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

3- Effect of different levels of rumen undegradable nitrogen

Shaker A. Hassan* and Khasraw M . Hassan**

***Dept. of Anim. Res. College of Agric. Univ. of Baghdad, Iraq .**

**** Dept. of Anim. Prod.. College of Agric. Univ. of Sulaimani, Iraq .**

ABSTRACT

The effect of two levels of rumen undegradable nitrogen (7 and 10 g UDN / kg DM) fed with two levels of Nigella sativa (0 and 7.5 g NS / kg DM) on the diurnal patterns of plasma growth hormone (GH) , serum sugar (SS) , serum uric acid (SUA)serum urea nitrogen (SUN) concentration during 24 h post morning feeding were investigated . Twenty four individual Karadi male lambs were used .They were weighing approximately 34+1.22 kg and 7 months of age. The diets were formulated to be given a 40 parts NaoH-treated barley straw DM to 60 parts concentrate DM. All diets were associated with post- prandial decreases in SS, GH, SUA and SUN concentration during the first 6 h post morning feeding . Lambs fed high level of UDN significantly reduced blood sugar (BS) and increase blood urea nitrogen (SUN) as compared with those fed low level of UDN. Whereas ,level of UDN had no effect on GH and SUA. The results also indicated that the lambs fed diets supplemented with NS significantly increased SS, GH and SUA and reduced SUN as compared with those fed diets without NS .

***Key word*:** Rumen undegradable nitrogen ,Blood parameters **,**Lambs**.**

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INTRODUCTION

In the specific case of lambs weighing more than 30 kg , ARC, (1984) has proposed that the nitrogen requirement may , in most instances, be met by microbial protein only, and thus, only RDN is required in the diet. However, protein supplementation and natural feed additives are very important material that can improve growth rate, utilization feed efficiency and carcass characteristics of growing lambs (Hassan and Bryant, 1985 Hassan and Bryant, 1986 ; Al-Jassim et al., 1991; Hassan et al., 1991., Hassan, 2005; Mahrous and Abuo Ammou,2005 ; Mohamed et al.,2005 ;Saarela et al.,2000 ; Hassan , 2009; Hassan et al.,2009 ; Hassan et al.,2009abc ; Hassan & Hassan, 2009abc). This improvement was associated with changes in some blood parameters (Al-Raheem et. al., 1995; Al-Raheem et. al., 1996; Hassan and Muhamad, 2009,Hassan and Hassan,2009d;Hassan et al.,2009c). Determination of serum urea nitrogen (SUN) analyses can be used as a signal red to point out potential problem in the feeding program. The SUN level in excess of 18 to 20 mg/dl can be associated with lower reproductive performance, higher feed costs, health problems, and poor production (Hansen, 2003). Therefore, the observed responses to medicinal plants need more explanation and some blood parameters may need to explain the beneficial of *Nigella stiva* in the diet. The first part of this study (Hassan and Hassan 2009d) was conducted to investigate the effect of using NS with increasing levels of UDN on voluntary feed intake ,live weight gain and feed conversion ratio .While this part was conducted to study the effect of using NS with increasing levels of UDN on the diurnal patterns of serum sugar (SS) , plasma growth hormone (GH) , serum uric acid (SUA) and serum urea nitrogen (SUN) 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 ,2009d) until 9 weeks of experiment. After this period and within 2-3 days before ending the feeding trail , blood samples were taken from the experimental animals to determine plasma SS, GH ,SUA and SUN 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 SS, GH ,SUA and SUN 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.

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. The treatment was partitioned into main effects and their interaction.

