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

**2**-Effect of different levels of rumen degradable nitrogen

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ABSTRACT

The effect of three levels of rumen degradable nitrogen (1.0 , 1.3 and 1.6 g RDN / MJ of ME) 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 urea nitrogen concentration (SUN) and serum uric acid (SUA). concentration during 24 h post morning feeding were investigated .Twenty four individual Karadi male lambs were used .They were weighing approximately 30 kg live weight and 6-7 months old . The diets were formulated to be given a 40 parts NaOH-treated barley straw DM to 60 parts concentrate DM. GH,SUN and SUA concentration decreased and SS concentration increased in all lambs fed the experimental diets during the first 6h post morning feeding **.**There was no significant effect of RDN and NS additives on growth hormone (GH) and serum sugar (SS) ;However ,GH and SS of lambs fed 1.3 g RDN/MJ of ME either with or without NS was slightly higher ($p>0.05$) than those fed other treatments . Serum Urea Nitrogen (SUN) was significantly ($p<0.01$) affected by the levels of RDN and NS supplementation .Lamb fed increasing levels of RDN was significantly ($p<0.01$) increase SUN, while NS supplementation significantly ($p<0.01$) reduced SUN and significantly ($p<0.05$) increased SUA concentration .

***Key word ,*** rumen degradable protein ,*nigella sativa* ,gain and blood parameter**s.**

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## INTRODUCTION

Its well understood , that the protein requirement for ruminant animals is a combination of the need of rumen micro-organism (Rumen degradable nitrogen ,RDN) and of the host animal (ARC.1984 , NRC,2001) .In the specific case of lambs weighing in excess of 30 kg , ARC (1984) has proposed that the nitrogen requirement may , in most instances, be met by microbial protein only, and thus, that only RDN is required in the diet .However , Hassan and Al-sultan (1995ab) indicated that frequency of feeding significantly increase responses to dietary supplement of RDN above ARC (1984 ) recommendation . These responses was associated with changes in some blood parameters such as insulin and growth hormone (Al-Raheem et. al; 1995 and 1996 ), serum urea and uric acid (Hassan and Muhamad 2009, Hassan and Ariff, 2009) ,total protein and serum sugar (Hassan et. al., 2009ab). A positive relationship has been found between serum urea nitrogen(SUN) and urinary nitrogen excretion so that monitoring SUN can help reduce excessive N excretion. The key factor is providing adequate rumen available carbohydrates to provide the energy for the rumen microbes to convert ammonia into microbial protein. (DAS, 2008) . 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. Therefore, changes in some blood parameters may possibly help to explain the beneficial of additives feed in the diet . The first part of this study (Hassan and Hassan ,2009a ) was conducted to investigate the effect of using NS with increasing levels of RDN on daily intake ,live weight gain and feed conversion ratio .While this part was conducted to study the effect of NS on the diurnal patterns of GH, SUN, SUA and SS, 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 ,2009) until 81 days 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 growth hormone(GH) , serum sugar(SS) , serum urea nitrogen concentration(SUN) and serum uric acid (SUA). 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 growth hormone ,sugar , serum urea nitrogen and serum uric acid 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.

***Table 1.****Formulation and chemical composition of experimental diets (kg DM) .*

| Level of Nigell Sativa (LNS) | Without NS | | | With NS | | |
|---|---|---|---|---|---|---|
| Level of RDN (g / MJ ME) | 1 | 1.3 | 1.6 | 1 | 1.3 | 1.6 |
| Diet no. | 1 | 2 | 3 | 4 | 5 | 6 |
| Ingredients ( g / kg DM ) | | | | | | |
| NaoH-treated barley straw * | 400 | 400 | 400 | 400 | 400 | 400 |
| Yellow corn | 460 | 420 | 355 | 452.5 | 412.5 | 347.5 |
| Soybean meal(SBM) | 75 | 135 | 220 | 75 | 135 | 220 |
| Formaldehyde-treated SBM | 40 | 20 | - | 40 | 20 | - |
| Nigella Sativa ** | - | - | - | 7.5 | 7.5 | 7.5 |
| Urea | 5 | 5 | 5 | 5 | 5 | 5 |
| Min. and vit. Mixture | 20 | 20 | 20 | 20 | 20 | 20 |
| Chemical composition) | | | | | | |
| TN | 19.8 | 23.7 | 27.94 | 19.9 | 23.89 | 28.04 |
| RDN | 12.7 | 16.6 | 20.54 | 12.7 | 16.59 | 20.54 |
| RDN g / MJ of ME | 1 | 1.3 | 1.6 | 1 | 1.3 | 1.6 |
| UDN | 7.1 | 7.2 | 7.0 | 7.2 | 7.3 | 7.1 |
| ME (MJ) *** | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 |
| NDF | 310 | 311 | 312 | 310 | 311 | 308 |
| ADF | 211 | 214 | 219 | 211 | 214 | 219 |
| Hemillulose | 98.9 | 96.3 | 92.2 | 98.9 | 96.3 | 92.2 |
| Cellulose | .152 | 153 | 154 | 152 | 153 | 154 |
| Lignin | 59.0 | 61.2 | 64.9 | 59.0 | 61.3 | 64.9 |

