EFFECTS OF VITAMIN E AND SELENIUM ON LEUKOCYTE PROFILE AND REPRODUCETION PERFORMANCE IN AWASSI EWES

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المستخلص

استخدمت ثلاثون نعجة من سلالة العواسي في عمر 3 إلى 3.5 سنة ومتوسط وزن 50 ± 1.27 كغم وقسمت إلى ثلاث مجموعات متساوية (أ، ب و ج). حقنت المجموعة (أ) بـ 100 مل فيتامين "هـ" ثم بـ 200 مل بعد ثلاثة أيام. وحقنت المجموعة (ب) بـ 60 مل فيتامين "هـ" زائداً 2250 مكروغرام من السلينيوم ثم بـ 80 مل فيتامين "هـ" زائداً 300 مكروغرام سلينيوم بعد ثلاثة أيام. واعتبرت المجموعة (ج) مجموعة سيطرة. تم حقن الفيتامين والسلينيوم في عضلة الفخذ ولمدة أربعة أسابيع قبل وأربعة أسابيع بعد التلقيح. تم تحقيق تزامن الشياع باستخدام اسفنجات مهبلية مشبعة بالبروجسترون. تم عد خلايا الدم البيض والعد التفريقي لخلايا الدم البيض وقياس حجم الخلايا المتراصة (مكداس الدم). كما تم تسجيل نسبة الشياع والاخصاب والخصوبة وحجم الولدة ووزن الحملان.

كان العدد الكلي للخلايا البيض والخلايا اللمفية والآحادية والعدلات وكذلك حجم الخلايا التراكمي في المجموعتين المعالجتين (أ) و (ب) أعلى مقارنة بمجموعة السيطرة (ج).

أوضحت نتائج الأداء التناسلي أن نسبة الإخصاب والخصوبة وحجم الولدة كانت أعلى معنوياً ($P<0.05$) في المجموعتين (أ) و (ب) مقارنة بالمجموعة (ج). ولم يكن هنالك اختلافاً معنوياً ($P>0.05$) بين الثلاثة مجموعات في وزن الحملان.

تؤيد نتائج هذه الدراسة حقن النعاج بفيتامين (هـ) وعنصر السلينيوم لتحسين الأداء التناسلي.

Abstract

Thirty Awassi ewes, 3- 3.5 years old with mean body weight of 50 ± 1.27 kg, were divided into three equal groups (A, B and C). Animals in group A were injected with 100 ml of vitamin E (Vit E) and then 200ml three days later. Animals in group B were injected with 60ml vit E + 2250 microgram of Selenium (Se) followed by 80ml vit E and 3000 microgram Se three days later, group (C) ewes were kept as untreated control.

Vit E and Se were given intramuscularly (IM) four weeks before and four weeks after mating. Oestrus was synchronized by sponges impregnated with Progesterone. The total blood leukocyte counts (WBC) and differential white cell counts and packed cell volume (PCV) were determined at the end of the experiment. Data on oestrus synchronization, conception rate, fertility, litter size and lamb birth weight were analyzed.

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The WBC, lymphocytes, monocytes and neutrophils as well as PCV were significantly ($P<0.05$) higher in animals of group (A) and (B) compared to control group (C).
The conception rate, fertility and litter size were significantly ($P<0.05$) higher in both treated groups (A) and (B) compared to control group (C). no significant difference ($P >0.05$) in lamb weights was observed between the three experiment groups.
The findings of this study support the use of Vit. E and Se injections for improving productive performance.

Key words: Awassi Ewes. Vitamin E, Selenium. Reproductive performance.

Introduction

Many techniques have been developed to improve the reproductive trait of animals, including; artificial insemination (AI), hormonal treatments, superovulation and embryo transfer (Bearden and Fuguay., 1997). Some metabolic signals have also been used to stimulate gonadotrophic hormonal release (Hall *et al*., 1992) and specific nutrients to improve reproduction and growth (Lindsay et al., 1993; Foster, 1994; Marin and Walkry-Brown., 1995).

Vitamin E and Selenium are important nutrients that act synergistically to enhance many biological processes in the body, such as immunity (Reddy *et al.* 1987; Hemken et al., 1998) and metabolism (Awadeh e*t al*., 1998) and improve reproductive performance (Jerry, 1996). Both nutrients improve spermatogenesis and semen qualities (Marin-Guzman *et al.*, 1997; Brzezinsks-Slebodzinska *et al.*, 1995).

The objective of this study was to evaluate the effect of vitamin E alone or with Se. on haematological parameters and reproductive performance in Awassi ewes.

Materials and Methods

Animals:

Thirty Awassi ewes aged 3 – 3.5 years with mean body weight of 50± 1.27 kg were used. They were kept in semi closed barns and maintained mainly on natural pasture grazing. Each animal received 500 g daily concentrate supplement consisting of barley (60%), wheat barn (18.5%), cotton seed cake (20%), calcium (1%) and sodium chloride (0.5%) which provided 12.5% crude protein. Water was provided ad lib.

Experimental design:

The animals were randomly divided into three equal groups of ten ewes each (A, B & C). each animal in group A was injected intramuscularly with 100 ml of Vit-E and three days later with 200 ml of the vitamin. Group B ewes were each injected with 60 ml Vit-E plus 2250 micrograms Se and three days later with 80 ml Vit-E and 300 micrograms Se. animals of group C were kept as untreated control.