Table 1. *Formulation and chemical composition of experimental diets.*

Level of UDN (g/kg DM)	Low UDN		High UDN	
Level of Nigella sativa (NS)	No NS	With NS	No NS	With NS
Diet no.	1	2	3	4
Ingredients (g / kg DM)				
NaOH-treated straw*	400	400	400	400
Yellow corn	400	392.5	360	352.5
Soybean meal(SBM)	175	175	130	130
Formaldehyde-treated SBM	-	-	85	85
Nigella sativa (NS)**	-	7.5	-	7.5
Urea	5	5	5	5
Min. and vit. Mixture	20	20	20	20
Chemical composition (g/kg DM)				
DM g/kg fresh	919.5	919.4	918.3	918.2
Total nitrogen (TN)	23.87	23.75	26.00	26.00
RDN g / MJ of ME	1.4	1.4	1.4	1.4
Rumen undegradable N(UDN)	7.17	7.12	9.78	9.84
Metabolizable energy (MJ)***	11.76	11.66	11.78	11.68
Neutral detergent fiber (NDF)	310.98	310	311.54	311.54
Acid detergent fiber (ADF)	215.92	215.93	219.04	219.04
Hemicellulose	95.06	95.06	92.5	92.5
Cellulose	153.5	153.6	154.35	154.35
Lignin	62.42	62.42	64.69	64.69

* NaoH-treated barley straw containing (DM basis): 87% OM , 0.59 % N, 8% NDF, 5% ADF, and 45% organic matter digestibility ,OMD

** NS containing (DM basis): 91.3% OM , 4.1 % N, 6.7% CF,11.5%EE,43.3% NFE

***ME (MJ/ kg DM) = 0.012 CP +0.031 EE+0.005 CF +0.014 NFE (MAFF, 975).

RESULTS

The mean values of daily intake, initial and final live weight ,daily gain and serum concentration of SS, GH ,SUA and SUN of lamb fed the experimental diets are presented in table 2. There were no differences in daily intake of DM ,ME and RDN among treatments. The UDN and daily intake of total N were followed the intended treatments composition ($P<0.01$) . SS and SUN were significantly ($p<0.05$) affected by the level of UDN .Lambs fed high level of UDN showed a significant ($p<0.05$) reduction in SS and SUN increased ($p<0.05$) as compared with those fed low level of UDN. However, UDN level had no effect on SUA and GH. Lambs fed diets supplemented with NS either containing low or high level of UDN had a significant ($p<0.05$) increase in SS,SUA and GH .In contrast NS supplementation caused significant ($p<0.05$) reduction in SUN of Lambs fed low or high level of UDN as compared with those fed diets with out NS . The interaction between level of UDN and NS for all parameters was not significant ($p>0.05$).

The diurnal patterns of SS, GH ,SUA and SUN concentration during 24 h post morning feeding are shown in Figure 1, 2, 3 and 4 respectively.

Table 2. *Daily nutrients intake , Live weight gain and blood parameters concentration .*

Level of UDN (LUDN)	Low UDN		High UDN		Se of means and significance of effects			
Level of NS (LNS)	No NS	With NS	No NS	With NS				LRDN x
Diet no.	1	2	3	4	SEM	LUDN	LNS	LNS
Dry matter (g/day)	1194	1194	1203	1228	11.02	NS	NS	NS
Metabolizable energy (MJ / day)	13.93	13.9	13.6	14.3	0.127	NS	NS	NS
RDN (g / MJ of ME)	1.5	1.5	1.5	1.5	0.009	NS	NS	NS
UDN (g/day)	9.14	9.27	13.09	13.5	0.334	**	NS	NS
Initial live weight (LW,Kg)	34.0	34.02	34.05	34.01	1.22	NS	NS	NS
Final LW (Kg)	47.65	47.05	45.75	48.76	1.34	NS	*	NS
Daily LW gain (LWG/g)	217	207	185	234	7.67	NS	*	*
blood parameters concentration								
SS (mg / dL)	64	77	56	70	2.73	*	*	NS
GH (ng/ ml)	2.23	3.07	2.72	3.21	0.136	NS	*	NS
SUA (mg / dL)	0.206	0.565	0.321	0.428	0.059	NS	*	NS
SUN (mg / dL)	40	36	45	41	1.38	*	*	NS

* P< 0.05 , NS ,not significant

Serum sugar concentration (SS **):** SS concentration of lambs fed high UDN diets with NS (Diet 4) remained relatively unchanged throughout the 24 h period (Figure. 1).While, lambs fed high UDN diet without NS was associated with post-prandial increase and achieved highest mean values of SS within 6-9 h after feeding, then, decreased rapidly to about (43.5 mg/dl) during the second 12 h after feeding. In contrast, SS concentration of lambs fed low UDN diets with or without NS was identical; both diets were reduced SS concentration following the first 6 h after feeding and then increased rapidly during the last 18 h after feeding**.**

