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Effect of use vitamin E and Zn on seminal plasma enzymes and their effect on trace minerals of shami male Goat

Zeaid Amad Hamid Taqi Zeny

Department of Animal production - Faculty of Agriculture - University of Kufa – Republic of Iraq

zaide.zainy@uokufa.edu

Abstract

The studay was designed to investigated the efeect of Vitamin E and Zn are two of the important feed elements that affect on semen quality and reduce the free radical or poor sperm quality .

Nine shami male goats of similar age (2.5 year) and body weight 37 kg were divided randomly into three groups each of three 1 st first group T1 serves as a control second group T2 given vitamin E 200 IU /Animal/ week orally and third group T3 given Zn 75 mg/Animal/ week orally for 45 days. The semen was collected every15days (15,30,45) and the following parameter was measured in semen plasma AST,ALT and Fructose, Na^+, k^+, Zn. The result showed a significant increased (p_>0.05)in T2 and T3 in Measures AST,ALT and Fructose significantly (p<_0.05).there was a significant (p<_0.05) decreased in the level of Na^+ and k^+. However the level of Zn was increased significantly(p_>0.05).The result showing that vitamin E and zinc doses to improved seminal plasma in shami male goat.

Keywords: vitamin E,Zn, seminal plasma ,Trace minerals , shami male Goat.

Introduction:

There is a good relationship between essential elements and seminal plasma enzyme. The seminal plasma, an extracellular fluid that provides the medium and vehicle for spermatozoa, is a composite mixture of secretions that come from the male accessory organs of reproduction, Biochemical estimates of seminal plasma are used for semen evaluation (1).

Vitamin E deficiency nutrients that can affect several biological process such as spermatogenesis and semen quality (2,3) and reproduction (4) Zn (zinc) Supplement improve semen characteristics ,it plays an important role in the physiology of spermatozoa (5) and controls sperm motility (6). Zinc levels in seminal plasma have been positively associated with sperm concentration and motility (7).

Seminal plasma has been talented with antioxidant substances which crush the produce free radicals (8). AST, ALT enzymes, fructose, Na^{+},k^{+},Ca^{+2} are essential for metabolic process which provide for survival motility and fertility of spermatozoa,Also calcium (Ca_2^{+}) is needed for stimulation of steroidogenesis in leydig cells of the testis (9)

However, the effect of specific seminal protein and semen characteristics is unavailable in shami goats. Therefore the major aim of this research is to view information on effect of vitamin E and Zn on seminal plasma enzymes and trace minerals of shami male goats in Iraq.

Materials and methods

The experiment was conducted from 3/2/2015 to 18/3/2015 in Iraq, in farm of ruminant research station /Abu - Graib / department of animal resources /public authority for agricultural research/ ministry of agriculture.

Nine shami male goats of similar age (2.5 year) and body weight 37 kg were divided randomly into three groups, First group T1 serves as a control second group given vitamin E 200 IU/animal/ week and third

group given Zn 75 mg/animal/ week for 45 days. Semen was collected using an artificial vagina once each 15 days through a period, The semen was collected every15days (15,30,45) and the following parameter was measured in semen plasma AST,ALT, Fructose, Na^+, k^+ and Zn also measured. The proportion of fructose was measured in semen plasma using the spectral analysis method described by the company Aracomex, and supports the principle of this analysis is that the fructose pink color when heated with resorcinol and the presence of hydrochloric acid can be measured in the manner and extent of spectral 546nm (10). Estimate the concentration of enzyme Glutamic Oxalate Transaminase: Saucepan (ALT) in plasma semen as instructed by the company bioassay system, America, which he described by Bergmeyer *et al* (11).The concentration of (ALT)was estimated in the plasma of semen as instructed by the company and the Canadian described by Ishiguro *et al* (12). Na^+, K^+ and Ca^{+2} were also measured by Micro light1 based on ion-exchanger colorimetric method (13) .

Statistical analysis

Data analysis was performed using SPSS software program (14) All values were expressed as Mean ± standard error of mean (S.E.M.). Spearman's correlation coefficient test was applied to examine the correlation between seminal plasma protein fractions with vitamin E and Zn of the semen. Differences were considered to be statistically significant at $P < 0.05$ under a liner model: $Yij = M+ti+pj+eijk$

Where

M=over all mean

Ti= Effect of vitamin E (200 IU)

Pj= Effect of Zn (75 mg).

