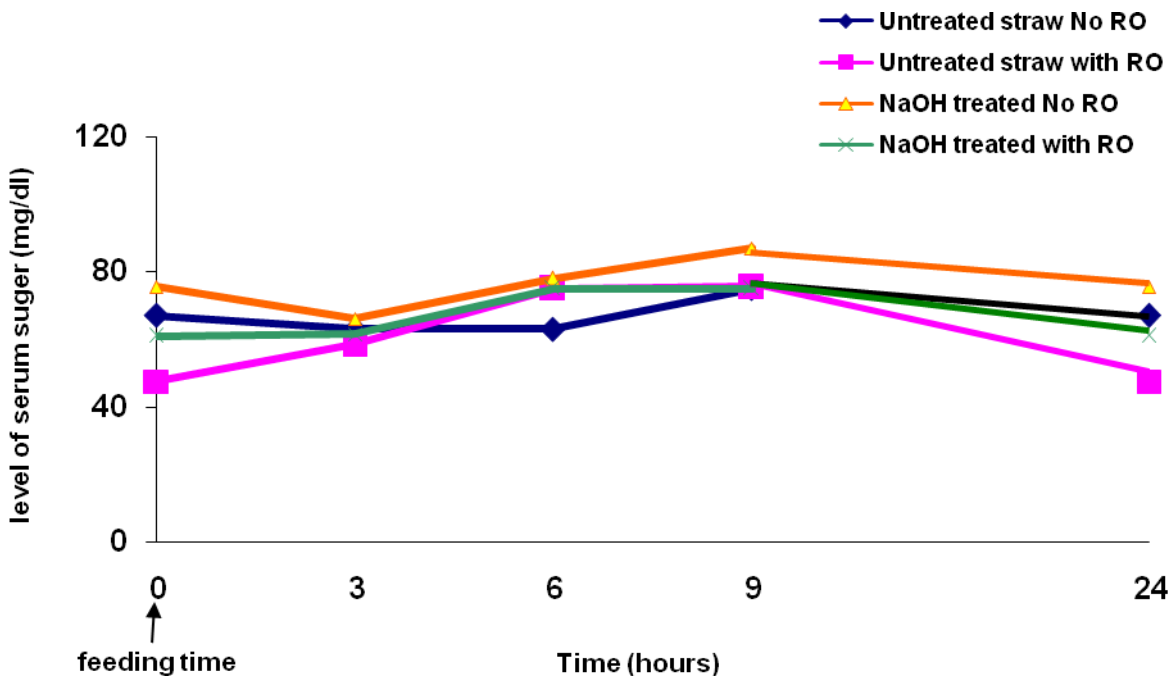

Figure 4. serum sugar concentration as affected by Rosemary officinal fed with either NaOH- treated or untreated barley straw basal diets.

DISCUSSION

No responses to RO supplementation in term of daily gain was associated with no changes in GH concentration . These results are disagreement with results reported by Mohamed et al..,(2005) , Youssif et al..,(1998) , El-Saadany et al.,.(2001) and Hassan, (2009) who obtained that the medicinal plants additives improved the body weight gain . Moreover, Hassan and Hassan, (2009a) found that karadi lambs fed concentrate diet supplemented with RO significantly increases GH and daily gain as compared with those fed diet without RO .While RO supplementation of lambs fed either treated or untreated straw were significantly increase SS as compared with those fed diet without RO. Similar observation was reported by Hassan and Hassan ,(2009a) . Lambs

fed untreated straw supplemented with RO significantly increases SUN as compared with those fed treated straw without RO. This result disagree with those reported by Hassan and Hassan, (2009abc) and Hassan et al.., (2009ab) ,that maximum response in live weight gain was associated with lower SUN concentration this might be indicate higher efficiency utilization of the nutrient available in the diets particularly those related to protein and energy . Hansen, (2003) reported that SUN level in excess of 18 to 20 mg/dl in cow can be associated with lower reproductive performance , higher feed costs, health problems , and poor production. Urea is produced in the liver from ammonia derived mainly from the breakdown of protein in the rumen and from normal daily metabolism of absorbed amino acids and body protein. If bacteria in the rumen cannot capture the ammonia and convert it to microbial protein, the excess ammonia is absorbed across the rumen wall. Excess ammonia circulating in blood can be toxic and the conversion of blood ammonia to urea is the way to prevent this toxicity. The body excretes blood urea in urine and milk. .Serum urea N has been related to efficiency of N use. As excessive protein or rumen degradable protein is consumed, SUN may increase (DAS, 2008).

Since chemical treatment is known to improved the OM digestibility and increase aerobic and an aerobic bacteria (Hassan and Mouhamed ,2009 and Hassan et al.; 2009ab) and in general improve microbial protein yield .So the hypothesis of this experiment was expected greater responses to RO when lambs fed NaoH-treated barley straw as compared with those fed untreated .

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العوامل المؤثرة على اضافة النباتات الطبيه في بعض صفات الدم في الحملان الكراديه .
١ - تأثير تبن الشعير المعامل وغير المعامل بالصودا الكاويه .

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الخلاصة

تم استخدام أربعة وعشرون حملا"كراديا" ذكراً بعمر 4 أشهر وبمتوسط وزن 2.25+22.3 كغم في حظائر مفرده لدراسة تأثير استخدام مستويين من أكليل ألجبل(0 و 7.5 غم /كغم ماده جافه) غذيت مع تبن الشعير المعامل أو غير المعامل بالصودا الكاويه في بعض صفات الدم .قسمت الحملان إلى أربعة مجاميع متساوية وتغذية على 4 علائق مختلفة. ألعليقه 1.لا تحتوى على أكليل الجبل (0 غم /كغم ماده جافه) + تبن غير معامل .العليقه 2 . تحتوي على أكليل الجبل (7.5 غم/كغم ماده جافه) + تبن غير معامل . ألعليقه 3 . لا تحتوى على أكليل الجبل (0 غم /كغم ماده جافه) + تبن معامل بالصودا الكاويه .العليقه 4 . تحتوي على أكليل الجبل (7.5 غم/كغم ماده جافه) + تبن معامل بالصودا الكاويه . أخذت نماذج من الدم لتقدير هرمون النمو ، سكر الدم ، نتروجين يوريا الدم وبلازما حامض اليوريك . إن الحملان المغذا ة على اكليل الجبل أظهرت زيادة معنوية ($P<0.05$) في سكر الدم ، نتروجين اليوريا وحامض اليوريك مقارنة بغير المغذاة على اكليل الجبل مع عدم وجود تأثير معنوي في هرمون النمو.كما أظهرت النتائج إن الحملان المغذات على التبن المعامل أدت إلى زيادة معنوية ($P<0.05$) في سكر الدم وانخفاض معنوي ($P<0.05$) في حامض اليوريك مقارنتاً مع تلك المغذات على التبن غير المعامل .كل العلائق المغذات أظهرت زيادة في تركيز هرمون النمو، سكر الدم و وحامض اليوريك خلال 0-6 ساعة بعد التغذية وانخفاض في تركيز نتروجين يوريا الدم .

*مفاتح الكلمات : نباتات طبية،تبن معامل بالقاعدة وقياسات الدم.

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* البحث مستل من أطروحة دكتوراه للباحث الثاني