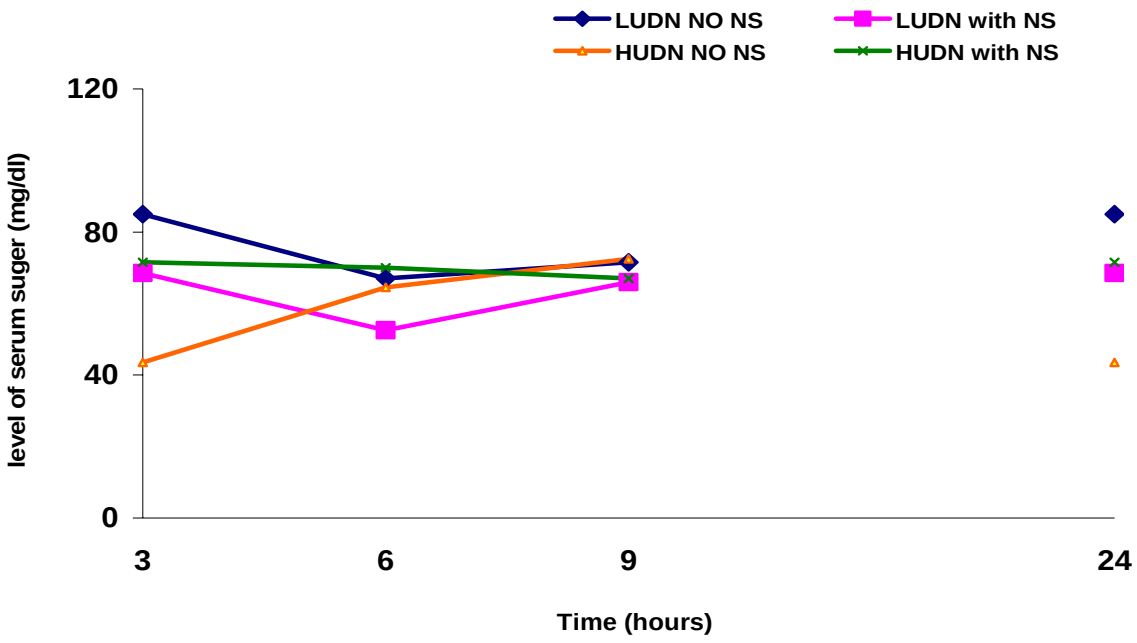

Figure 1.*The diurnal pattern of SS concentration as affected by increasing levels of UDN and NS during 24 hours post morning feeding .*

Serum growth hormone concentration (GH): All diets were associated with post-prandinal decreases for GH concentration within 0-9 h after feeding then increased rapidly during the second 12 h after feeding except the lambs fed diet 3 (high UDN without NS) was rapidly increased during 0-9 h after feeding and achieved highest level of GH at 9 h after feeding, then dropped to lower value during the second 12 h following feeding (figure .2).