Eijk: Random error

Results and discussion

The result of semen plasma parameters of nine shami male goats are summarized in Table (1).

Enzyme ALT,AST and Fructose were significantly increased (p>_0.05) between treatments ,this increase in treatment 2 and 3 may be due to the role of vitamin E and Zn

as a antioxidant factors (15) which could prevent from free radical and increase fructose level. Treated with vitamin E in the second treatment reduced oxidative stress because supportive the combat liver damage(16)

The value of seminal plasma composition Na^+ and K^+ showed in Table (1), the lowest seminal plasma concentration of Na^+, K^+ was recorded in shami male goats in T2 and T3.

Zamiri and Khodaei (17) showed that low levels of Na+ and K+ ions were associated with high percentage of motile sperm. This study suggest that the cation Na^+ and K^+ generally establish the osmotic balance, and seminal plasma osmolality ultimately plays an important role in the activation sperm cell also potassium ions (K^+) are intracellular cation.

The levels of Ca^{2+} were not significant differences between treatment groups as compared with control group, In this study, the effect of Zn supplementation on seminal plasma antioxidant enzymes and trace minerals were evaluated. The result of the present study indicated that Zn at the dose of 75 mg/ animal/ week produced optimum results regarding seminal plasma characteristics. The present results are in agreement with previous researchers who observed almost similar findings in goat (18) and bull. Furthermore,The increase in Zn in T3 due to supplementation of zinc(19).

Based on the present results, it is suggested that vitamin E 200 IU/animal/ week and zinc75 mg/ animal/ week doses was improved seminal plasma in shami male goat.

(Table 1) Effect of vitamin E and Zn in seminal plasma enzyme and minerals.

Factors affecting	AST UE/ML^3	ALT UE/ML^3	Fructose Mm/L	Na^+ Mg/dl	K^+ Mg/dl	Ca^{+2} Mg/dl	Zn mg
T1	13.70±0.37**A**	9.80±2.0**A**	55.79±5.06**A**	46. 60 ± 1.61**A**	14.45±1.23**A**	11.21±1.23	5.61±0.47**A**
T2	11.60±0.50**B**	10.96B±2.16**B**	58.61±6.21***A*B**	46.01±2.85**A**	13.12±1.72**B**	12.10±0.91	5.93±0.18**A**
T3	12.09±0.70**B**	11.65B±2.80**B**	56.12±4.21**B**	45.92±2.96 ***B***	13.67±1.86**B**	12.78±0.62	8.91±0.19**B**
M							

Averages bearing different letters within the same column means that there were significant differences (p<_0.05).

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تأثير استخدام فيتامين هـ والزنك في انزيمات البلازما المنوية واثرها على العناصر المعدنية في ذكور الماعز الشامي في العراق

زيد عماد حميد تقي زيني
قسم الانتاج الحيواني - كلية الزراعة – جامعة الكوفة – جمهورية العراق
zaide.zainy@uokufa.edu

المستخلص

فيتامين هـ والزنك هما من العناصر الغذائية المهمة التي تؤثر على نوعية السائل المنوي وتقلل الجذور الحرة واثارها الضارة او فقر نوعية السائل المنوي.

تسعة من الماعز الشامي بعمر متشابه 2.5 سنة وبوزن متقارب 37 كغم قسمت عشوائيا على ثلاثة مجاميع اعتبرت الأولى سيطرة ت1 والثانية ت2 أعطيت فيتامين ه 200 وحدة دولية/ حيوان / اسبوعيا – الأسبوع والثالثة ت3 أعطيت الزنك 75 ملغم / حيوان / اسبوعيا ولمدة 45 يوما حيث جمع السائل المنوي كل15 يوما اي في الايام (15و30و45)، تم قياس مستوى انزيمات AST,ALT والفركتوز وكل من العناصر المعدنية Na^+, k^+, Zn في بلازما السائل المنوي و اظهرت النتائج وجود فروقات معنوية (أ <0,05) في المجموعتين الثانية والثالثة في قياسات انزيمات AST,ALT والفركتوزوفي مستوى الصوديوم والبوتاسيوم ظهرت فروقات معنوية بينما الزنك ازداد معنويا (أ <0,05).

النتائج بينت ان فيتامين هـ والزنك حسنت البلازما المنوية لذكور الماعز الشامي.

الكلمات المفتاحية: فيتامين هـ ،الزنك ،العناصر المعدنية ،انزيمات البلازما المنوية ، ذكور الماعز الشامي