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

** Nigella Sativa 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, 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. The treatment was partitioned into main effects and their interaction

RESULTS AND DISCUSSION

The mean values of initial and final live weight ,daily intake,daily gain , GH , SUN , SUA and SS of lamb fed the experimental diets are presented in table 2 . The RDN:ME ratio and daily intake of total N were followed the intended treatments composition . live weight gain was significantly ($P<0.01$) improved with those lambs fed diets supplemented with NS ( Diets 4,5 and 6 ) as compared with those fed diets with out NS .

There were no significant effect of RDN and NS additives on GH and SS ;While ,GH and SS of lambs fed 1.3 g RDN/MJ of ME either with or without NS was slightly higher ($p>0.05$) than those fed other treatments .

Urea Nitrogen was significantly ($p<0.01$) affected by the levels of RDN and NS supplementation .Lambs fed high levels of RDN had significantly ($p<0.01$) higher BUN, while NS additives reduced SUN ($p<0.01$). Level of RDN and NS had a significant effect ($p<0.05$) on SUA. Increasing levels of RDN without NS reduced SUA significantly ($p<0.05$), but for those lambs fed RDN with NS had significant ($p<0.05$) increase SUA.

The diurnal patterns of GH, SS, SUN and SUA concentration are shown in figures 1, 2, 3 and 4 respectively.

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

| Level of Nigell sativa (LNS) | Without NS | | | With NS | | | Se of means and significance of effects | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RDN: ME ratio (g / MJ of ME) | 1 | 1.3 | 1.6 | 1 | 1.3 | 1.6 | | | | Interaction |
| Diet no. | 1 | 2 | 3 | 4 | 5 | 6 | SEM | LNS | LRDN | LNSxLRDN |
| Initial live weight (Lw , Kg) | 33.83 | 33.93 | 33.95 | 33.75 | 33.95 | 33.975 | 0.375 | NS | NS | NS |
| Final Lw (Kg) | 44.6 | 46.2 | 44.9 | 46.65 | 46.75 | 47.75 | 0.451 | * | NS | NS |
| DM (g/day) | 1209 | 1195 | 1215 | 1190 | 1215 | 1217 | 28.1 | NS | NS | NS |
| TN(g/day) | 23.98 | 28.37 | 33.94 | 23.74 | 29.0 | 33.9 | 1.180 | NS | ** | NS |
| ME (MJ / day) | 15.35 | 15.06 | 15.18 | 15.12 | 15.3 | 15.13 | 0.374 | NS | NS | NS |
| RDN (g / MJ of ME ) | 1 | 1.3 | 1.6 | 1 | 1.3 | 1.6 | 0.012 | NS | ** | NS |
| UDN (g/day) | 8.58 | 8.54 | 8.99 | 8.57 | 8.85 | 9.04 | 0.220 | NS | NS | NS |
| Live weight gain (g/day) | 171 | 195 | 174 | 205 | 203 | 211 | 8.03 | ** | NS | NS |
| blood parameters concentration | | | | | | | | | | |
| Serum growth hormone (ng / ml) | 2.96 | 3.13 | 2.65 | 2.86 | 3.3 | 2.91 | 0.120 | NS | NS | NS |
| Serum sugar (mg / dL ) | 58.87 | 68.4 | 55.6 | 63.25 | 58.9 | 70.75 | 1.810 | NS | NS | NS |
| Serum urea nitrogen (mg//dL) | 38.0 | 41.1 | 47.7 | 31.8 | 33.3 | 37.6 | 1.296 | ** | ** | NS |
| Serum uric acid (mg / dL ) | 0.68 | 0.35 | 0.32 | 0.39 | 0.55 | 0.61 | 0.037 | * | NS | NS |

** P<0.01 , NS , not significant

**growth hormone concentration(GH) :**All diets were associated with post-prandial decreases in GH concentration during the first 6 h after feeding (figure.1); except that lambs fed 1.3 RDN/MJ of ME With NS showed an increase in GH during the first 6 h after feeding ,then rapidly fluctuated to reach a lower concentration within 6-9 h after feeding and maintain at this level during the second 12 h after feeding .However, higher reduction in GH concentration was associated with lambs fed diet 3 and 4 during 6 and 9 h after feeding .