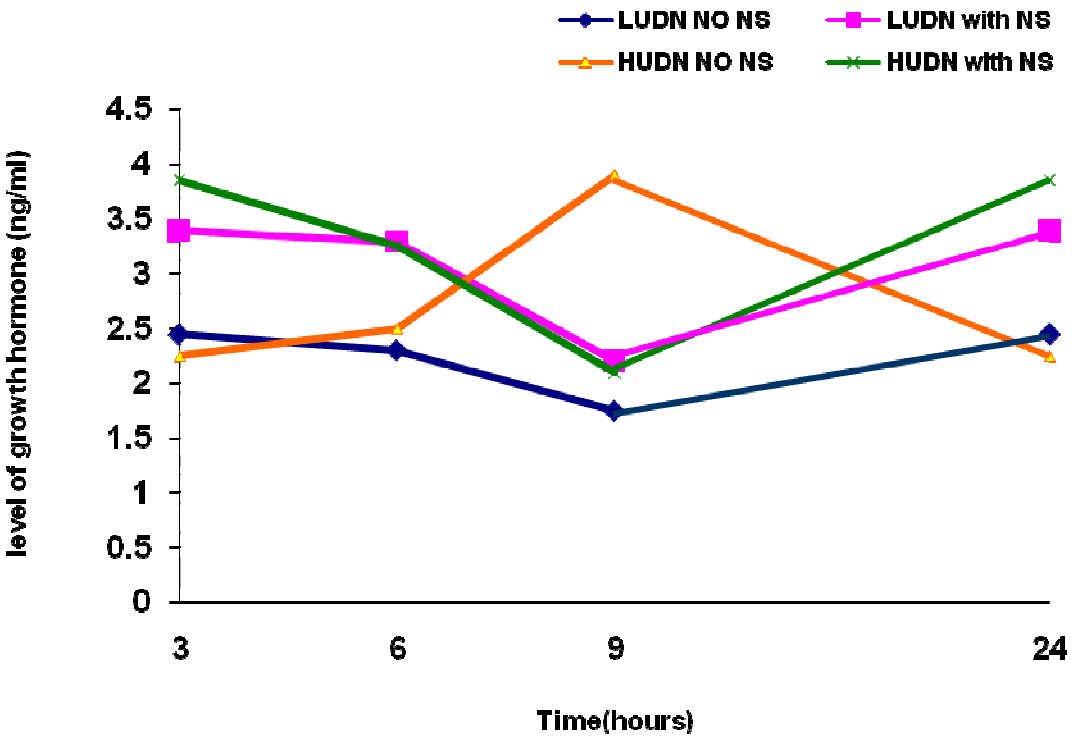

Figure 2.*The diurnal pattern of GH concentration as affected by increasing levels of UDN and NS during 24 hours post morning feeding.*

Serum uric acid concentration (SUA**):** All diets were associated with post-prandial decreases in SUA concentration .The lowest mean values for SUA concentration appeared to be within 6-9 h after feeding ,then increased rapidly and maintain at (0.55 mg/dl) level during the second 12 h after feeding .Except, the lambs fed diet 2 (low UDN with NS) which showed slightly increase in USA concentration within 6 -9h after feeding, then decreased slightly to maintain at (0.16 mg /dI) concentration during the 12 h after feeding (Figure. 3).

Figure 3. *The diurnal pattern of SUA concentration as affected by increasing levels of UDN and NS during 24 h post morning feeding.*

Serum urea nitrogen concentration (SUN**):** All diets were associated with post-prandial decreases in SUN concentration (Figure. 4).The lowest values for SUN concentration appeared with those lambs fed diets with NS and within 6-9 h after feeding .Except , the lambs fed diet 1 (low UDN without NS) showed an increase level of SUN during the first 6 h after feeding. However, all diets had increasing SUN concentration during the second 12 h after feeding.

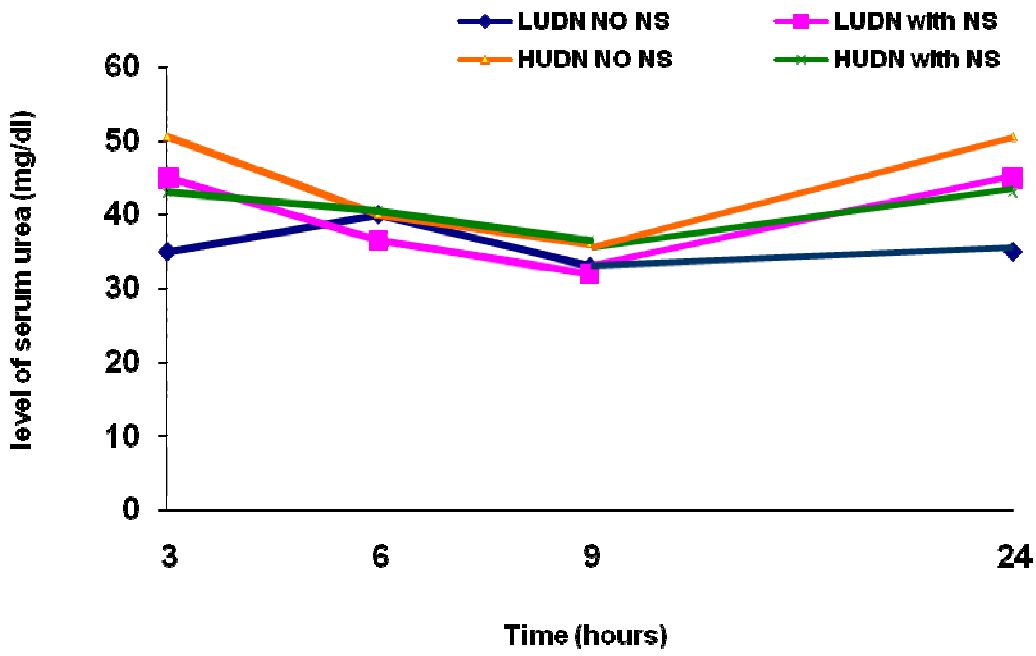

Figure 4. *The diurnal pattern of SUN concentration as affected by increasing levels of UDN and NS during 24 h post feeding.*