The vitamin and Se were administered for 8 weeks (4 weeks before and 4 weeks after mating).

Oestrus synchronization and mating:

Oestrus was synchronized by intravaginal sponges impregnated with Progestrone (40 mg Medoxy progesterone, Inter Vet-Holland) for 11 days. Synchronized oestrus was detected by introducing vasectomized rams twice a day at early morning and early evining. Then three health rams 2.5 - 3.0 years old with mean body weight of 50 ± 0.75 Kg were introduced for mating the ewes (one ram for 10 ewes).

Reproductive performance:

This was evaluated by recording conception rate, fertility, litter size. And lamb birth weight.

Haematological methods:
Total leukocyte count (WBC), Differential leukocyte count (DLC) and packed cell volume (PCV) were determined using autoanalyzer (Sysmex).

Statistical Analysis:
The record data was subjected to statistical analysis using (ANOVA) as analytical technique and (LSD) was used to determine the difference between the means (Sat Soft, Inc., 1995).

Results and Discussion

The reproductive performance of the experimental ewes can be seen in table (1). Hundred percent synchronization was achieved and all ewes were mated. All ewes in group A (injected with Vit-E) and group B (injected with Vit-E an Se) lambed with 100% conception rate, while 8 ewes in group C (receiving no treatment) lambed with 80% conception rate. This may indicate that Vit- E and Se maintain and improve fertility. Vit- E and Se, as antioxidants, may protect gonadotrophic hormone receptors form oxidation with subsequent elevation of oestrogen secretion (Sergerson *et al.*, 1980) which is important for follicular development. Gabryszuk and Klewiec (2002) reported that two consecutive injections of Se before mating and lambing significantly increased incidence of oestrus and fertility of 3 years old ewes and also increased lamb weight gain.

Table 1: Effects of vit-E and vit-E+ Se on the reproductive performance of ewes.

Treatment Group	Number of Ewes	% Oestrus response	Number of Ewes mated	Number of Ewes Lambed	Fertility rate (%)
C (Control)	10	100_{a}	10_{a}	8_{a}	80_{a}
A (Vit- E)	10	100_{a}	10_{a}	10_{b}	100_{b}
B (Vit- E +Se)	10	100_{a}	10_{a}	10_{b}	100_{b}

Means within the same column bearing different superscripts are significantly different ($P<0.05$)

The lambing data obtained (table 2) shows that group B ewes (receiving both Vit-E and Se injections) had significantly ($P<0.05$) higher lambing rate (140%) and litter size (1.4) compared to the other groups A and C. This result may be attributed to the effect of Vit-E and Se on oestrogen secretion and follicular development (Bearden and Fuquay, 1997) and hence on oestrus, fertility, conception and lambing rates and twining (Malecki *et al.*, 2002; Koyuncu and Yerlikaya, 2007; El-Shahat and Abdel Monem, 2011). No significant difference ($P > 0.05$) in birth weight of lambs has been obtained here. However, Vit-E and Se supplimintation has been reported to improve birth weight and daily weight gain of lambs borne from treated ewes (Gabryszuk and Klewiec, 2002; El Shahat and Abdel Monem 2011; Soliman *et al.*, 2012).

Table 2: Lambing data of different treatment groups.

Treatment Group	No. of ewes	No. of Lambs born	Lamb weight (mean ± SE)at birth	Lambing rate (%)	Litter size
C (Control)	10	8 a	4.11±0.21 a	8 0 a	0.8
A (Vit- E)	10	10 b	4.64±0.25 a	100 b	1.0
B (Vit- E +Se)	10	14 c	4.13±0.43 a	140 c	1.4

Means within the same column bearing different superscripts are significantly different (P<0.05)

Values of PCV, WBC and DLC for ewes in the three treated groups are shown in table (3). These represent mean values of the blood samples obtained once at the end of the experiment. However, significantly (P<0.05) higher PCV, WBC, Lymphocyte, Neutrophil and Monocyte counts (especially if viewed as absolute values) were obtained for the Vit-E or Vit-E / Se treated groups as compared to untreated controls. The increase in WBC and the other leukocyte fractions may indicate increased immunological responses (Meydani, 1990; Shinde *et al.*, 2007). Leukocyte count could be an important index for judging health status and may be adopted for assessing physiological changes related to stress, pregnancy and immune responses (Bike 2003).

Table 3: Mean values (± S E) for PCV, WBC & DLC of ewes in different treatment groups

Treatment Group	PCV (%)	WBC(X10/ ul) L	Lymphocyte (%)	Monocyte (%)	Neutrophil (%)	Eosinophils l (%)	Basophil (%)
C (Control)	32.35±0. 34 a	8180±8.2 a	39.13±0.3 3 a a	6.49±0.0 7a	48.54±0. 2 a	3.44±0.1 3 a	2.75±0.1 9 a
A (Vit- E)	36.37±1. 24 b	13 200±5.2 b	43.53±1.1 6 b	7.9±0.46 b	41.97±1. 0 b	4.01±0.bs a	2.66±0.3 2a
B (Vit- E +Se)	36.93±1. 40 c	16200±10.3 c	45.23±1.4 5 c	7.48±0.3 5 b	42.64±1. 35 b	2.08±0.3 1 a	1.49±0.2 3 a

Means within the same column bearing different superscripts are significantly different. (P<0.05).

In conclusion, the present results support the supplementation of Vit-E and Se for improving reproductive performance

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