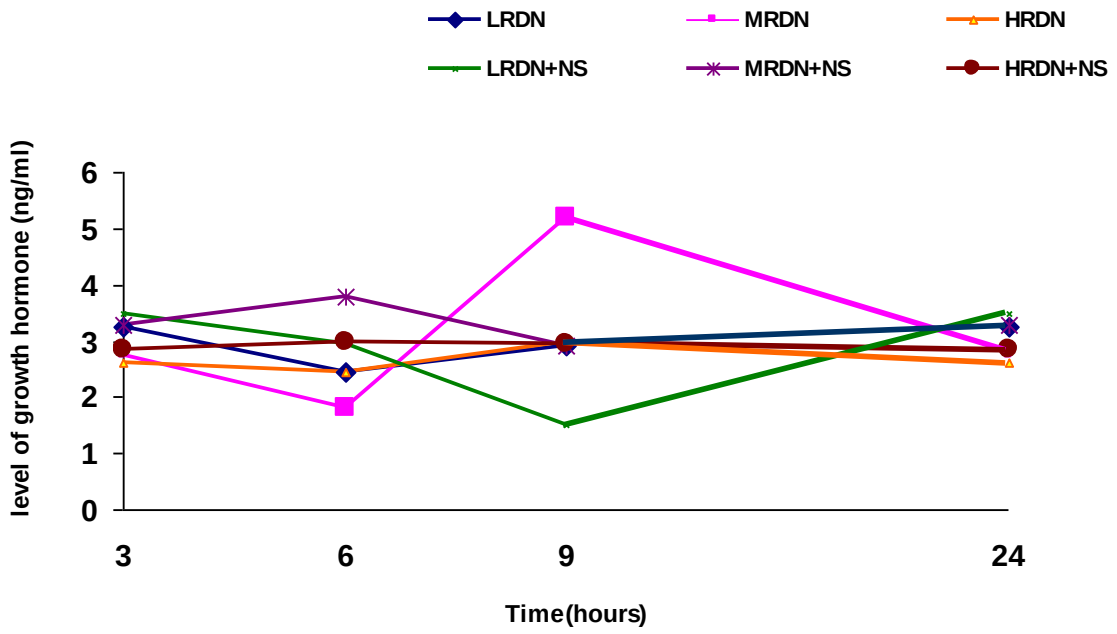


***Figure 1****.The diurnal pattern of GH concentration as affected by increasing levels of RDN and NS during 24 hours after feeding.*

**Serum sugar concentration (SS):** All diets were associated with pos-prandial increases in SS concentration .The highest mean values for SS concentration appeared to be within 6-9 h after feeding (figure.2).SS concentration of diet 2(1.3 RDN/MJ of ME without NS) increased to reach a peak concentration within 6-9 h after feeding, then decreased rapidly during the second 15 h after feeding.