DISCUSSION

One explanation for the responses to UDN supplementation with present of NS, might be related to NS which may be reduce the rate of nutrient passage in elementary tract and give more time for utilization UDN amino acids and absorption of nutrients (Wu et. al., 2005; Shim, 2005) .The lower SUN associated with higher response to UDN for those lambs fed diets supplemented with NS was sport the above hypothesis since , SUN concentration can be used as a signal or indication to point out potential problem in feeding program . 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 (Hansen ,2003) .Similar improvement in protein utilization and

reduction in SUN was associated with NS and rosemary officinal additives reported by Hassan and Hassan, (2009a) and Hassan et al.,(2009c).

Alternative explanation cited by Mohamed et al., (2005) and Hassan and Hassan, (2009a) , may be that feed additives such as medicinal plants used as alternative growth promoters, since Lambs fed diets supplemented with NS either containing low or high level of UDN significantly increased SS,UAS and GH such diets include NS ,has some properties as antiseptic, antibacterial activities against microorganism treatment ,of gastro-intestinal complaints and tonic.Moreover ,Mericli ,(1990) recorded that Matricaria chamamilla has anti-inflammatory ,antiseptic and spasnolytic activities against microorganisms treatment of gesture-intestinal complaints and tonic. Hanafy and Hatem, (1997) reported that NS seeds extract inhibited gram-positive and gram- negative bacteria .Ferdous et al.,(1992) indicated that the oil of NS seeds have therapeutic potential for the treatment of diarrhea caused by 37 isolates of shigella species and 10 strain of V. cholera and E .coli.

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العوامل المؤثرة على اضافة النباتات الطبيه في بعض صفات الدم في الحملان الكراديه
3- تاثير مستويات مختلفه من النتروجين غير المتحلل في الكرش .

شاكر عبد الأمير حسن* خسرو محي الدين حسن**

***قسم الثروة الحيوانية - كلية الزراعة - جامعة بغداد- بغداد- العراق .**
**** قسم الإنتاج الحيواني - كلية الزراعة – جامعة السليمانية- السليمانية- العراق .**

الخلاصة

تمت دراسة تاثير مستويين من النتروجين غير المتحلل في الكرش (7و10 غم/كغم مادة جافة) ومستويين من الحبة السوداء (0 و7.5 غم/كغم مادة جافة) في معدل الزيادة الوزنية اليومية وبعض صفات الدم في 2x2 تجربة عاملية. تم استخدام 24 حمل عواسي ذكر في حضائر مفردة وبوزن تقريبي 34 ± 1.22كغم وبعمر 7 اشهر. تم اختيار حملين عشوائيا من كل معاملة لتقدير بعض قياسات الدم. اظهرت النتائج عدم وجود اختلافات معنوية في كمية المتناول من المادة الجافة، الطاقة المتايضة بين المعاملات. ان الحملان المغذاة على مستوى عالي من النتروجين غير المتحلل في الكرش اظهرت انخفاضا معنويا ($P<0.05$) في كل من السكر ونتروجين يوريا سيرم الدم مقارنة بالحملان المغذاة على مستوى واطئ من النتروجين غير المتحلل في الكرش. في حين لم يؤثر مستوى نتروجين غير المتحلل في الكرش على مستوى حامض اليوريك وهرمون النمو. اظهرت نتائج أن التغذية على الحبة السوداء زيادة معنوية ($P<0.05$) في تركيز كلا من السكر و حامض اليوريك بلازما الدم وهرمون النمو يقابلها انخفاض معنوي في نتروجين اليوريا مقارنة بالحملان المغذاة التي لم تحتوي عليقتها على الحبة السوداء.