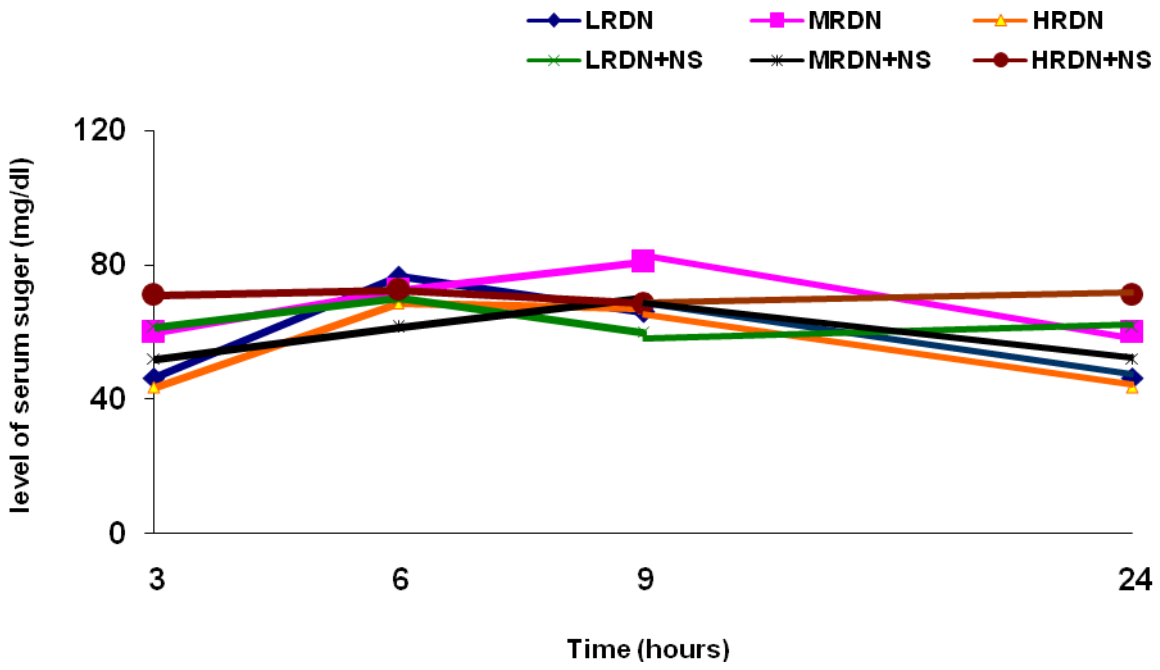


*Figure 2. The diurnal pattern of SS concentration as affected by increasing levels of RDN and NS during 24 hours after feeding.*

**Serum urea nitrogen concentration (SUN):** SUN concentration decreased in all lambs fed the experimental diets during the first 6h after feeding (figure.3). The highest mean values of SUN concentration appeared within 6 h after feeding in lambs fed diet 2 (1.3 RDN without NS) ;except the lambs fed diet 6 (1.6 RDN/MJ of ME with NS) which showed decrease in SUN concentration during the first 9 h after feeding . All diets were associated with rapidly decreases in SUN concentration within 6-9 h after feeding; except the lambs fed diet 3.maintain increases in SUN concentration during the 9 h after feeding, then decreased slightly during the last 15 h after feeding. However, all diets except diet 3 were rapidly increased to maintain concentration (34 mg/dl) during the second 12 h after feeding.

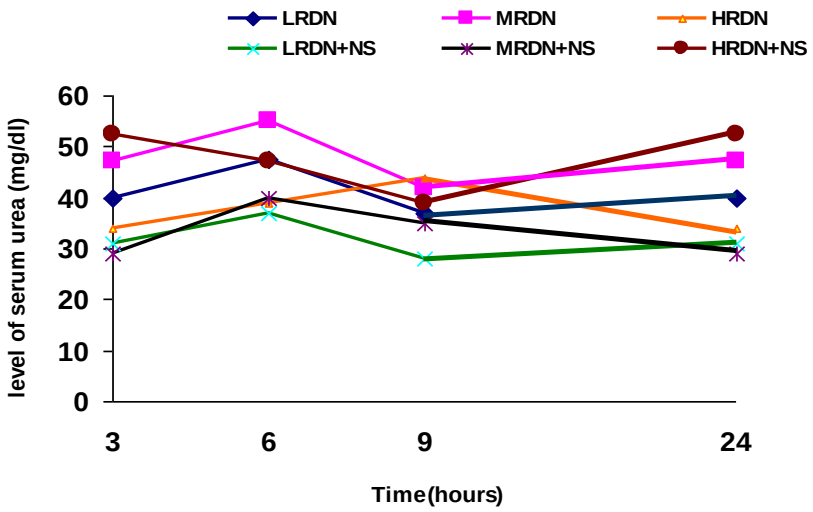


***Figure 3****.The diurnal pattern of SUN concentration as affected by increasing levels of RDN and NS during 24 h post morning feeding.*

**Serum uric acid concentration(SUA )**: SUA concentration decreased in all lambs fed the experimental diets during the first 9 h after feeding (figure.4).The lower mean values for SUA concentration were found in lamb fed diets 2 and 6 during the 9 h after feeding . However, all lambs were showed rapid increase in SUA concentration during the last 12 h after feeding.

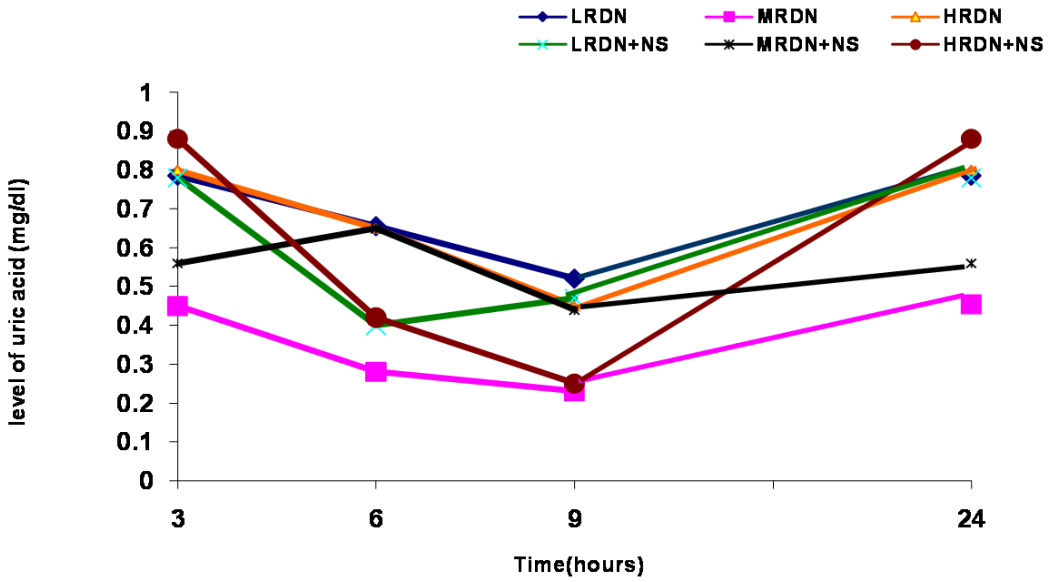


***Figure 4****. The diurnal pattern of SUA concentration as affected by increasing levels of RDN and NS during 24 h post morning feeding .*

**Discussion**

Positive responses to NS might be related to reduce the rate of nutrient passage in elementary tract and give more time for utilization and absorption of nutrients (Wu et. al., 2005, Shim, 2005).The lower concentration of SUN associated with higher responses agree with the above hypothesis. Similar results was reported by Hassan et al., (2009ab) .Urea is produced in the liver from ammonia derived mainly from the breakdown of rumen degradable 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) . While no significant effect of RDN and NS additives on GH and SS were shown ,these results disagree with those reported by Hassan and Hassan, (2009b)who found that Awassi lambs fed concentrate diet supplemented with rosemary officinal (RO) significantly increases GH 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 without RO (Hassan and Hassan, 2009c). 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. Increasing levels of RDN without NS reduced SUA significantly, but for those lambs fed RDN with NS had significant increase SUA . Recently, Hassan and Hassan , (2009b)found that, feed additives supplementation (NS, RO and probiotic) were significantly reduce SUA as compared with those lambs fed control diet.

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

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**الخلاصة**

أستخدم أربعة و عشرون حملا" كراديا " بعمر 6-7 اشهروبمتوسط وزن 30كغم وضعت في حظائر مفرده لدراسة تأثير استخدام ثلأثة مستويات من النتروجين المتحلل في الكرش( 1 ، 1.3 و1.6 غم/ميكاجول طاقه متأيضه) و مستويين من الحبه السوداء (0 و 7.5 غم /كغم ماده جافه) في معدل النمو وبعض صفات الدم .قسمت الحم لان الى 6 مجاميع متساويه وغذية على 6 عlائق مختلفه مكونه من 60 %علف مركز و 40 % تبن معامل بالصوده الكاويه . أخذت نماذج من الدم لتقدير هرمون النمو ، سكر الدم ، نتروجين يوريا الدم وب لازما حامض اليوريك خلال ألاسبوع ألاخير من التجربه ان زيادة مستوى النتروجين المتحلل واضافة الحبه السوداء لم تظهر تأثيراً معنوياً على هرمون النمو وسكر الدم ، مع ذلك فأن الحملان المغذاة على مستوى 1.3 غم نتروجين متحلل / ميكاجول طاقه متأيضه اظهرت زيادة غير معنوية في هرمون النمو وسكر الدم مقارنةً مع المعاملات الاخرى . كما اظهرت النتائج ان زيادة مستوى النتروجين المتحلل في العليقة ادى الى زيادة معنوية ( $p<0.01$) في مستوى يوريا الدم . في حين ان اضافة الحبة السوداء ادت الى انخفاض معنوي ($p<0.01$) في مستوى يوريا الدم.